received
6-12-07

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

07-81

c: Hoet
Lockard
McKenna
Glover
Holt
Reider
ENV file

June 7, 2007

Commander,
Radford Army Ammunition Plant
Attn: SJMRF-OP-EQ (Jim McKenna)
P.O. Box 2
Radford, VA 24141-0099

P.W. Holt
Environmental Manager
Alliant Techsystems, Inc.
Radford Army Ammunition Plant
P.O. Box 1
Radford, VA 24141-0100

Re: Radford Army Ammunition Plant, Va.
Review of Army's Final Site Screening Process Report for Solid Waste Management Units 13, 37, 38, 46, 57, 68, 69 and Areas of Concern A, F, Q.

Dear Mr. McKenna and Ms. Holt:

The U.S. Environmental Protection Agency (EPA) has reviewed the U.S. Army's (Army's) May, 2007 Final Site Screening Process Report for Solid Waste Management Units 13, 37, 38, 46, 57, 68, 69, and Areas of Concern A, F, Q, located at the Radford Army Ammunition Plant (RFAAP). Based upon our review, the report is approved, and in accordance with Part II. (E) (5) of RFAAP's Corrective Action Permit, it can now be considered final.

If you have any questions, please call me at 215-814-3413. Thanks.

Sincerely,

William Geiger
RCRA Project Manager
General Operations Branch (3WC23)

cc: Russell Fish, EPA
James Cutler, VDEQ
Leslie Romanchik, VDEQ

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Customer Service Hotline: 1-800-438-2474

Radford Army Ammunition Plant
Route 114, P.O. Box 1
Radford, VA 24143-0100
USA

May 11, 2007

Mr. William Geiger
RCRA General Operations Branch, Mail Code: 3WC23
Waste and Chemicals Management Division
U. S. Environmental Protection Agency, Region III
1650 Arch Street
Philadelphia, PA 19103-2029

Subject: Site Screening Process Report for Solid Waste Management Units 13, 37, 38, 46, 57, 68, 69 and Areas of Concern A, F, Q Final May 2007
Radford Army Ammunition Plant Installation Action Plan
EPA ID# VA1 210020730

Dear Mr. Geiger:

Enclosed is one copy of the subject document. Your additional two copies and the certification will be sent under separate cover. Also under separate cover one copy each will be sent to the distribution below.

Please coordinate with and provide any questions or comments to myself at (540) 639-8658, Jerry Redder of my staff (540) 639-7536 or Jim McKenna, ACO Staff (540) 639-8641.

Sincerely,

P.W. Holt, Environmental Manager
Alliant Techsystems Inc.

c: Russell Fish, P.E., EPA Region III, 3WC23

Jim Cutler
Virginia Department of Environmental Quality
P. O. Box 10009
Richmond, VA 23240-0009

Durwood Willis
Virginia Department of Environmental Quality
P. O. Box 10009
Richmond, VA 23240-0009

E. A. Lohman
Virginia Department of Environmental Quality
West Central Regional Office
3019 Peters Creek Road
Roanoke, VA 24019

07-815-99
JMcKenna

Rich Mendoza
U.S. Army Environmental Command
1 Rock Island Arsenal
Bldg 90, 3rd Floor, Room 30A
IMAE-CDN
Rock Island, Illinois 61299

Dennis Druck
U.S. Army Center for Health Promotion and Preventive Medicine
5158 Blackhawk Road, Attn: MCHB-TS-REH
Aberdeen Proving Ground, MD 21010-5403

Tom Meyer
Corps of Engineers, Baltimore District
ATTN: CENAB-EN-HM
10 South Howard Street
Baltimore, MD 21201

Coordination: J. McKenna

bc: Administrative File
J. McKenna, ACO Staff
Rob Davie-ACO Staff
P. W. Holt
J. J. Redder
Env. File

07-815-99
JMcKenna

received
4-19-07

07-47

c: Holt
Lockard
Redder
Flint
McKenna
ENV file

COMMONWEALTH of VIRGINIA

L. Preston Bryant, Jr.
Secretary of Natural Resources

DEPARTMENT OF ENVIRONMENTAL QUALITY
Street address: 629 East Main Street, Richmond, Virginia 23219
Mailing address: P.O. Box 1105, Richmond, Virginia 23218
Fax (804) 698-4500 TDD (804) 698-4021
www.deq.virginia.gov

David K. Paylor
Director

(804) 698-4000
1-800-592-5482

April 13, 2007

Mr. Jim McKenna
Radford Army Ammunition Plant
Route 114, P.O. Box 1
Radford, Virginia 24143-0100

Re: Revised SSP Report, Radford Army Ammunition Plant

Dear Mr. McKenna:

The Virginia Department of Environmental Quality (VDEQ) has reviewed the Draft Revised Site Screening Process Report for SWMUs 13, 37, 38, 46, 57, 68, 69 and AOCs A, F, Q dated January 2007 and approves the report as revised. The VDEQ concurs that no further action is required for SWMUs 46, 68, 69 and AOC F.

Please contact me at (804) 698-4498 if you have any questions or comments regarding the above site.

James L. Cutler, Jr., CPG
Federal Facilities Project Manager

cc: Paige Holt, ATK
Will Geiger, US EPA Region 3
Durwood Willis, VDEQ
Norman Auldridge, VDEQ-WCRO



Geiger.William@epamail.epa.gov
05/02/2007 02:28 PM

To Tina_Devine@URSCorp.com, jim.mckenna@us.army.mil, jerome.redder@atk.com
cc James_O_Spencer@URSCorp.com
bcc
Subject Re: SSP Comments - Draft responses for call tomorrow

USEPA approves of the below responses to comments on the SSP report. Nancy and BTAG also sent their approval in separate emails, so the report can now be finalized. Thanks

William A. Geiger
USEPA Region III
1650 Arch Street
Philadelphia, PA 19103
(215)814-3413

Tina_Devine@URSCorp.com
04/24/2007 03:00 PM

To Mike Cramer/R3/USEPA/US@EPA
cc James_O_Spencer@URSCorp.com, William Geiger/R3/USEPA/US@EPA
Subject SSP Comments - Draft responses for call tomorrow

Good afternoon. Here are my responses to your comments and a copy of a updated revision key per your comments. We can discuss them further tomorrow at 8:30.

1. For EPA's comment number 1, I was unable to determine if Subsection 6.6.4 had been changed based on EPA's comments and the facility's response to those comments. When I read the subsection, the requested changes, which the facility said they made, are not apparent to me. Changes in other subsections are noted in the margin, underlined, or crossed out.

Response: The Subsection should be 6.6.5 not 6.6.4.

2. For EPA's comment number 7, I was unable to determine if Subsection 3.3.7 and all preliminary wildlife risk characterization tables have been revised.

Response: Original Section 3.3.7.1 describing the pre-screen was removed. Wildlife food chain modeling tables were revised to include all bioaccumulative chemicals (track

changes are not available for excel spreadsheets.)

3. For EPA's comment number 8, I was unable to determine if the changes were made.

Response: The pre-screen was eliminated and tables provide occurrence distribution information. Tables 4-19, 4-22, 4-24, 5-26, 5-28, 5-30, 6-10, 7-11, 8-11, 9-13, 10-9, and 11-10.

4. Unable to locate the Section 5.7.5 referred to in EPA comment 18.

Response: The section should be 5.7.4 not 5.7.5.

5. Unable top locate Section 5.7.4.1 (former Section 5.7.5.1) referred to in EPA comment 19.

Response: The section should be 5.7.3.5 not 5.7.4.1.

6. Unable to determine what the Chromium MDC is. Can't determine if it was corrected.

Response: The chromium MDC on Table 5-39 was changed from 114 mg/kg to 82 mg/kg.

7. Cannot determine if the replaced picture for SWMU 68 is accurate for EPA comment 22.

Response: Previous Response (May 2005)The area shown in the photograph contains sparse vegetation due to traffic unrelated to SWMU 68. The parallel tracks are due to wear from tires. The photograph in the report will be replaced with a photograph of SWMU 68 that is more representative of site conditions. SWMU 68 photograph replaced.

8. EPA's comment 26 refers to Section 6.6.4. Although this section does not appear to have changed, Section 6.6.5, which is not listed in the description of revisions section of the document revision key, does have the revisions which were listed for section 6.6.4.

Response: Section should be 6.6.5 not 6.6.4.

9. For EPA's comment 27, I was unable to determine if the proposed changes had been made.

Response: On Table I-16, Body weights for receptors revised. The American robin body weight was changed from 0.8 to 0.08 kg and the short-tailed shrew was changed from 0.22 to 0.022 kg.

10. The VADEQ comments were repetitive of EPA's comments, except for numbers 2 and 3.

Response: No response required.

(See attached file: SSP Report Comment Key revised per comments.doc)
I look forward to talking to you tomorrow. Have a great day.

Sincerely,

Tina DeVine
URS Corporation
(804)474-5448

This e-mail and any attachments are confidential. If you receive this message in error or are not the intended recipient, you should not retain, distribute, disclose or use any of this information and you should destroy the e-mail and any attachments or copies.

(See attached file: SSP Report Comment Key revised per comments.doc)



SSP Report Comment Key revised per comments.doc



Davis.Katie@epamail.epa.gov
04/26/2007 01:41 PM

To Tina_Devine@URSCorp.com, john_mccloskey@fws.gov, pluta.bruce@epa.gov
cc James_O_Spencer@URSCorp.com, Geiger.William@epamail.epa.gov
bcc
Subject Re: Radford Army Ammunition Plant - SSP Comments

Tina,
The BTAG approves of the Revised Text.
Thank you,
Katie

Katie Davis
US EPA, 3HS41
1650 Arch Street
Philadelphia, PA 19103-2029
phone 215-814-3358
fax 215-814-3015
davis.katie@epa.gov

Tina_Devine@URSCorp.com
04/24/2007 01:51 PM

To Katie Davis/R3/USEPA/US@EPA
cc James_O_Spencer@URSCorp.com, William Geiger/R3/USEPA/US@EPA
Subject Radford Army Ammunition Plant - SSP Comments

Good afternoon. I am trying to keep the ball rolling with the SSP Report and hope to submit the final report next week, so I wanted to address your comment and get some feedback as to whether it is acceptable prior to submitting the final report.

Comment
In response to your request, representatives of the BTAG have completed the review of the subject document. The response to the follow-up to comment 18 states that a toxicity assessment of calcium may be conducted. This statement should be more definitive. A toxicity assessment should be conducted to demonstrate whether or not the high levels of calcium could have a negative impact on receptors.

Current Text - Section 5.4.7

Upon further investigation of the sites, a toxicity assessment due to the elevated levels of calcium in SWMU 37 may be conducted.

Revised Text - Section 5.4.7

If sludge is to remain in place (i.e., no sludge removal of the drying bed is proposed at the site as a corrective measure), a toxicity assessment due to the elevated levels of calcium in SWMU 37 will be conducted.

Let me know if this is acceptable. Please don't hesitate to contact me with any questions. Have a great day.

Sincerely,

Tina DeVine
URS Corporation
(804)474-5448

This e-mail and any attachments are confidential. If you receive this message in error or are not the intended recipient, you should not retain, distribute, disclose or use any of this information and you should destroy the e-mail and any attachments or copies.



Rios-Jafolla.Nancy@epamail.epa.gov
04/25/2007 12:19 PM

To Tina_Devine@URSCorp.com
cc James_O_Spencer@URSCorp.com, Geiger.William@epamail.epa.gov, Thomson.Bob@epamail.epa.gov
bcc
Subject Re: Radford Army Ammunition Plant - SSP Report

Tina,

I agree with the responses to comments. Note, however, for comment 1 that the strikeout is applicable to new Work Plans.

I have no further comments at this time. Please let me know if you need further assistance with this site.

cc: EJohnson (3HS41)

Tina_Devine@URSCorp.com
04/24/2007 01:51 PM

To Nancy Rios-Jafolla/R3/USEPA/US@EPA
cc William Geiger/R3/USEPA/US@EPA, James_O_Spencer@URSCorp.com
Subject Radford Army Ammunition Plant - SSP Report

Good afternoon. I am trying to keep the ball rolling with the SSP Report and hope to submit the final report next week, so I wanted to address your comment and get some feedback as to whether it is acceptable prior to submitting the final report.

Commments

1. Note that it was previously agreed that the 95%UTL is not an appropriate screening background parameter. An alternate background parameter is the 95%UPL. While it was agreed that the 95%UTL will be used for ongoing risk assessments, the revised Work Plan for Radford should incorporate updated background approaches for the site for upcoming risk assessments. Only applicable to new Work Plans. This is an old SSP

Report.

Response: The strikeout and comment was provided by either Rob Thomson or Will Geiger.
Therefore no reponse required.

2. There are new TEFs for dioxins, WHO 2005, that should be used. The
WHO 1998 TEFs can be used in the uncertainty analysis.

Response: Table 4-8 (attached below) was revised to include the WHO 2005 TEFs for Dioxins. The resulting TEQ of 2.14E-06 was below the adjusted R-RBC (4.6 E-06) and I-RBC (1.9E-05).

(See attached file: RFAAP SSP Report Revised Dioxin Table.xls)

3. There is a new RfD for Iron of 7E-01 mg/kg/day that should be considered further. Refer to the April 2007 RBC table.

Response: The updated RfD for iron resulted in higher RBCs for the chemical. Upon further consideration, the new RBC would not result in a change in the inclusion or exclusion of the chemical for the sites.
The revised RBCs (April 2007) will be considered in future workplans and RFIs for SSP sites.

4. The site-specific SSLs for soil-to-groundwater should be reviewed by
the hydrogeologist if they have not been previously reviewed.

Response: Mike Cramer also reviewed and provided comment on the SSP Report.

Let me know if these responses are acceptable. Please don't hesitate to contact me with any questions. Have a great day.

Sincerely,

Tina DeVine
URS Corporation
(804)474-5448
(See attached file: RFAAP SSP Report Revised Dioxin Table.xls)



RFAAP SSP Report Revised Dioxin Table.xls

Tina Devine/Richmond/URSCorp
05/03/2007 11:05 AM

To Tina Devine/Richmond/URSCorp
cc
bcc
Subject Fw: SSP Comments

-----Original Message-----
From: Geiger.William@epamail.epa.gov [mailto:Geiger.William@epamail.epa.gov]

Sent: Friday, April 20, 2007 1:35 PM
To: McKenna, Jim Mr. RFAAP ACO Staff; jerome.redder@atk.com
Subject: SSP Comments

In the interest of keeping things moving, I am forwarding you guys the rough draft of EPA comments on the January Site Screening Process report that Rob Thomson sent up to me. I've only been able to look over them briefly, but most of the comments seem to be from Mike Cramer. If you guys (or your consultants) can answer any of his questions, feel free to contact him next week while I am away and discuss. Jim Cutler also has a copy. Russ should be around as well if you need immediate assistance. I'll be in touch the following week. Thanks

(See attached file: BTAG review of revised SSP SWMU 13 27 28 46 et al.wpd) (See attached file: Tox review of revised SSP SWMU 13 27 28 46 et al.wpd) (See attached file: Hydro review of revised SSP SWMU 13 27 28 46 et al.wpd)

William A. Geiger
USEPA Region III
1650 Arch Street
Philadelphia, PA 19103
(215)814-3413


BTAG review of revised SSP SWMU 13 27 28 46 et al.wpd


Tox review of revised SSP SWMU 13 27 28 46 et al.wpd


Hydro review of revised SSP SWMU 13 27 28 46 et al.wpd

April 18, 2007

SUBJECT: Site Screening Process Report for Solid Waste Management Units 13, 37, 38, 46, 57, 68, 69, and Areas of Concern A, F, Q; Radford Army Ammunition Plant, Blacksburg, Virginia; January 2007

FROM: Bruce R. Pluta, Coordinator
Biological Technical Assistance Group

TO: Robert G. Thomson, Jr.(3HS11)
NPL/BRAC Federal Facilities Branch

In response to your request, representatives of the BTAG have completed the review of the subject document. The response to the follow-up to comment 18 states that a toxicity assessment of calcium may be conducted. This statement should be more definitive. A toxicity assessment should be conducted to demonstrate whether or not the high levels of calcium could have a negative impact on receptors. We appreciate the opportunity to provide continuing support on this project.

Thank you for the opportunity to review this document. Please contact Katie Davis at x3358 if you have questions or wish to discuss these comments.

Nancy Rios-Jafolla/R3/USEPA/US
04/13/2007 05:06 PM To
Bob Thomson/R3/USEPA/US@EPA
cc

bcc

Subject
Radford Army Ammunition Plant- SWMUs 13, 37, 38, 46, 57, 68, 69 and Areas of Concern A, F, and Q, Draft revised January 2007 SSP Report, Review of the Army's January 31, 2007 response to comments

I have reviewed the subject document and have just a few comments that should be considered further:

1. ~~Note that it was previously agreed that the 95%UTL is not an appropriate screening background parameter. An alternate background parameter is the 95%UPL. While it was agreed that the 95%UTL will be used for ongoing risk assessments, the revised Work Plan for Radford should incorporate updated background approaches for the site for upcoming risk assessments.~~ Only applicable to new Work Plans. This is an old SSP Report.
2. There are new TEFs for dioxins, WHO 2005, that should be used. The WHO 1998 TEFs can be used in the uncertainty analysis.
3. There is a new RfD for Iron of 7E-01 mg/kg/day that should be considered further. Refer to the April 2007 RBC table.
4. The site-specific SSLs for soil-to-groundwater should be reviewed by the hydrogeologist if they have not been previously reviewed.

I have no further comments at this time. Please let me know if you need further assistance with this site.
cc: EJohnson (3HS41)

DRAFT

RAAP SWMU 31 Draft Soil Screening Process Report for SWMU 13, 37, 38, 46, 57, 68, 69, and AOC A, F, and Q dated January 2007 — 03/15/07

Michael P. Cramer
WCMD Technical Support Branch (3WC31)

Rob Thomson
RPM
HSCD, OFFRSA (3HS11)

This memo is in response to your requested review of the subject report by April, 17 2007.

EPA's comments included several requests for further site characterization, soil screening and other work.

I have used the document revision Key as a guide to the revisions.

1. For EPA's comment number 1, I was unable to determine if Subsection 6.6.4 had been changed based on EPA's comments and the facility's response to those comments. When I read the subsection, the requested changes, which the facility said they made, are not apparent to me. Changes in other subsections are noted in the margin, underlined, or crossed out.

2. For EPA's comment number 7, I was unable to determine if Subsection 3.3.7 and all preliminary wildlife risk characterization tables have been revised.

3. For EPA's comment number 8, I was unable to determine if the changes were made.

4. Unable to locate the Section 5.7.5 referred to in EPA comment 18.

5. Unable top locate Section 5.7.4.1 (former Section 5.7.5.1) referred to in EPA comment 19.

6. Unable to determine what the Chromium MDC is. Can't determine if it was corrected.

7. Cannot determine if the replaced picture for SWMU 68 is accurate for EPA comment 22.

8. EPA's comment 26 refers to Section 6.6.4. Although this section does not appear to have changed, Section 6.6.5, which is not listed in the description of revisions section of the document revision key, does have the revisions which were listed for section 6.6.4.

9. For EPA's comment 27, I was unable to determine if the proposed changes had been made.

10. The VADEQ comments were repetitive of EPA's comments, except for numbers 2 and 3. The changes for comments 2 and 3 were confirmed.

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Tina Devine/Richmond/URSCorp
04/24/2007 01:51 PM

To davis.katie@epa.gov
cc James O Spencer/Richmond/URSCorp@URSCORP, Geiger.William@epamail.epa.gov
bcc
Subject Radford Army Ammunition Plant - SSP Comments

Good afternoon. I am trying to keep the ball rolling with the SSP Report and hope to submit the final report next week, so I wanted to address your comment and get some feedback as to whether it is acceptable prior to submitting the final report.

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Current Text - Section 5.4.7

Upon further investigation of the sites, a toxicity assessment due to the elevated levels of calcium in SWMU 37 may be conducted.

Revised Text - Section 5.4.7

If sludge is to remain in place (i.e., no sludge removal of the drying bed is proposed at the site as a corrective measure), a toxicity assessment due to the elevated levels of calcium in SWMU 37 will be conducted.

Let me know if this is acceptable. Please don't hesitate to contact me with any questions. Have a great day.

Sincerely,

Tina DeVine
URS Corporation
(804)474-5448

This e-mail and any attachments are confidential. If you receive this message in error or are not the intended recipient, you should not retain, distribute, disclose or use any of this information and you should destroy the e-mail and any attachments or copies.

Tina
Devine/Richmond/URSCorp
04/24/2007 01:51 PM

To rios-jafolla.nancy@epa.gov
cc Geiger.William@epamail.epa.gov, James O Spencer/Richmond/URSCorp@URSCORP
bcc
Subject Radford Army Ammunition Plant - SSP Report

Good afternoon. I am trying to keep the ball rolling with the SSP Report and hope to submit the final report next week, so I wanted to address your comment and get some feedback as to whether it is acceptable prior to submitting the final report.

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Response: The strikeout and comment was provided by either Rob Thomson or Will Geiger.

Therefore no reponse required.

2. There are new TEFs for dioxins, WHO 2005, that should be used. The WHO 1998 TEFs can be used in the uncertainty analysis.

Response: Table 4-8 (attached below) was revised to include the WHO 2005 TEFs for Dioxins. The resulting TEQ of

2.14E-06 was below the adjusted R-RBC (4.6E-06) and I-RBC (1.9E-05).



RFAAP SSP Report Revised Dioxin Table.xls

3. There is a new RfD for Iron of 7E-01 mg/kg/day that should be considered further. Refer to the April 2007 RBC table.

Response: The updated RfD for iron resulted in higher RBCs for the chemical. Upon further consideration,

the new RBC would not result in a change in the inclusion or exclusion of the chemical for the sites.

The revised RBCs (April 2007) will be considered in future workplans and RFIs for SSP sites.

4. The site-specific SSLs for soil-to-groundwater should be reviewed by the hydrogeologist if they have not been previously reviewed.

Response: Mike Cramer also reviewed and provided comment on the SSP Report.

Let me know if these responses are acceptable. Please don't hesitate to contact me with any questions. Have a great day.

Sincerely,

Tina DeVine
URS Corporation
(804)474-5448

Table 4-8
Conversion of Dioxin Detections in Soil to Equivalents of 2,3,7,8-TCDD for SWMU 13
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID Sample Date		13SB9A-DUPS AVG 09/30/03		
Dioxin/Furans Method 8290	TEF[1]	mg/kg	Flags	2,3,7,8-TCDD Equivalents mg/kg
1,2,3,4,6,7,8,9-OCDD	0.0003	2.21E-03	J	6.63E-07
1,2,3,4,6,7,8,9-OCDF	0.0003	7.78E-06	J	2.33E-09
1,2,3,4,6,7,8-HpCDD	0.01	4.53E-05		4.53E-07
1,2,3,4,6,7,8-HpCDF	0.01	3.63E-06	J	3.63E-08
1,2,3,4,7,8,9-HpCDF	0.01	3.52E-07	J	3.52E-09
1,2,3,4,7,8-HxCDD	0.1	6.06E-07	J	6.06E-08
1,2,3,4,7,8-HxCDF	0.1	4.79E-07	J	4.79E-08
1,2,3,6,7,8-HxCDD	0.1	1.64E-06	J	1.64E-07
1,2,3,6,7,8-HxCDF	0.1	3.89E-07	J	3.89E-08
1,2,3,7,8,9-HxCDD	0.1	1.85E-06		1.85E-07
1,2,3,7,8,9-HxCDF	0.1	< 5.88E-07		--
1,2,3,7,8-PeCDD	0.03	4.21E-07	J	1.26E-08
1,2,3,7,8-PeCDF	1	2.79E-07	J	2.79E-07
2,3,4,6,7,8-HxCDF	0.1	3.73E-07	J	3.73E-08
2,3,4,7,8-PeCDF	0.3	3.70E-07	J	1.11E-07
2,3,7,8-TCDD	1	< 1.32E-07		--
2,3,7,8-TCDF	0.1	4.89E-07	A	4.89E-08
Total HpCDD	0	9.54E-05		--
Total HpCDF	0	8.94E-06		--
Total HxCDD	0	1.61E-05		--
Total HxCDF	0	5.25E-06		--
Total PeCDD	0	3.19E-06	J	--
Total PeCDF	0	2.89E-06	J	--
Total TCDD	0	6.06E-07	J	--
Total TCDF	0	4.10E-06		--
Total 2,3,7,8-TCDD Equivalents				2.14E-06

Notes:

[1] = Developed by the World Health Organization (2005). [Van den Berg, et al. Re-evaluation of Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like compounds. ToxSci Advance Access, 7 July 2006]
mg/kg = Milligram Per Kilogram

Tina Devine/Richmond/URSCorp
04/24/2007 03:00 PM

To Cramer.Mike@epamail.epa.gov
cc James O Spencer/Richmond/URSCorp@URSCORP, Geiger.William@epamail.epa.gov
bcc
Subject SSP Comments - Draft responses for call tomorrow

Good afternoon. Here are my responses to your comments and a copy of a updated revision key per your comments. We can discuss them further tomorrow at 8:30.

1. For EPA's comment number 1, I was unable to determine if Subsection 6.6.4 had been changed based on EPA's comments and the facility's response to those comments. When I read the subsection, the requested changes, which the facility said they made, are not apparent to me. Changes in other subsections are noted in the margin, underlined, or crossed out.

Response: The Subsection should be 6.6.5 not 6.6.4.

2. For EPA's comment number 7, I was unable to determine if Subsection 3.3.7 and all preliminary wildlife risk characterization tables have been revised.

Response: Original Section 3.3.7.1 describing the pre-screen was removed. Wildlife food chain modeling tables were revised to include all bioaccumulative chemicals (track changes are not available for excel spreadsheets.)

3. For EPA's comment number 8, I was unable to determine if the changes were made.

Response: The pre-screen was eliminated and tables provide occurrence distribution information. Tables 4-19, 4-22, 4-24, 5-26, 5-28, 5-30, 6-10, 7-11, 8-11, 9-13, 10-9, and 11-10.

4. Unable to locate the Section 5.7.5 referred to in EPA comment 18.

Response: The section should be 5.7.4 not 5.7.5.

5. Unable top locate Section 5.7.4.1 (former Section 5.7.5.1) referred to in EPA comment 19.

Response: The section should be 5.7.3.5 not 5.7.4.1.

6. Unable to determine what the Chromium MDC is. Can't determine if it was corrected.

Response: The chromium MDC on Table 5-39 was changed from 114 mg/kg to 82 mg/kg.

7. Cannot determine if the replaced picture for SWMU 68 is accurate for EPA comment 22.

Response: Previous Response (May 2005)The area shown in the photograph contains

sparse vegetation due to traffic unrelated to SWMU 68. The parallel tracks are due to wear from tires. The photograph in the report will be replaced with a photograph of SWMU 68 that is more representative of site conditions. SWMU 68 photograph replaced.

8. EPA's comment 26 refers to Section 6.6.4. Although this section does not appear to have changed, Section 6.6.5, which is not listed in the description of revisions section of the document revision key, does have the revisions which were listed for section 6.6.4.

Response: Section should be 6.6.5 not 6.6.4.

9. For EPA's comment 27, I was unable to determine if the proposed changes had been made.

Response: On Table I-16, Body weights for receptors revised. The American robin body weight was changed from 0.8 to 0.08 kg and the short-tailed shrew was changed from 0.22 to 0.022 kg.

10. The VADEQ comments were repetitive of EPA's comments, except for numbers 2 and 3.

Response: No response required.



SSP Report Comment Key revised per comments.doc

I look forward to talking to you tomorrow. Have a great day.

Sincerely,

Tina DeVine
URS Corporation
(804)474-5448

.

This e-mail and any attachments are confidential. If you receive this message in error or are not the intended recipient, you should not retain, distribute, disclose or use any of this information and you should destroy the e-mail and any attachments or copies.

Document Revision Key for SSP Report (January 2007)-Updated Per EPA Comments April 2007				
EPA Comment # **March 7, 2005 Comments Letter to RFAAP**	**Response to EPA Comment # RFAAP/URS June 1, 2005 Response Letter to EPA**	**EPA Response to Comments in RFAAP/URS June 1, 2005 Response Letter (November 9, 2005)**	**Location of Revision(s)**	**Description of Revision(s)**
1	1	--	Sections 4.9, 5.9, 7.9, 10.9 SWMU 46 – Sections 6.5 and 6.6.1.2, 6.6.45 Area F – Sections 11.5, 11.6.1.2, 11.6.4	Groundwater will be addressed as part of the RFI for SWMUs 13, 57, 37, 38, Areas A and Q. As part of additional work for SSP, groundwater was sampled at SWMU 46 (TCE and degradation products) and Area F (chromium and pesticides) refer to Sections 6 and 11 respectively. Groundwater sampling was not required for SWMUs 68 and 69.
2	2	--	Tables 4-3 through 4-5; Table 5-2 through 5-4; Table 6-2; Table 7-3; Table 8-3; Table 9-5; Table 10-1; Table 11-2	Data qualifiers added to tables.
3	3	--	Section 4.6.3.5; Sections 5.6.7.1, 5.6.7.2, 5.6.7.3; Section 6.6.7; Section 9.6.7; Section 10.6.6; Section 11.6.7	Text revised with regard to references to background comparisons.
4	4	--	--	No revisions necessary.
5	5	--	All cumulative risk and hazard tables.	Implemented use of one significant figure in risk and hazard estimates.
6	6	--	Section 6.7.1.1; Section 7.7.1.1; Section 8.7.1.1; and Section 9.7.1.1	Text revised to indicate that these sites may support some use (i.e., shelter and foraging) by some smaller species.
7	7	Follow-up to #7	Section 3.3.7 and all preliminary wildlife risk characterization tables	Original Section 3.3.7.1 describing the pre-screen was removed. All detected bioaccumulative chemicals, as listed on Table 4-2 in *Bioaccumulative Testing and Interpretation for the Purpose of Sediment Quality Assessment, Status and Needs*, EPA-823-R-00-001, February 2000, were included in food chain modeling.
8	8	--	~~Table 4-26; Tables 5-32 through 5-34; Table 6-12; and Table 7-13~~Table 4-19, 4-22, 4-24, 5-26, 5-28, 5-30, 6-10, 7-11, 8-11, 9-13, 10-9, and 11-10	The prescreen was eliminated and the Tables have been revised to serve as occurrence and distribution tables.
9	9	--	Section 1.0	Text added to address SWMUs 75 and 76.
10	10	--	--	No Action – Conference Call (6/16/2005) – the use of 95% UTL for background comparison, as described in the approved SSP workplan, is acceptable.
11	11	--	Section 3.3.4.1	Text revised to indicate correct sampling interval.

Document Revision Key for SSP Report (January 2007)-Updated Per EPA Comments April 2007				
EPA Comment # March 7, 2005 Comments Letter to RFAAP	**Response to EPA Comment # RFAAP/URS June 1, 2005 Response Letter to EPA**	**EPA Response to Comments in RFAAP/URS June 1, 2005 Response Letter (November 9, 2005)**	**Location of Revision(s)**	**Description of Revision(s)**
12	12	--	Section 3.3.7.2 (former Section 3.3.7.3) and all preliminary invertebrate risk characterization tables	Text revised to provide revised protocol and tables updated utilizing the revised screening value hierarchy accordingly.
13	13	--	--	No Action – For sites that failed the site screening process, bioavailability will be addressed in the proposed RFI.
14	14	--	--	No Action – For sites that failed the site screening process, bioavailability will be addressed in the proposed RFI.
15	15	--	Section 4.6.1.3	Text revised to indicate that the model predicted that the probability of children expected to have blood levels of 10 micrograms per deciliter or greater exceeded the SSP threshold of 5%.
16	16	Follow-up to #16	Table 4-30	Table was revised utilizing BTAG Sediment Screening Values (2004).
17	17	--	Section 5.9	Groundwater to be addressed in proposed RFI.
18	18	Follow-up to #18	Section 5.7.~~5~~4	Upon further investigation, a toxicity assessment of calcium at SWMU 37 may be conducted as part of the proposed RFI.
19	19	Follow-up to #19	Section ~~5.7.4.1~~5.7.3.5 (former Section 5.7.5.1)	Area Use Factors for SWMUs 37, 38, and Area Q were calculated using the sum of the site areas to the average home range of the receptor.
20	20	--	Table 5-39	Chromium MDC corrected from 114 mg/kg to 82 mg/kg.
21	21	--	Section 7.7.5	Conclusion revised to propose additional assessment.
22	22	--	Section 8.0	Previous Response (May 2005)The area shown in the photograph contains sparse vegetation due to traffic unrelated to SWMU 68. The parallel tracks are due to wear from tires. The photograph in the report will be replaced with a photograph of SWMU 68 that is more representative of site conditions. SWMU 68 photograph replaced.
23	23	--	--	No Action – Conference Call (6/16/2005) – NFA acceptable for SWMU 69
24	24	--	Section 10.5 and 10.9	Additional samples (5 soil) analyzed for full suite of chemicals; conclusion revised to propose RFI.
25	25	--	Section 11.5, 11.6.1.2, 11.6.4, 11.6.7	Three additional soil samples from a boring advanced within the ditch were analyzed for the full suite of chemicals. Based on the results of the existing and additional soil samples for the site, one groundwater sample was collected and analyzed for chromium and pesticides.

Document Revision Key for SSP Report (January 2007)-Updated Per EPA Comments April 2007				
EPA Comment # **March 7, 2005 Comments Letter to RFAAP**	**Response to EPA Comment # RFAAP/URS June 1, 2005 Response Letter to EPA**	**EPA Response to Comments in RFAAP/URS June 1, 2005 Response Letter (November 9, 2005)**	**Location of Revision(s)**	**Description of Revision(s)**
26	26	--	Sections 4.9, 5.9, 7.9, 10.9 SWMU 46 – Sections 6.5 and 6.6.1.2, 6.6.45, 6.6.7 Area F – Sections 11.5, 11.6.1.2, 11.6.4, 11.6.7	For sites that exceeded the T-RBC based site specific SSLs (SWMU 13, SWMU 57, SWMU 37, SWMU 38, Area A) the soil-to-groundwater migration pathway will be addressed in the RFI. As part of additional work for SSP, groundwater was sampled at SWMU 46 (TCE and degradation product) and Area F (chromium and pesticides) refer to Sections 6 and 11 respectively.
27	27	--	Table 1-16, Appendix I – Wildlife Receptor Profiles	Body weights for receptors revised. The American robin body weight was changed from 0.8 to 0.08 kg and the short-tailed shrew was changed from 0.22 to 0.022 kg.

Document Revision Key for SSP Report (January 2007)			
VDEQ Comment # March 29, 2005 Comments Letter to RFAAP	**Response to VDEQ Comment # RFAAP/URS June 1, 2005 Response Letter to VDEQ**	**Location of Revision(s)**	**Description of Revision(s)**
1	1	Sections 4.9, 5.9, 7.9, 10.9 SWMU 46 – Sections 6.5 and 6.6.1.2, 6.6.4, 6.6.7 Area F – Sections 11.5, 11.6.1.2, 11.6.4, 11.6.7	Groundwater will be addressed as part of the RFI for SWMUs 13, 57, 37, 38, Areas A and Q. As part of additional work for SSP, groundwater was sampled at SWMU 46 (TCE and degradation products) and Area F (chromium and pesticides) refer to Sections 6 and 11 respectively. Groundwater sampling was not required for SWMUs 68 and 69.
2	2	Section 5.9	RFI recommended for SWMUs 37, 38 and Area Q to include PCBs.
3	3	Section 7.9	RFI recommended for SWMU 57 including soil and groundwater.
4	4	--	No Action – Conference Call (6/16/2005) - NFA acceptable for SWMU 69
5	5	Section 10.5 and 10.9	Additional samples (5 soil) analyzed for the full suite of chemicals; conclusion revised to propose RFI.
6	6	Section 11.5, 11.6.1.2, 11.6.4, 11.6.7	Three additional soil samples from a boring advanced within the ditch were analyzed for the full suite of chemicals. Based on the results of the existing and additional soil samples for the site, on groundwater sample was collected and analyzed for chromium and pesticides.

Radford Army Ammunition Plant
Route 114, P.O. Box 1
Radford, VA 24143-0100
USA

January 31, 2007

Mr. Robert Thomson
U. S. Environmental Protection Agency
Region III
1650 Arch Street
Philadelphia, PA 19103-2029

Subject: Site Screening Process Report for Solid Waste Management Units 13, 37, 38, 46, 57, 68, 68, and Areas of Concern A, F, Q, Draft, January 2007
Radford Army Ammunition Plant Installation Action Plan
EPA ID# VA1 210020730

Dear Mr. Thomson:

Enclosed is one copy of the subject document. Your additional four copies will be sent under separate cover. Also under separate cover one copy each will be sent to the distribution below.

Per your letter dated January 27, 2006 the agreed upon fieldwork and document revision was performed in calendar year 2006. Per our October 4, 2006 meeting the revisions are shown in track changes to facilitate your review.

Please coordinate with and provide any questions or comments to myself at (540) 639-8658, Jerry Redder of my staff (540) 639-7536 or Jim McKenna, ACO Staff (540) 639-8641.

Sincerely,

P.W. Holt, Environmental Manager
Alliant Techsystems Inc.

c: Russell Fish, P.E., EPA Region III

Jim Cutler
Virginia Department of Environmental Quality
P. O. Box 10009
Richmond, VA 23240-0009

Durwood Willis
Virginia Department of Environmental Quality
P. O. Box 10009
Richmond, VA 23240-0009

E. A. Lohman
Virginia Department of Environmental Quality
West Central Regional Office
3019 Peters Creek Road
Roanoke, VA 24019

07-815-24
JMcKenna

Rich Mendoza
U.S. Army Environmental Command
1 Rock Island Arsenal
Bldg 60, 3rd Fl, NW Wing
Room 320 (IMAE-CDN)
Rock Island, Illinois 61299

Karen Colmie
U.S. Army Environmental Command, Office of Counsel
Beal Road, Bldg E4460
Aberdeen Proving Ground, MD 21010-5401

Dennis Druck
U.S. Army Center for Health Promotion and Preventive Medicine
5158 Blackhawk Road, Attn: MCHB-TS-REH
Aberdeen Proving Ground, MD 21010-5403

Tom Meyer
Corps of Engineers, Baltimore District
ATTN: CENAB-EN-HM
10 South Howard Street
Baltimore, MD 21201

bc: Administrative File
J. McKenna, ACO Staff
Rob Davie-ACO Staff
C. A. Jake
J. J. Redder
Env. File

Coordination: J. McKenna

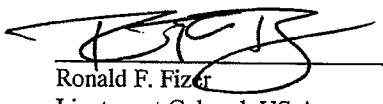
07-815-24
JMcKenna

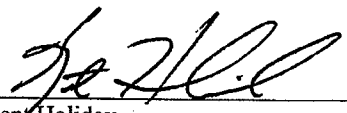
Concerning the following:

Radford Army Ammunition Plant
Site Screening Process Report for Solid Waste Management Units
13, 37, 38, 46, 57, 68, 68, and Areas of Concern A, F, Q
Draft, January 2007

Radford Army Ammunition Plant

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

SIGNATURE: 
PRINTED NAME: Ronald F. Fizer
TITLE: Lieutenant Colonel, US Army
Commanding Officer

SIGNATURE: 
PRINTED NAME: Ken Holiday
TITLE: Vice President and General Manager
ATK Energetics Systems Division

07-815-24
JMcKenna

Document Revision Key for SSP Report (January 2007)				
EPA Comment # March 7, 2005 Comments Letter to RFAAP	**Response to EPA Comment # RFAAP/URS June 1, 2005 Response Letter to EPA**	**EPA Response to Comments in RFAAP/URS June 1, 2005 Response Letter (November 9, 2005)**	**Location of Revision(s)**	**Description of Revision(s)**
1	1	--	Sections 4.9, 5.9, 7.9, 10.9 SWMU 46 – Sections 6.5 and 6.6.1.2, 6.6.4 Area F – Sections 11.5, 11.6.1.2, 11.6.4	Groundwater will be addressed as part of the RFI for SWMUs 13, 57, 37, 38, Areas A and Q. As part of additional work for SSP, groundwater was sampled at SWMU 46 (TCE and degradation products) and Area F (chromium and pesticides) refer to Sections 6 and 11 respectively. Groundwater sampling was not required for SWMUs 68 and 69.
2	2	--	Tables 4-3 through 4-5; Table 5-2 through 5-4; Table 6-2; Table 7-3; Table 8-3; Table 9-5; Table 10-1; Table 11-2	Data qualifiers added to tables.
3	3	--	Section 4.6.3.5; Sections 5.6.7.1, 5.6.7.2, 5.6.7.3; Section 6.6.7; Section 9.6.7; Section 10.6.6; Section 11.6.7	Text revised with regard to references to background comparisons.
4	4	--	--	No revisions necessary.
5	5	--	All cumulative risk and hazard tables.	Implemented use of one significant figure in risk and hazard estimates.
6	6	--	Section 6.7.1.1; Section 7.7.1.1; Section 8.7.1.1; and Section 9.7.1.1	Text revised to indicate that these sites may support some use (i.e., shelter and foraging) by some smaller species.
7	7	Follow-up to #7	Section 3.3.7 and all preliminary wildlife risk characterization tables	All detected bioaccumulative chemicals, as listed on Table 4-2 in *Bioaccumulative Testing and Interpretation for the Purpose of Sediment Quality Assessment, Status and Needs*, EPA-823-R-00-001, February 2000, were included in food chain modeling.
8	8	--	Table 4-26; Tables 5-32 through 5-34; Table 6-12; and Table 7-13	Tables have been revised to serve as occurrence and distribution tables.
9	9	--	Section 1.0	Text added to address SWMUs 75 and 76.
10	10	--	--	No Action – Conference Call (6/16/2005) – the use of 95% UTL for background comparison, as described in the approved SSP workplan, is acceptable.
11	11	--	Section 3.3.4.1	Text revised to indicate correct sampling interval.
12	12	--	Section 3.3.7.2 (former Section 3.3.7.3) and all preliminary invertebrate risk characterization tables	Text revised to provide revised protocol and tables updated utilizing the revised screening value hierarchy accordingly.

Document Revision Key for SSP Report (January 2007)				
EPA Comment # March 7, 2005 Comments Letter to RFAAP	**Response to EPA Comment # RFAAP/URS June 1, 2005 Response Letter to EPA**	**EPA Response to Comments in RFAAP/URS June 1, 2005 Response Letter (November 9, 2005)**	**Location of Revision(s)**	**Description of Revision(s)**
13	13	--	--	No Action – For sites that failed the site screening process, bioavailability will be addressed in the proposed RFI.
14	14	--	--	No Action – For sites that failed the site screening process, bioavailability will be addressed in the proposed RFI.
15	15	--	Section 4.6.1.3	Text revised to indicate that the model predicted that the probability of children expected to have blood levels of 10 micrograms per deciliter or greater exceeded the SSP threshold of 5%.
16	16	Follow-up to #16	Table 4-30	Table was revised utilizing BTAG Sediment Screening Values (2004).
17	17	--	Section 5.9	Groundwater to be addressed in proposed RFI.
18	18	Follow-up to #18	Section 5.7.5	Upon further investigation, a toxicity assessment of calcium at SWMU 37 may be conducted as part of the proposed RFI.
19	19	Follow-up to #19	Section 5.7.4.1 (former Section 5.7.5.1)	Area Use Factors for SWMUs 37, 38, and Area Q were calculated using the sum of the site areas to the average home range of the receptor.
20	20	--	Table 5-39	Chromium MDC corrected.
21	21	--	Section 7.7.5	Conclusion revised to propose additional assessment.
22	22	--	Section 8.0	SWMU 68 photograph replaced .
23	23	--	--	No Action – Conference Call (6/16/2005) – NFA acceptable for SWMU 69
24	24	--	Section 10.5 and 10.9	Additional samples (5 soil) analyzed for full suite of chemicals; conclusion revised to propose RFI.
25	25	--	Section 11.5, 11.6.1.2, 11.6.4, 11.6.7	Three additional soil samples from a boring advanced within the ditch were analyzed for the full suite of chemicals. Based on the results of the existing and additional soil samples for the site, one groundwater sample was collected and analyzed for chromium and pesticides.
26	26	--	Sections 4.9, 5.9, 7.9, 10.9 SWMU 46 – Sections 6.5 and 6.6.1.2, 6.6.4, 6.6.7 Area F – Sections 11.5, 11.6.1.2, 11.6.4, 11.6.7	For sites that exceeded the T-RBC based site specific SSLs (SWMU 13, SWMU 57, SWMU 37, SWMU 38, Area A) the soil-to-groundwater migration pathway will be addressed in the RFI. As part of additional work for SSP, groundwater was sampled at SWMU 46 (TCE and degradation product) and Area F (chromium and pesticides) refer to Sections 6 and 11 respectively.
27	27	--	Table 1-16, Appendix I – Wildlife Receptor Profiles	Body weights for receptors revised.

Document Revision Key for SSP Report (January 2007)			
VDEQ Comment # March 29, 2005 Comments Letter to RFAAP	**Response to VDEQ Comment # RFAAP/URS June 1, 2005 Response Letter to VDEQ**	**Location of Revision(s)**	**Description of Revision(s)**
1	1	Sections 4.9, 5.9, 7.9, 10.9 SWMU 46 – Sections 6.5 and 6.6.1.2, 6.6.4, 6.6.7 Area F – Sections 11.5, 11.6.1.2, 11.6.4, 11.6.7	Groundwater will be addressed as part of the RFI for SWMUs 13, 57, 37, 38, Areas A and Q. As part of additional work for SSP, groundwater was sampled at SWMU 46 (TCE and degradation products) and Area F (chromium and pesticides) refer to Sections 6 and 11 respectively. Groundwater sampling was not required for SWMUs 68 and 69.
2	2	Section 5.9	RFI recommended for SWMUs 37, 38 and Area Q to include PCBs.
3	3	Section 7.9	RFI recommended for SWMU 57 including soil and groundwater.
4	4	--	No Action – Conference Call (6/16/2005) - NFA acceptable for SWMU 69
5	5	Section 10.5 and 10.9	Additional samples (5 soil) analyzed for the full suite of chemicals; conclusion revised to propose RFI.
6	6	Section 11.5, 11.6.1.2, 11.6.4, 11.6.7	Three additional soil samples from a boring advanced within the ditch were analyzed for the full suite of chemicals. Based on the results of the existing and additional soil samples for the site, on groundwater sample was collected and analyzed for chromium and pesticides.

received
2-1-06
#06-12

c: Holt
Glunt
Kelley
McKenna
ENV file

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

January 27, 2006

In reply
Refer to 3HS11

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Commander,
Radford Army Ammunition Plant
Attn: SIORF-SE-EQ (Jim McKenna)
P.O. Box 2
Radford, VA 24141-0099

Paige Holt
Environmental Manager
Alliant Techsystems, Inc.
Radford Army Ammunition Plant
P.O. Box 1
Radford, VA 24141-0100

Re: Radford Army Ammunition Plant, Radford, Virginia
SWMUs 13, 37, 38, 46, 57, 68, 69 and AOCs A, F, & Q
Draft *Site Screening Process Report*
Army's August 2005 *Proposal to Conduct Further Work*
Review of the Army's 11/28/05 response to EPA's 11/9/05 letter

Dear Mr. McKenna and Ms. Holt:

The U.S. Environmental Protection Agency (EPA) has reviewed the U.S. Army's (Army's) November, 28 2005 response to EPA's November 9, 2005 review letter concerning the Army's August 2005 *Proposal to Conduct Further Work* as a follow-up submittal to the Army's June 1, 2005 response to EPA's March 7, 2005 letter pertaining to the review of the Army's draft *Site Screening Process Report* (SSP Report) for the investigation of SWMUs 13, 37, 38, 46, 57, 68, 69 and Areas of Concern (AOCs) A, F, and Q, located at the Radford Army Ammunition Plant (RFAAP). Based upon that review, EPA finds the Army's response, along with the *Proposal to Conduct Further Work* to be acceptable. In accordance with Part II. (E)(5) of RFAAP's Corrective Action Permit, the *Site Screening Process Report* can now be finalized.

Please make the appropriate revisions to the draft *Site Screening Process Report* based upon the Army's responses, including the *Proposal to Conduct Further*

Work in the text of the final *SSP Report*, and proceed to finalize the *Site Screening Process Report*. Please forward **eleven** complete copies of the final *Site Screening Process Report* for the investigation of SWMUs 13, 37, 38, 46, 57, 68, 69 and Areas of Concern (AOCs) A, F, and Q to EPA for insertion into the project files.

If you have any questions, please call me at 215-814-3357.

Sincerely,

Robert Thomson

Robert Thomson, PE, REM
Federal Facilities Branch

cc: Russell Fish, EPA
Leslie Romanchik, VDEQ-RCRA
James Cutler, VDEQ-CERCLA

ATK
ALLIANT TECHSYSTEMS

Radford Army Ammunition Plant
Route 114, P.O. Box 1
Radford, VA 24143-0100
USA

November 28, 2005

Mr. Robert Thomson
U. S. Environmental Protection Agency
Region III
1650 Arch Street
Philadelphia, PA 19103-2029

Subject: Site Screening Process Report for SWMUs 13, 37, 38, 46, 57, 68, 69 and AOCs A, F, Q,
Draft September 2004, Radford Army Ammunition Plant,
EPA ID# VA1 210020730

Dear Mr. Thomson:

We have received your November 9, 2005 letter in response to our June 1, 2005 letter and proposal for resolving regulatory comments from your March 7, 2005 letter on the subject report.

First regarding the schedule, as you know the subject report cannot be revised with out obtaining additional data, which cannot be accomplished in 60 days. Also the task of data collection is dependent on a site visit and subsequent approval of ground water well locations by the EPA hydrogeologist. This site visit was originally scheduled for November 15 through 17, 2005 and is now tentatively scheduled for the week of November 28, 2005. We propose the schedule listed in Attachment 1 as the only effective means to forecast the uncertainties of when key actions will take place. Therefore we request an extension for providing the revised draft report in accordance with this schedule.

Second regarding the remaining regulatory comments our response is provided in Attachment 2.

Please coordinate with and provide any questions or comments to myself at (540) 639-8266, Jerry Redder of my staff (540) 639-7536 or Jim McKenna, ACO Staff (540) 639-8641.

Sincerely,

Paige Holt, Environmental Manager
Alliant Ammunition and Powder Company LLC

Enclosure

w/o enclosure
c: Russell Fish, P.E., EPA Region III

Jim Cutler
Virginia Department of Environmental Quality
P. O. Box 10009
Richmond, VA 23240-0009

Durwood Willis
Virginia Department of Environmental Quality
P. O. Box 10009
Richmond, VA 23240-0009

05-815-217
JMcKenna/JJRedder

E. A. Lohman
Virginia Department of Environmental Quality
West Central Regional Office
3019 Peters Creek Road
Roanoke, VA 24019

Tony Perry
U.S. Army Environmental Center
5179 Hoadley Road, Attn: SFIM-AEC-CDN
Aberdeen Proving Ground, MD 21010-5401

Karen Colmie Heckelman
U.S. Army Environmental Center, Office of Counsel
Beal Road, Bldg E4460
Aberdeen Proving Ground, MD 21010-5401

Dennis Druck
U.S. Army Center for Health Promotion and Preventive Medicine
5158 Blackhawk Road, Attn: MCHB-TS-REH
Aberdeen Proving Ground, MD 21010-5403

Steve Wood
Corps of Engineers, Baltimore District
ATTN: CENAB-EN-HM
10 South Howard Street
Baltimore, MD 21201

bc: Administrative File
J. McKenna, ACO Staff
Rob Davie-ACO Staff
P. W. Holt
J. J. Redder
Env. File

Coordination: J. McKenna

05-815-217
JMcKenna/JJRedder

Attachment 1

Proposed Schedule for Revised Site Screening Process (SSP) Report

Task	No. of Calendar Days after EPA/DEQ approval
Final EPA and VDEQ Concurrence on Additional Investigation Plan for SSP	Start, day 0
Complete Field Investigation and Sampling	60
Complete Laboratory Analysis	90
Complete Data Validation	111
Complete Risk Screening and Assessment	156
Internal Draft Report	177
Draft Report to USEPA and VDEQ per 11/09/2005 EPA letter	191

* EPA/VDEQ concurrence will occur after site visit at RFAAP scheduled for the week of November 28 – December 2, 2005.

Attachment 2
Responses to USEPA Comments on Additional Investigation Plan for SSP dated 9 November 2005

EPA Follow-up to Comment #7

Stated that the table showing the results of food chain modeling did not show all bioaccumulative chemicals the EPA BTAG recommends be evaluated. The Army response states that the chemicals evaluated by food chain modeling consisted of identified contaminants of potential ecological concern that were also bioaccumulative chemicals. However, even if a bioaccumulative compound does not exceed the direct toxicity screening value, a food chain evaluation must still be performed. Therefore, the current approach is unacceptable. All detected chemicals that are in Table 4-2 in *Bioaccumulative Testing and Interpretation for the Purpose of Sediment Quality Assessment, Status and Needs*, EPA-823-R-00-001, February 2000 are considered bioaccumulative chemicals and should be evaluated as part of the food chain modeling.

RFAAP Response

The food chain modeling presented in the SSP report will be revised to include all detected bioaccumulative chemicals in the above referenced USEPA table. Comment noted for future submittals.

EPA Follow-up Comment #16

Stated that the sources of the Freshwater Sediment Screening Values should be provided in Table 4-27. The Army response states that the sources would be provided. Please note that EPA Region 3 BTAG has developed new freshwater sediment screening values that are available on the EPA Region 3 website (www.epa.gov/reg3hwmd/risk/eco/index.htm). These freshwater sediment values should be incorporated into future evaluations.

RFAAP Response

Comment noted for future evaluations and submittals.

EPA Follow-up Comment #18

Stated that SWMU 37 received calcium sulfate sludge, and the concentrations of calcium are extremely elevated (i.e., 106,000 mg/kg at SWMU 37) in the soil. The EPA BTAG recommended that the potential risk from this elevated calcium should be evaluated, even though calcium is considered a nutrient, since nutrients at high enough concentrations can be toxic. The Army response states that a quantitative assessment is not appropriate since published toxicity data is lacking and because a recent study at SWMU 36 supported low toxicity. The EPA BTAG does not agree with this response. The lack of published toxicity data is insufficient justification for eliminating these chemicals from further evaluation. In addition, the evaluation at SWMU 36 only included a comparison to ecological screening benchmarks, which the Army states are unavailable for calcium. If no pertinent data are available, the EPA BTAG

recommends that earthworm toxicity tests be performed to determine if the sludge is toxic to terrestrial receptors, otherwise the no further action is not supported.

RFAAP Response

Given this comment and USEPA follow-up to Comment 19 below, RFAAP is proposing to include SWMU 37 in the RAAP-10 RFI to be conducted for other proximate calcium sulfate sites including SWMU 35, SWMU 38, and AOC Q rather than conducting additional evaluations as part of the SSP. The RFI work plan for SWMU 37 will include a plan for conducting earthworm toxicity tests of the calcium sulfate sludge to support a potential No Further Action Decision at the site.

EPA Follow-up Comment #19

Stated that because SWMU 37, SWMU 38 and AOC Q are in close proximity to each other, they should be evaluated together when using area use factors (AUF) to refine risk estimates. The Army response states that SWMU 38 and AOC Q would be evaluated together because of their close proximity. However, because SWMU 37 was over 420 feet away from these sites, it would continue to be evaluated separately. The home range of the species being evaluated should dictate what sites should be considered together. For receptors with larger home ranges, all three sites may fall within their home range, and should therefore be considered together.

RFAAP Response

Concur. Collective evaluations will be performed for the RAAP-10 RFI (including SWMU 37, SWMU 38, and AOC Q) for refined risk estimates, where the home range of the species evaluated encompasses more than site being evaluated.

received
11-15-05

05-136 C: Holt
Redder
McKenna
ENV file

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

November 9, 2005

In reply
Refer to 3HS11

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Commander,
Radford Army Ammunition Plant
Attn: SIORF-SE-EQ (Jim McKenna)
P.O. Box 2
Radford, VA 24141-0099

Paige Holt
Environmental Manager
Alliant Techsystems, Inc.
Radford Army Ammunition Plant
P.O. Box 1
Radford, VA 24141-0100

Re: Radford Army Ammunition Plant, Radford, Virginia
SWMUs 13, 37, 38, 46, 57, 68, 69 and AOCs A, F, & Q
Draft *Site Screening Process Report*
Review of Army's August 2005 *Proposal to Conduct Further Work*

Dear Mr. McKenna and Ms. Holt:

The U.S. Environmental Protection Agency (EPA) has reviewed the U.S. Army's (Army's) August 2005 *Proposal to Conduct Further Work* as a follow-up submittal to the Army's June 1, 2005 response to EPA's March 7, 2005 letter pertaining to the review of the Army's draft *Site Screening Process Report* (SSP Report) for the investigation of SWMUs 13, 37, 38, 46, 57, 68, 69 and Areas of Concern (AOCs) A, F, and Q, located at the Radford Army Ammunition Plant (RFAAP). Outlined below, please find EPA's comments based upon that review:

1. **Comment #7** stated that the table showing the results of food chain modeling did not show all bioaccumulative chemicals the EPA BTAG recommends be evaluated.

The Army response states that the chemicals evaluated by food chain modeling consisted of identified contaminants of potential ecological concern that were also bioaccumulative chemicals. However, even if a bioaccumulative compound does not exceed the direct toxicity screening value, a food chain evaluation must still be performed. Therefore, the current approach is unacceptable. All detected chemicals that are in Table 4-2 in *Bioaccumulative Testing and Interpretation for the Purpose of Sediment Quality Assessment, Status and Needs*, EPA-823-R-00-001, February 2000 are considered bioaccumulative chemicals and should be evaluated as part of the food chain modeling.

2. **Comment #16** stated that the sources of the Freshwater Sediment Screening Values should be provided in Table 4-27. The Army response states that the sources would be provided. Please note that EPA Region 3 BTAG has developed new freshwater sediment screening values that are available on the EPA Region 3 website (www.epa.gov/reg3hwmd/risk/eco/index.htm). These freshwater sediment values should be incorporated into future evaluations.

3. **Comment #18** stated that SWMU 37 received calcium sulfate sludge, and the concentrations of calcium are extremely elevated (i.e., 106,000 mg/kg at SWMU 37) in the soil. The EPA BTAG recommended that the potential risk from this elevated calcium should be evaluated, even though calcium is considered a nutrient, since nutrients at high enough concentrations can be toxic. The Army response states that a quantitative assessment is not appropriate since published toxicity data is lacking and because a recent study at SWMU 36 supported low toxicity. The EPA BTAG does not agree with this response. The lack of published toxicity data is insufficient justification for eliminating these chemicals from further evaluation. In addition, the evaluation at SWMU 36 only included a comparison to ecological screening benchmarks, which the Army states are unavailable for calcium. If no pertinent data are available, the EPA BTAG recommends that earthworm toxicity tests be performed to determine if the sludge is toxic to terrestrial receptors, otherwise the no further action is not supported.

4. **Comment #19** stated that because SWMU 37, SWMU 38 and AOC Q are in close proximity to each other, they should be evaluated together when using area use factors (AUF) to refine risk estimates. The Army response states that SWMU 38 and AOC Q would be evaluated together because of their close proximity. However, because SWMU 37 was over 420 feet away from these sites, it would continue to be evaluated separately. The home range of the species being evaluated should dictate what sites should be considered together. For receptors with larger home ranges, all three sites may fall within their home range, and should therefore be considered together.

This concludes EPA's review of the Army's August 2005 *Proposal to Conduct Further Work* as a follow-up submittal to the Army's June 1, 2005 response to EPA's March 7, 2005 letter pertaining to the review of the Army's September, 2004 draft *SSP Report* for the investigation of SWMUs 13, 37, 38, 46, 57, 68, 69 and AOCs A, F, and Q, located at the RFAAP. The referenced draft *SSP Report*, along with the draft *Proposal to Conduct Further* Work, is not acceptable to EPA in its current form, and

must be revised to reflect the comments above. Per Part II, Section E.4.e. of the EPA RCRA Corrective Action Permit, the Army is required to revise the draft document(s) and submit a revised draft copy to EPA for review within 60 days of the receipt of EPA comments on the draft document. Part II, Section E.4.f. of the Permit allows for an additional 20 days for issuing the revised draft document to EPA, provided that timely notice is given, i.e. within 10 days. Additional time extensions can be requested under Part II, Section F. of the permit.

If you have any questions, please call me at 215-814-3357.

Sincerely,

Robert Thomson

Robert Thomson, PE, REM
Federal Facilities Branch

cc: Russell Fish, EPA
Leslie Romanchik, VDEQ-RCRA
James Cutler, VDEQ-CERCLA

McKenna, Jim

From: McKenna, Jim
Sent: Thursday, August 25, 2005 10:12 AM
To: rob thomson (E-mail); Jim Cutler (E-mail)
Cc: Stephen. C. Wood (E-mail); jim spencer (E-mail); Tony Perry (E-mail); Redder, Jerome; Davie, Robert
Subject: SSP Report, plan to address EPA and DEQ comments

Importance: High

Rob, Jim Culter:

Attached files contain the subject plan. It tracks with our June 1, 2005 response to EPA/DEQ comments. Please review. If you approve we will begin the sampling effort based on it. In this way we can avoid another workplan preparation/review cycle.

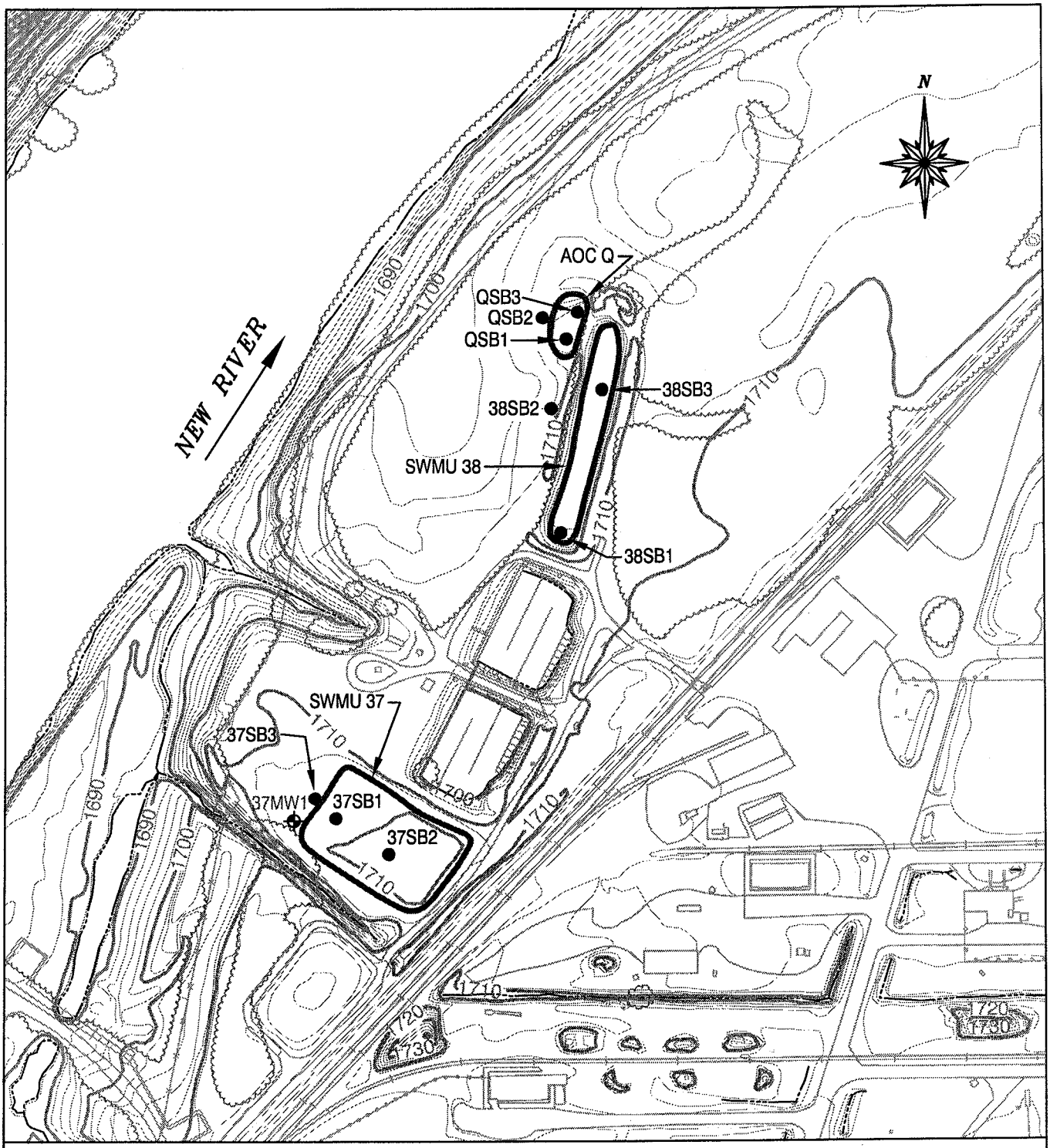

RFAAP SSP ollowup Investigati.


RFAAP SSP ollowup Investigati..

Jim McKenna
IMPORTANT NOTE: When replying to this message please cut and paste jim.mckenna@atk.com into the address line. Please do not hit the reply button. THIS A NEW ADDRESS. Thanks.

Radford Army Ammunition Plant – Site Screening Process (SSP) Sites – Proposed Further Actions and Investigations			
Site	**Primary Data Gaps**	**Investigation Plan**	**Report**
SWMU 13	• Nature and extent of lead in soil and sediments	• Complete Focused RFI with HHRA and SLERA • Additional sampling will be completed to characterize the nature and extent of constituents in soil and sediment	RFI Work Plan will be submitted to EPA and VDEQ.
SWMU 37	• Evaluate TCE SSL exceedance in soil	• Install one monitoring well 37MW1 immediately outside and downgradient of SWMU 37 at the location shown on attached Figure 1. A groundwater sample will be collected from 37MW1 for analysis of TCL VOCs.	Revise SSP Report. The site screening for SWMU 37 will be revised to include the additional groundwater data.
SWMU 38	• Further evaluate nature and extent of COPCs in soil including Aroclors • Evaluate potential releases to groundwater	• Complete RFI with HHRA and SLERA • Additional soil sampling to characterize nature and extent • Combine with adjacent AOC Q as part of RAAP 10 (also includes SWMU 35) • Evaluate potential releases to groundwater by installing groundwater-monitoring wells in the area of SWMU 38/AOC Q.	RFI Work Plan will be submitted to EPA and VDEQ.
SWMU 46	• Evaluate TCE SSL exceedance in soil	• Install one monitoring well 46MW1 adjacent to boring 46SB2 at the location shown on attached Figure 2. A groundwater sample will be collected from 46MW1 for analysis of TCL VOCs.	Revise SSP Report. The site screening for SWMU 46 will be revised to include the additional groundwater data.
SWMU 57	• Nature and extent of metals in soil • Evaluate SSL exceedances in soil and potential release to groundwater	• Complete Focused RFI with HHRA and SLERA • Additional sampling will be completed in and around the SWMU area • Evaluate potential releases to groundwater by installing groundwater-monitoring wells	RFI Work Plan will be submitted to EPA and VDEQ.
SWMU 68	• No further action proposed	• N/A	Revise SSP Report to address EPA comments as outlined in EPA Comment Response
SWMU 69	• No further action proposed	• N/A	Revise SSP Report to address EPA comments as outlined in EPA Comment Response

Radford Army Ammunition Plant – Site Screening Process (SSP) Sites – Proposed Further Actions and Investigations			
Site	**Primary Data Gaps**	**Investigation Plan**	**Report**
AOC A	• Evaluate potential releases and constituent migration to soil below concrete ditch • Nature and extent of explosives • Evaluate potential constituent migration from concrete ditch area to soil	• Complete two additional soil borings at the site at the locations shown on Figure 3. Soil boring ASB4 will be completed through the concrete at the midpoint of the ditch and soil boring ASB5 will be completed at the terminus of the ditch. Three soil samples (surface, intermediate, and terminal depth) will be collected from each boring for analysis of TCL VOCs, TCL SVOCs/PAHs, TCL Pesticides, TCL PCBs, explosives and TAL inorganics. • Install one groundwater monitoring well AMW1 at the location of boring ASB5. A groundwater sample will be collected from FMW1 for analysis of explosives, total and dissolved TAL metals, and any other constituents detected in samples collected from borings ASB4 and ASB5 that exceed SSLs.	Revise SSP Report. The site screening for AOC A will be revised to include the additional soil and groundwater data.
AOC F	• Assess potential migration and/or release of constituents to soil in drainage ditch at the northern edge of the site • Evaluate Chromium SSL exceedance in soil and potential impact on groundwater	• Complete one additional soil boring (FSB3A) within the drainage ditch at the location shown on Figure 4. Three soil samples (surface, intermediate, and terminal depth) will be collected for analysis of TCL VOCs, SVOCs/PAHs, TCL Pesticides, TCL PCBs, explosives, and TAL inorganics. • Install one groundwater monitoring well FMW1 immediately adjacent to and downgradient of AOC F at the location shown on attached Figure 1. A groundwater sample will be collected from FMW1 for analysis of total and dissolved chromium, and for any other parameters exceeding SSLs in soil from FSB3A.	Revise SSP Report. The site screening for AOC F will be revised to include the additional soil and groundwater data.
AOC Q	• Due to its proximity to SWMU 38, AOC Q will be evaluated collectively with SWMU 38 to further evaluate nature and extent of COPCs in $CaSO_4$ drying bed area • Evaluate potential releases to groundwater	• Complete RFI with HHRA and SLERA • Combine with adjacent SWMU 38 as part of RAAP 10 (also includes SWMU 35) • Evaluate potential releases to groundwater by installing groundwater-monitoring wells in the area of SWMU 38/AOC Q	RFI Work Plan will be submitted to EPA and VDEQ.



(SOURCE: MODIFIED FROM HERCULES, INC., 1992)

Legend

- Soil Sampling Location
- Proposed Monitoring Well
- SWMUs 37, 38, and AOC Q Approximate Boundaries
- Vegetation
- Water

RFAAP

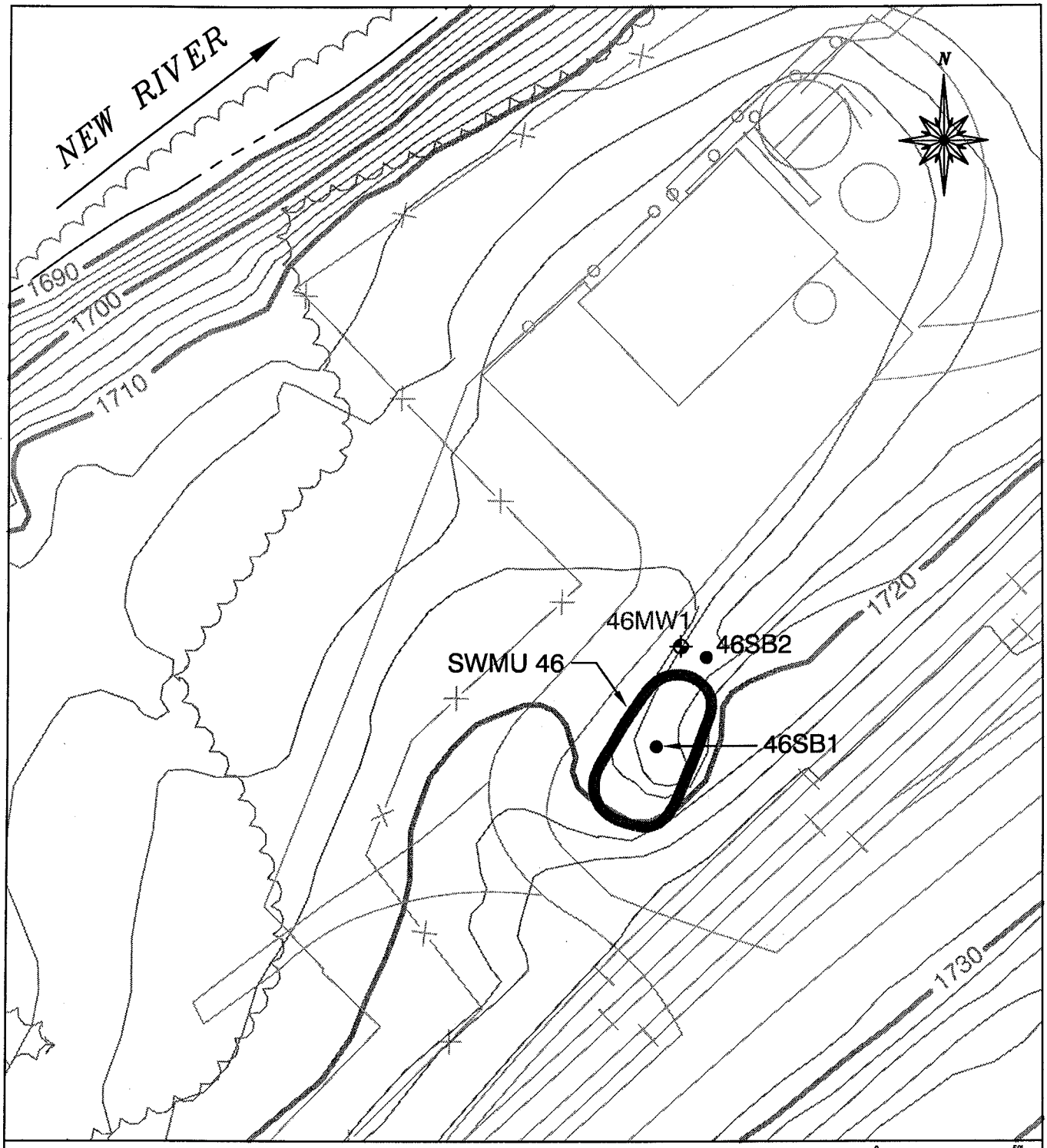
SSP REPORT - Additional Investigation

Date:	Prepared By:
August 2005	KDC/TDH
Scale:	**File Name:**
1"=200'	15900619

FIGURE 1

SSP ADDITIONAL SAMPLING LOCATION MAP

SWMU 37



(SOURCE: MODIFIED FROM HERCULES, INC., 1992)

0 50'

1 inch = 50 feet

Legend

- Soil Sampling Location
- Proposed Monitoring Well
- SWMU 46 Approximate Boundary
- Vegetation
- Water

RFAAP

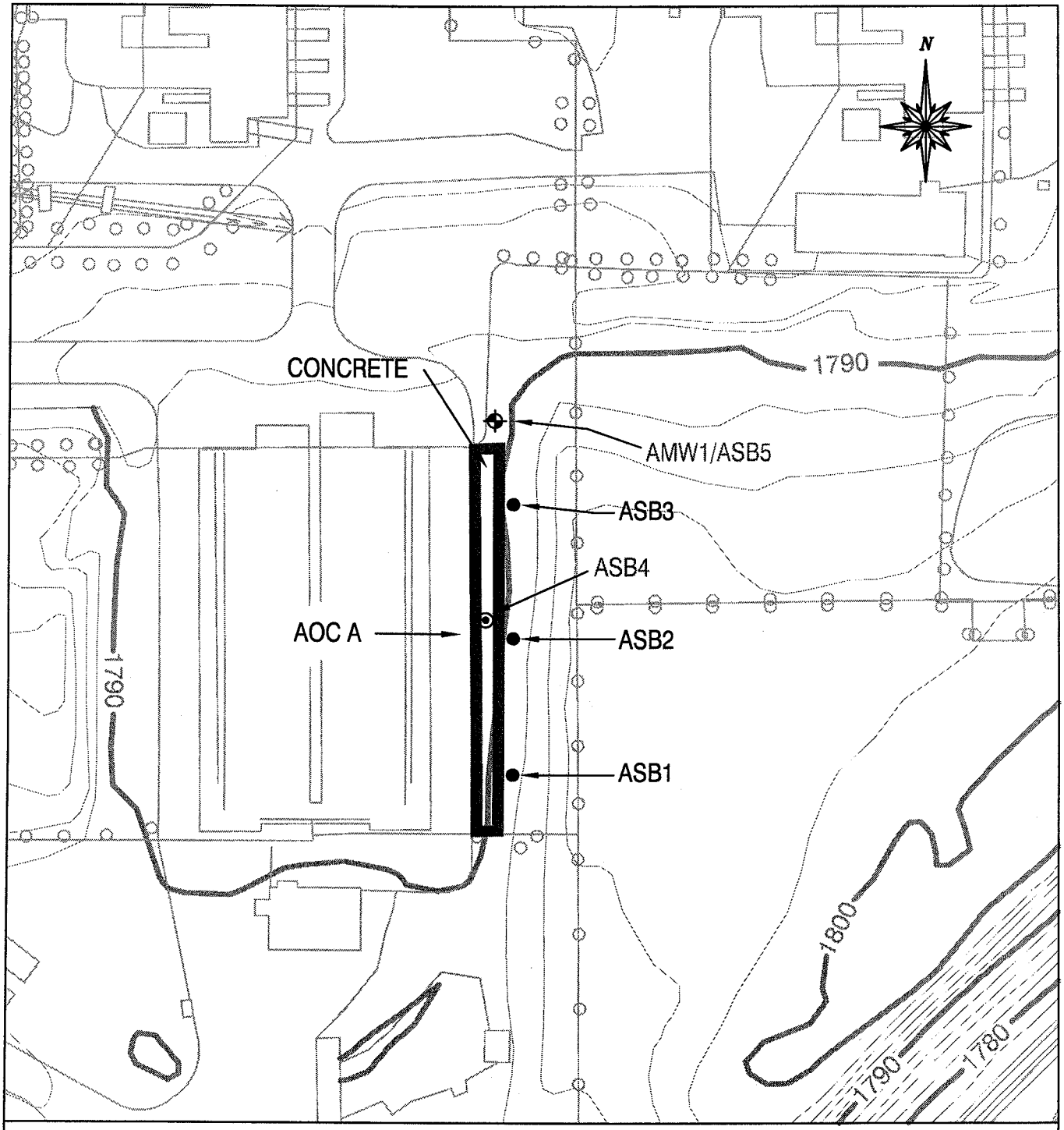
SSP REPORT - Additional Investigation

Date:	Prepared By:
August 2005	*TDH*
Scale:	**File Name:**
1"=50'	*15900619*

FIGURE 2

SSP ADDITIONAL SAMPLING LOCATION MAP

SWMU 46



Legend

- Soil Sampling Location
- Proposed Monitoring Well
- Proposed Soil Boring
- AOC A Approximate Boundary
- Aboveground Piping

RFAAP

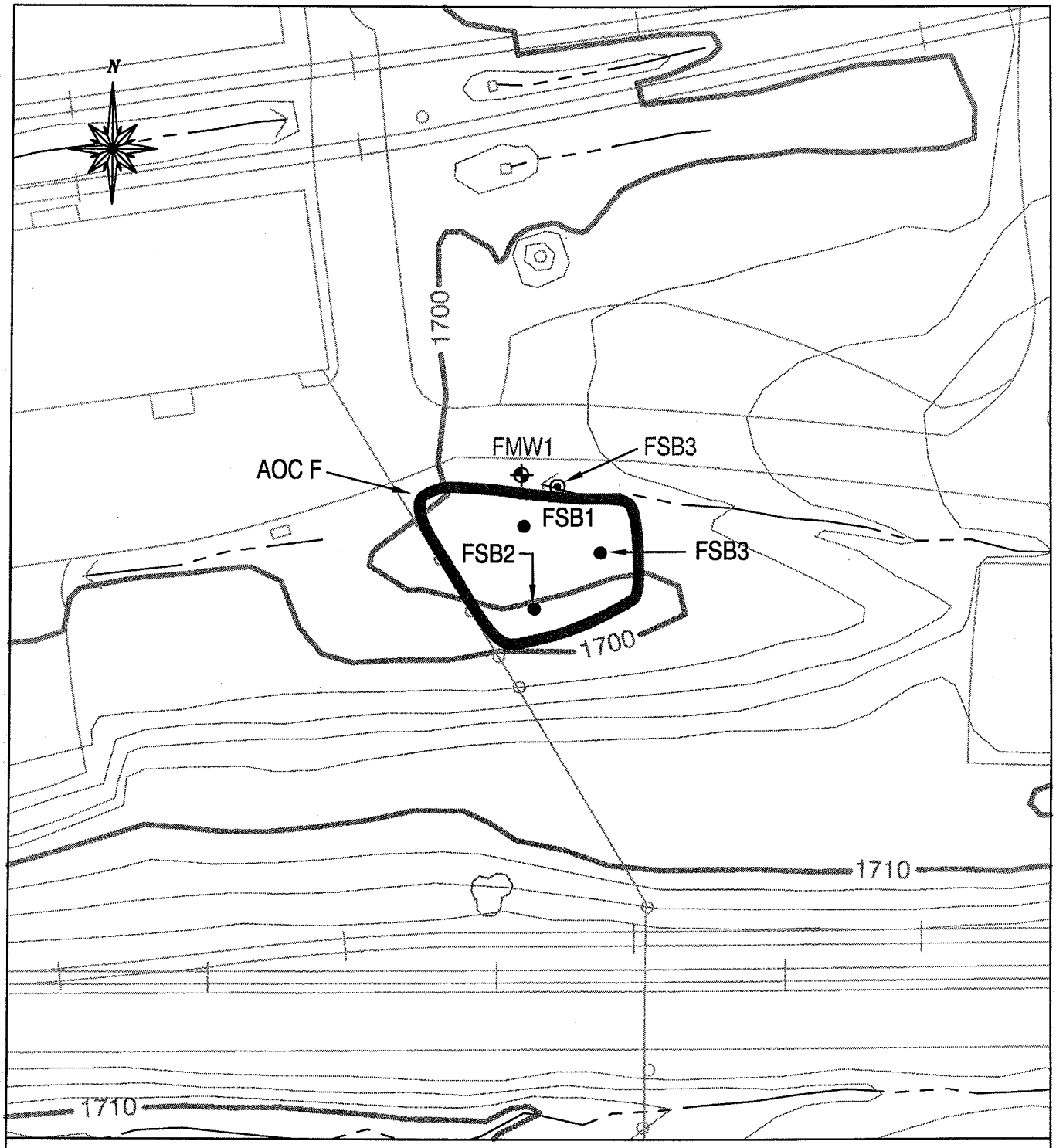
SSP REPORT - Additional Investigation

Date:	Prepared By:
August 2005	*TDH*
Scale:	**File Name:**
1"=50'	*15900619*

FIGURE 3

SSP ADDITIONAL SAMPLING LOCATION MAP

AOC A



(SOURCE: MODIFIED FROM HERCULES, INC., 1992)

0 50'

1 inch = 50 feet

Legend

- Soil Sampling Location
- Proposed Monitoring Well
- Proposed Soil Boring
- AOC F Approximate Boundary
- Vegetation
- Water

RFAAP

SSP REPORT - Additional Investigation

Date:	Prepared By:
August 2005	*TDH*
Scale:	**File Name:**
1"=50'	*15900619*

FIGURE 4

SSP ADDITIONAL SAMPLING LOCATION MAP

AOC F

Recv'd ENV 8-17-05

C: Holt
Redder
McKenna
ENV file

05-93

COMMONWEALTH of VIRGINIA

W. Tayloe Murphy, Jr.
Secretary of Natural Resources

DEPARTMENT OF ENVIRONMENTAL QUALITY
Street address: 629 East Main Street, Richmond, Virginia 23219
Mailing address: P. O. Box 10009, Richmond, Virginia 23240
Fax (804) 698-4500 TDD (804) 698-4021
www.deq.virginia.gov

Robert G. Burnley
Director

(804) 698-4000
1-800-592-5482

August 8, 2005

Mr. Jim McKenna
Radford Army Ammunition Plant
Route 114, P.O. Box 1
Radford, Virginia 24143-0100

Re: Response to VDEQ Comments on draft Site Screening Process Report, Sept. 2004

Dear Mr. McKenna:

The Virginia Department of Environmental Quality (VDEQ) has reviewed the Response to VDEQ Comments that were included in the June 1, 2005 letter to Mr. Robert Thompson, USEPA. The Army's proposed actions (focused RFIs at SWMUs 13, 38, 57 and AOC Q as well as additional sampling at SWMUs 37, 46 and AOCs A,F) have satisfactorily addressed our comments.

Please contact me at (804) 698-4498 if you have any questions or comments regarding the above site.

Sincerely,

J L Cutler

James L. Cutler, Jr., CPG
Federal Facilities Project Manager
Office of Remediation Programs

cc: C.A.Jake, ATK
Robert Thompson, US EPA Region 3
Norman Auldridge, VDEQ-WCRO
Durwood Willis, VDEQ

DRAFT CONFERENCE CALL SUMMARY FROM THE RADFORD ARMY AMMUNITION PLANT (RFAAP)
June 16, 2005

Attendance

Attendees:	Organization:
Jim McKenna	RFAAP/RAB Co-Chair
Jerry Redder	RFAAP/AAPC
Tony Perry	AEC
Steve Wood	USACE – Baltimore
Cliff Opdyke	USACE - Baltimore
Rob Thomson	USEPA – Region III
Mike Kramer	USEPA – Region III
Nancy Jafolla	USEPA – Region III
Bruce Pluta	USEPA – Region III
Katie Davis	USEPA – Region III
John McCloskey	USEPA – Region III
Jim Cutler	VA DEQ
Tina Henderson	URS Group
James O. Spencer	URS Group
Jeff Parks	Shaw Environmental, Inc.
Mark Weisburg	Shaw Environmental, Inc.

Topic

SWMU 39 RFI/CMS

1. What is the status of EPA action on out May 3, 2005 response?

   EPA Response: An e-mail approving the SWMU 39 RFI/CMS has been issued. Hard copy letter to follow via mail.

NRU Railyard RI Report

1. Comment 2: How will groundwater be addressed?

   Discussion Results: Shaw Environmental and the Army will develop a strategy to assess groundwater at the NRU Railyard. Potential methods discussed included well installation and a dye tracer study. The strategy will be submitted to the EPA via e-mail for approval.

2. Comments 7, 8, 10, and 12: EPA does not accept ecological level of risk conclusion

   Discussion Results: Presentation of ecological screening criteria exceedances on maps will be explored as a reporting option to provide addition information on exceedance distribution. In future reports the nature and extents section need to address ecological impacts as well as human health impacts.

3. Comments 13: Is the response to comment acceptable?

   Discussion Results: EPA stated that the future industrial worker scenario should be included in future human health risk assessments or a justification for the exclusion be provided in the report on a site-by-site basis.

4. Comment 15: The elimination of the t-test was proposed for future reports. Does this include the NRU Railyard RI Report?

   Discussion Results: The t-test should be used if both data sets are normally distributed while the Mann-Whitney or similar other tests should be used if one or both of the data sets are not normal or lognormal. See general comment summary for additional information regarding utilizing 95% UTLs and background comparisons.

5. Comment 16: Is the response to comment acceptable? Relates to MDLs.

   Discussion Results: For future reports, make effort to ensure the MDLs are sensitive enough for the screening criteria whenever possible. For this report, include a discussion of the MDLs as they relate to the screening criteria in the uncertainties section.

6. Comment 18: Is the response to comment acceptable? Relates to PEF for fugitive dust.

   Discussion Results: Recalculate the numbers to see if the revised calculations to see if the number vary greatly. Send an e-mail to Nancy Jafolla with the results to determine if it requires a change in the report.

7. Comment 20: Is the response to comment acceptable? Relates to site size and PEFs.

   Discussion Results: For sites that have already been sampled, it is acceptable to discuss the site size in the uncertainties section. For future sites, the site size used as the basis of PEFs (0.5 ac for residential) should be kept in mind during the sampling plan development.

8. Comment 23: Is the response to comment acceptable? Related to ecological screening level assessment.

   Discussion Results: For this investigation it is acceptable since it will not impact the outcome but in the future EPA does not want to see screening level assessment (i.e. 50% rule of thumb for surface water). It is standard to use BTAG screening criteria for the screening level assessment. It is appropriate after the baseline problem formulation to look at other toxicological data to determine if the site requires an ecological study.

9. Comment 27: Is the response to comment acceptable?

   Discussion Result: BTAG concluded that they would like to review the response to comments again to come to a consensus on this issue. Rob Thomson will contact the

Army for BTAG regarding this comment. Jeff Parks agreed to provide draft ecological figures identifying screening level exceedances to Rob Thomson, Bruce Pluta, John McCloskey, Jim McKenna, Jerry Redder, and Jim Cutler.

10. Comment 29: Is the response to comment acceptable?

    Discussion Result: Response acceptable since it didn't change the ultimate decision on the document.

11. Comment 30: Is the response to comment acceptable?

    Discussion Result: Response acceptable since it didn't change the ultimate decision on the document.

12. Comment 31: Is the response to comment acceptable?

    Discussion Result: PCBs are the main concern at the site for BTAG. The PCB exceedances are limited to two areas where transformers had previously been located on poles. Samples were also collected from the two main drainageways and the creek located at the site and sampled for PCBs with no screening exceedances. BTAG concluded that they would like to review the response to comments again to come to a consensus on this issue. Nothing in this document required changes, but additional guidance will be provided by BTAG for future ecological assessments.

13. Comment 32: Is the response to comment acceptable?

    Discussion Result: Response acceptable.

SSP Report Proposed Further Actions

1. Comment #1: Concurrence from EPA/DEQ on proposed groundwater sampling for SWMU 46

   Discussion Results: One groundwater sample to be analyzed for VOCs. Approved by Jim Cutler and Rob Thomson

2. Comment #10:Methodology for background comparison for the SSP

   The SSP, the process, as described in the approved work plan, remains the accepted SSP. It is understood that the 95% UTL may not be the best technical approach for background comparisons, but there also has been no better overall methodology suggested. There was an extraordinary effort put into collecting the large background data set in order to give the statistical comparison some credibility. Therefore, going forward the Army should continue using the approved SSP process, noting the inherent uncertainties with utilizing a 95% UTL.

3. Comment #17: Concurrence from EPA/DEQ on proposed groundwater sampling for SWMU 37

   Discussion Results: One groundwater sample to be analyzed for VOCs and provide additional information regarding Calcium Sulfate. Approved by Jim Cutler and Rob Thomson

4. Comment #23: Concurrence from EPA/DEQ on proposed no further action at SWMUs 68 and 69

   Discussion Results: BTAG stated that as long as the preliminary screening for bioaccumulative chemicals with regard to the food chain analysis is conducted appropriately the ecological result of NFA for the sites is acceptable.

   EPA agreed that the results of the SSP for SWMU 69 did not identify a release at the site, but if there were PCBs identified at the site or if any SSLs were exceeded then groundwater must be assessed. In addition EPA stated that the drainage ditch may be a separate concern apart from SWMU 69.

5. Comment #24: Concurrence from EPA/DEQ on proposed groundwater and soil sampling for AOC A

   Discussion Results: two additional borings (one under the concrete at the midpoint of the ditch and one at the terminus of the ditch) to be analyzed for the full suite of chemicals and one groundwater sample to be analyzed for explosives and metals. Approved by Jim Cutler and Rob Thomson

6. Comment #25: Concurrence from EPA/DEQ on proposed groundwater and soil sampling for AOC F

   Discussion Results: One additional boring in the ditch located adjacent to the area to be analyzed for the full suite of chemicals and one groundwater sample to be analyzed for chromium. Approved by Jim Cutler and Rob Thomson

General Comments

Background Comparison

RFI/RI - For performing a full baseline human health and ecological risk assessment, please coordinate up-front with the EPA toxicologist and EPA BTAG team members to insure that input parameters, methodologies, and assumptions are valid for the site. The coordination can be via e-mail if necessary. Note that background comparisons can be made in the discussion section of the RI. However, if inorganics are found to be risk drivers at a site, and the concentrations of

the risk drivers fall below the background concentrations (derived from 95% UTL), then further evaluation of the data is needed.

Use of ProUCL for EPC Calculation

EPA advocates the use of ProUCL for the calculation of EPCs in the risk assessment portion of the RFI report. The use of ProUCL for data sets with non-detects of 15% or greater is not recommended per the ProUCL guidance. The discussion concluded with an agreement for the consultants to write up their statistical analysis procedures and forward it to the EPA for review.

SSP Sites – Proposed Further Actions and Investigations

Site	Primary Data Gaps	Investigation Plan	Report
SWMU 13	• Nature and extent of lead in soil and sediments •	• Complete Focused RFI with HHRA and SLERA • Additional sampling will be completed to characterize the nature and extent of constituents in soil and sediment	RFI Work Plan will be submitted to EPA and VDEQ.
SWMU 37	• Evaluate TCE SSL exceedance in soil	• Install one monitoring well 37MW1 immediately outside and downgradient of SWMU 37 at the location shown on attached Figure 1. A groundwater sample will be collected from 37MW1 for analysis of TCL VOCs.	Revise SSP Report. The site screening for SWMU 37 will be revised to include the additional groundwater data.
SWMU 38	• Further evaluate nature and extent of COPCs in soil including Aroclors • Evaluate potential releases to groundwater	• Complete RFI with HHRA and SLERA • Additional soil sampling to characterize nature and extent • Combine with adjacent AOC Q as part of RAAP 10 (also includes SWMU 35) • Evaluate potential releases to groundwater by installing groundwater-monitoring wells in the area of SWMU 38/AOC Q.	RFI Work Plan will be submitted to EPA and VDEQ.
SWMU 46	• Evaluate TCE SSL exceedance in soil	• Install one monitoring well 46MW1 adjacent to boring 46SB2 at the location shown on attached Figure 2. A groundwater sample will be collected from 46MW1 for analysis of TCL VOCs.	Revise SSP Report. The site screening for SWMU 46 will be revised to include the additional groundwater data.
SWMU 57	• Metals in soil • Evaluate SSL exceedances in soil and potential release to groundwater	• Complete Focused RFI with HHRA and SLERA • Additional sampling will be completed in and around the SWMU area • Evaluate potential releases to groundwater by installing groundwater-monitoring wells	RFI Work Plan will be submitted to EPA and VDEQ.
SWMU 68	• No further action proposed	• N/A	Revise SSP Report to address EPA comments as outlined in EPA Comment Response
SWMU 69	• No further action proposed	• N/A	Revise SSP Report to address EPA comments as outlined in EPA Comment Response

SSP Sites – Proposed Further Actions and Investigations			
Site	**Primary Data Gaps**	**Investigation Plan**	**Report**
AOC A	• Evaluate potential releases and constituent migration to soil below concrete ditch. • Evaluate potential constituent migration from concrete ditch area to soil.	• Complete two additional soil borings at the site at the locations shown on Figure 3. Soil boring ASB4 will be completed through the concrete at the midpoint of the ditch and soil boring ASB5 will be completed at the terminus of the ditch. Three soil samples (surface, intermediate, and terminal depth) will be collected from each boring for analysis of TCL VOCs, TCL SVOCs/PAHs, TCL Pesticides, TCL PCBs, explosives, and TAL inorganics. • Install one groundwater monitoring well AMW1 at the location of boring ASB5. A groundwater sample will be collected from FMW1 for analysis of explosives, total and dissolved TAL metals, and any other constituents detected in samples collected from borings ASB4 and ASB5 that exceed SSLs.	Revise SSP Report. The site screening for AOC A will be revised to include the additional soil and groundwater data.
AOC F	• Assess potential migration and/or release of constituents to soil in drainage ditch at the northern edge of the site. • Evaluate Chromium SSL exceedance in soil and potential impact on groundwater.	• Complete one additional soil boring (FSB3A) within the drainage ditch at the location shown on Figure 4. Three soil samples (surface, intermediate, and terminal depth) will be collected for analysis of TCL VOCs, SVOCs/PAHs, TCL Pesticides, TCL PCBs, explosives, and TAL inorganics. • Install one groundwater monitoring well FMW1 immediately adjacent to and downgradient of AOC F at the location shown on attached Figure 1. A groundwater sample will be collected from FMW1 for analysis of total and dissolved chromium, and for any other parameters exceeding SSLs in soil from FSB3A.	Revise SSP Report. The site screening for AOC F will be revised to include the additional soil and groundwater data.
AOC Q	• Due to its proximity to SWMU 38, AOC Q will be evaluated collectively with SWMU 38 to further evaluate nature and extent of COPCs in $CaSO_4$ drying bed area • Evaluate potential releases to groundwater	• Complete RFI with HHRA and SLERA • Combine with adjacent SWMU 38 as part of RAAP 10 (also includes SWMU 35) • Evaluate potential releases to groundwater by installing groundwater-monitoring wells in the area of SWMU 38/AOC Q.	RFI Work Plan will be submitted to EPA and VDEQ.

Radford Army Ammunition Plant
Route 114, P.O. Box 1
Radford, VA 24143-0100
USA

June 1, 2005

Mr. Robert Thomson
U. S. Environmental Protection Agency
Region III
1650 Arch Street
Philadelphia, PA 19103-2029

Subject: Site Screening Process Report for Solid Waste Management Units 13, 37, 38, 46, 57, 68, 69 and Areas of Concern A, F, Q
Draft Document, September 2004
Radford Army Ammunition Plant
EPA ID# VA1 210020730

Dear Mr. Thomson:

Enclosed is the response to your March 7, 2005 letter on the subject report and to Mr. Cutler's letter of March 29, 2005.

Please coordinate with and provide any questions or comments to myself at (540) 639-8266, Jerry Redder of my staff (540) 639-7536 or Jim McKenna, ACO Staff (540) 639-8641.

Sincerely,

C. A. Jake, Environmental Manager
Alliant Ammunition and Powder Company LLC

c: Russell Fish, P.E., EPA Region III

Jim Cutler
Virginia Department of Environmental Quality
P. O. Box 10009
Richmond, VA 23240-0009

Durwood Willis
Virginia Department of Environmental Quality
P. O. Box 10009
Richmond, VA 23240-0009

E. A. Lohman
Virginia Department of Environmental Quality
West Central Regional Office
3019 Peters Creek Road
Roanoke, VA 24019

Tony Perry
U.S. Army Environmental Center
5179 Hoadley Road, Attn: SFIM-AEC-CDN
Aberdeen Proving Ground, MD 21010-5401

05-815-111
JMcKenna/JJRedder

Karen Colmie Heckelman
U.S. Army Environmental Center, Office of Counsel
Beal Road, Bldg E4460
Aberdeen Proving Ground, MD 21010-5401

Dennis Druck
U.S. Army Center for Health Promotion and Preventive Medicine
5158 Blackhawk Road, Attn: MCHB-TS-REH
Aberdeen Proving Ground, MD 21010-5403

Steve Wood
Corps of Engineers, Baltimore District
ATTN: CENAB-EN-HM
10 South Howard Street
Baltimore, MD 21201

Coordination: J. McKenna
J McKenna

bc: Administrative File
J. McKenna, ACO Staff
Rob Davie-ACO Staff
C. A. Jake
P. W. Holt
J. J. Redder
Env. File

05-815-111
JMcKenna/JJRedder

Response to USEPA Comments Dated 07 March 2005
Received via email on 08 March 2005
Radford Army Ammunition Plant, Radford, Virginia
SWMUs 13, 37, 38, 46, 57, 68, 69 and AOCs A, F, & Q
Draft *Site Screening Process Report*

GENERAL COMMENTS

USEPA Comment 1

The draft *SSP Report* does not explain why the potential for groundwater contamination has not been evaluated for the Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) identified. Site related soil screening levels (SSLs) for migration to groundwater were exceeded at SWMUs 13, 37, 46 and 57 for bromodichloromethane, 1,3-dinitrobenzene, chloroform and trichloroethylene (TCE). It is understood that, based on Work Plan Addendum No. 16 - *Site Screening Process for Solid Waste Management Units 13, 37, 38, 46, 57, 68, 69, 75, 76 and Areas of Concern A, F and Q, Work Plan Addendum 016* (URS 2003) - the site screening process is geared toward a screening-level evaluation of constituent concentrations in soil and that Radford Army Ammunition Plant (RFAAP) is assessing subsurface flow characteristics and constituent concentrations in groundwater on a site-wide, holistic basis through the implementation of Area Groundwater Studies. This approach has been utilized at other Federal facilities, even to the extent of separating the groundwater and soils into separate operable units. It has also been utilized in other work plan addendums for RFAAP (e.g., Work Plan Addendum No. 12). However, the characterization of individual SWMUs and AOCs (and thus, determination of future actions) is not complete until the groundwater investigation at each SWMU or AOC is completed. This facility-wide groundwater investigation must be comprehensive enough to characterize the groundwater at the individual SWMUs and AOCs. EPA recognizes the complex nature (karst) of the groundwater at the site and will consider the groundwater concerns at individual SWMUs during review of the site-wide groundwater study. However, it is recommend that the groundwater pathway be evaluated for SWMUs and AOCs that have groundwater monitoring data (e.g., SWMU 13, for which extensive quarterly monitoring data are available). In addition, please revise the draft *SSP Report* to include a summary discussion of groundwater conditions at these SWMUs and AOCs. The investigative sections of the draft *SSP Report* should at least discuss how potential groundwater contaminations at these SWMUs and AOCs will be addressed.

Army Response

SSP soil investigations at each of the sites were extended to the depth of groundwater and included an evaluation of potential releases to groundwater through soil sampling, comparison of chemical data to RBCs, SSLs, etc, and physical soil testing. At SWMUs 38, 68, and 69 and AOCs A, F, and Q, it was concluded that the potential for impact to groundwater was low based on the SSP screening results (cumulative risk screenings, SSLs, background comparisons, etc.), and therefore, no further evaluations of the groundwater migration pathway were proposed for these sites. Additional comparisons of SSLs to historical groundwater data are not possible for SWMUs 37, 38, 68, and 69 and AOCs A, F, and Q given the lack of historical groundwater data proximate to these sites.

The groundwater pathway for SWMU 13 is being evaluated as part of the RCRA permitting for this active area (open burning ground permit with VDEQ). These data will also be incorporated into a facility-wide groundwater study. As discussed in Response to EPA Comments on the SSP Work Plan dated June 16, 2004 (Comment 1), SSP investigative activities for SWMU 13 focused on the area between the New River and the earthen berm that borders the southern portion of the active operational area. The objective of the SSP was to evaluate soil, sediment, and surface water migration pathways at the perimeter of SWMU 13 rather than groundwater within the active operational area.

One groundwater sample will be collected at SWMUs 37 and 46 and analyzed for VOCs to assess the potential migration of TCE to groundwater. The SSP report will be revised to include an evaluation of the groundwater data (using the SSP process) collected at SWMUs 37 and 46. The SSP Report will be revised to discuss how the groundwater migration pathway will be evaluated at SWMU 13 (VDEQ permit, facility-wide groundwater study, and the proposed RFI) and SWMU 57 (as part of the proposed RFI).

USEPA Comment 2

The tables included in the draft *SSP Report* do not provide definitions for all data qualifiers used. As examples, Table 4-3 includes a column for laboratory qualifiers, validation qualifiers and reason codes. However, the qualifiers used ("E", "N", "J", "B", "t" and "x") are not defined on the table. Table 4-8 includes data flags "A" and "J", however, definitions for "A" and "J" are not included on the table. Please revise the draft *SSP Report* to include definitions for all data qualifiers used.

Army Response

Definitions for data qualifiers will be added to the appropriate tables.

USEPA Comment 3

Several references appear throughout the document to background concentrations of organic constituents. For example, it is stated on page 5-21 that, "the MDCs [maximum detected concentration] for COPCs [constituent of potential concern] detected above background (chromium and Aroclor 1254) are below their unadjusted R-RBCs [Residential Risk Based Concentration]." It is further stated on page 10-5 that, "the MDC for the COPC detected above background (2,4-DNT) is below the unadjusted R-RBC." Constituents that are not naturally-occurring, such as 2,4-DNT and Aroclor 1254, should **not** have a background concentration, since their presence in environmental media implies an anthropogenic impact. In addition, the *Facility-Wide Background Study, Final Document* (December 2001) indicates that explosives and organic compounds were used as background markers to discern potential contamination associated with selected background sample locations, and background concentrations are only provided for a select group of metals. Although the draft *SSP Report* only provides background data for metals, these statements imply that background comparisons were made for all detected constituents. Revise the draft *SSP Report* to remove all references to background comparisons for organic constituents.

Army Response

The SSP Report will be revised to remove all references to background comparisons for organic constituents.

USEPA Comment 4

It is stated in Section 3.2.2, Cumulative Risk Screen, that "if the cumulative HI [hazard index] for a site is greater than or equal to 0.5 for a target organ, then a quantitative RA [risk assessment] would be recommended for the site." However, with the exception of SWMU 57, it does not appear that quantitative RAs were conducted (or recommended) for units where the HI was greater than or equal to 0.5 for one or more target organs. These elevated HIs were determined to be the result of exposure to constituents detected at concentrations less than their site-wide background concentrations, and these units were recommended for no further action (NFA). Please provide information to justify the NFA recommendation for units that appear to meet the criteria for quantitative RA recommendations, as described in Section 3.2.2.

Army Response

Quantitative RAs were not recommended for SWMUs 37, 46, 68, and 69, and AOCs A, F, and Q because the cumulative HIs equal to or greater than 0.5 for a target organ were attributable to background levels of metals in soil. Recommendation of no further action is appropriate based on provisions of Section 6.1.5 of the SSP Guidance Document, which indicates that based on comparisons of maximum detected concentrations (MDCs) to background point estimates and other relevant information, "a recommendation will be made as to whether further investigation or response action is warranted at each SSA."

Using the MDC for background evaluations of metals is considered a conservative approach to evaluate whether metals concentrations in surface soil and total soil are potentially attributable to site-related activities given the objectives of the SSP and the number of samples collected from each site (3 surface and 6 subsurface, also see Response to Comment 10).

USEPA Comment 5

The quantitative estimates of risk and hazard are, in some cases, provided in up to three significant figures. However, this may imply a greater degree of certainty in the estimate than actually exists, since the precision of a risk assessment can be no better than the least certain input parameter. Therefore, it is usually only appropriate to use one significant figure when presenting quantitative estimates of risk and hazard. Please consider revising the level of certainty reported for the quantitative estimates of risk and hazard.

Army Response

Quantitative estimates of risk and hazard will be revised to use one significant figure.

USEPA Comment 6

The ecological site characterization for many of these sites states that the lack of habitat and the disturbed nature of the site greatly limit its capacity to support wildlife. This is generally not supported by accompanying text which states that observations made during site reconnaissance indicate that a viable herbaceous vegetation community occurs at the site, and there are no signs of stressed vegetation. This conclusion of the lack of habitat is also not supported by the pictures of the site, which show viable productive grassland communities. These types of communities would support valuable habitat for many different wildlife receptors.

Army Response
The text will be revised for SWMUs 46, 57, 68, and 69 to indicate that these sites may support some use (i.e., shelter and foraging) by some smaller common species.

USEPA Comment 7
The tables showing the results of food chain modeling (i.e., Tables 4-29 through 4-31 for SWMU 13) show a much smaller list of chemicals than the list of bioaccumulative chemicals that should be evaluated by food chain modeling. An explanation should be provided stating why the other bioaccumulative chemicals were not evaluated or if they were, why the results do not appear in the tables.

Army Response
As outlined in Section 3.3.7.1, chemicals with MDCs above their screening values and/or detected constituents without screening values are identified as constituents of potential ecological concern (COPECs) and carried through to the risk characterization step. The chemicals evaluated by food chain modeling consisted of identified COPECs that are also bioaccumulative compounds.

USEPA Comment 8
Tables 4-26, 5-32, 5-33, 5-34, 6-12 and 7-13 contain the preliminary soil invertebrate risk characterization for different sites. The direct contact TRVs listed are from one of three sources. Of the values selected from the EPA Region III BTAG screening level document, only one (cyanide) appears to be correct. Chromium, iron, mercury, nickel and zinc values are inconsistent from table to table. The purpose of these tables is not clear since essentially this information is presented in the COPEC Selection tables. Please correct.

Army Response
Tables 4-26, 5-32, 5-33, 6-12, and 7-13 will be revised as appropriate. These tables provide preliminary exposure estimates for direct contact in addition to the information included in the COPEC selection tables.

SPECIFIC COMMENTS

USEPA Comment 9
Section 1.0, Introduction, page 1-1: The first paragraph of this section states that this Report presents the results and findings of the RCRA investigations conducted at Radford Army Ammunition Plan (RFAAP) for nine SWMUs and three AOCs. However, results are presented for seven SWMUs and three AOCs. Work Plan Addendum No. 16 listed SWMUs 75 (Used Oil Storage Tank) and SWMU 76 (Oil Tanks) as units not requiring field activities because either impact was to groundwater only (SWMU 75), which will be evaluated on a site-wide basis or the unit will be addressed by another regulatory mechanism (SWMU 76 State closure). Please revise the draft *SSP Report* to resolve this discrepancy and state that SWMUs 75 and 76 were not investigated for the SSP.

Army Response
Section 1.0 of the SSP will be revised to indicate that SWMUs 75 and 76 were not investigated for the SSP.

USEPA Comment 10

Section 3.2.7, Page 3-4: The background and onsite comparison should be based on a statistical analysis of comparison of the mean concentration, not just the UTLs.

Army Response

The SSP was designed to evaluate whether releases of hazardous constituents occurred at sites and as such, Section 6.1.5 of the SSP guidance specifies a conservative comparison of MDCs to background point estimates rather than means testing. Means testing for surface soil is not appropriate given that each site data set comprises three samples. For total soil, the large difference in site sample data sets (9 samples) and the background data set (79 samples) makes the use of MDC point comparisons more appropriate than means testing. For sufficient statistical power and inference, sample data sets for means testing should be of a similar size so that evaluations are meaningful. The sampling program for SSP is not designed as a comprehensive RFI (it is designed to assess for the presence of hazardous constituents and to screen the site for further action or no further action), where data sets for total soil are more comparable to background data sets and where means testing may be more appropriate.

USEPA Comment 11

Section 3.3.4.1, Page 3-8: presents the approach used to collect and analyze data for evaluation of ecological risk. The section states that the soil layer from 0 to 1 foot below ground surface (bgs) is the most appropriate data set to assess potential terrestrial exposure. If this is the most appropriate layer for evaluating ecological risk, it is unclear why soil was collected from 0 to 6 inches bgs for evaluation of ecological risk (Section 2.5.1 on page 2-3.) In lieu of site specific data pertaining to the depths of the O and A soil horizons, the EPA BTAG generally recommends the use of soil from 0 to 6 inches and 6 to 24 inches bgs for the evaluation of ecological risk. This issue should be clarified.

Army Response

Soil sampling was conducted according to SSP Guidance Section 3.0 (where the surface soil is 0 to 1 feet below ground surface 0-6 inches for constituents other than VOCs and 6-12 inches for VOCs) and in accordance with the approved work plan dated August 2003.

USEPA Comment 12

Section 3.3.7.3 states that to evaluate direct toxicity to soil invertebrates and microbial communities, toxicity reference values were selected. The section provides references to values other than the EPA BTAG screening values, including Oak Ridge National Laboratory (ORNL) microbial and earthworm values, and ORNL preliminary remediation goals. A review of site specific evaluations indicates that these values were often used instead of the EPA BTAG screening values. Please note that if the EPA Eco-SSLs or the EPA BTAG screening values exist, they are to be utilized for the evaluation of direct toxicity to invertebrates and microbial communities.

Army Response

The minimum value for BTAG and ORNL screening values was used for the evaluation of direct toxicity to invertebrates and microbial communities, as referenced in the preliminary invertebrate risk characterization tables in Sections 4 through 11. The

preliminary risk estimates for the direct contact will be reevaluated for each site to determine whether EPA Eco-SSLs (for soil invertebrates) are available for the constituents evaluated. If EPA Eco-SSLs are available for the constituents evaluated then they will be incorporated into the direct contact evaluation. The lowest value screening value from BTAG, ORNL, and Eco-SSLs will be used as the direct contact toxicity reference value (TRV). Section 3.3.7.3 will be revised to reflect this methodology.

USEPA Comment 13

Section 3.3.9.2, Page 3-14 discusses the uncertainty with the risk characterization because the bioavailability of the chemicals of concern is unknown, and it is assumed that the total concentrations are bioavailable and toxic. The EPA agrees that this creates uncertainty. In order to begin to reduce this uncertainty, the EPA has recommended the collection of soil for pH, organic carbon and grain size. These can be used to more quantitatively evaluate bioavailability of specific chemicals. While these were measured at every site, no effort was made at specific sites to evaluate bioavailability on a site-specific basis.

Army Response

As appropriate, the SSP will be revised to further evaluate bioavailability of specific chemicals using site-specific physical soil data including pH, organic content, and grain size distribution.

USEPA Comment 14

Section 3.3.9.6, Page 3-15: discusses the uncertainty with the hazard quotient (HQ) method, and that uncertainty is primarily associated with the assumption that a HQ greater than 1 is an adequate indicator of the potential for ecological risk of individual chemicals. EPA agrees that a HQ greater than one does not necessarily mean there is risk for individual receptors. However, a HQ greater than one indicates the potential for risk, and, thus, necessitates the need for additional ecological evaluation to reduce uncertainty.

Army Response

Text will be added to section 3.3.9.6 discussing additional evaluations to reduce uncertainty including evaluating bioavailability of specific chemicals using site-specific physical soil data including pH, organic content, and grain size distribution.

USEPA Comment 15

Section 4.6.1.3, Page 4-8: The lead evaluation for SWMU 13 states that the results of the IEUBK model for the site indicated a percentage of children expected to have blood [lead] levels of 10 ug/dL or greater. However, the IEUBK model does not actually make such population estimates. Rather, the model "allows the user to estimate a plausible distribution of blood lead concentrations centered on a geometric mean blood lead concentration... From this distribution, the model estimates the probability that a child's, or population of children's, blood lead concentration will exceed a certain level of concern (typically 10 ug/dL)." Although this distinction does not change the decision outcome for SWMU 13, and does not require a revision to the draft *SSP Report*, the distinction between predicting an outcome and predicting the probability of an outcome should be made in future reports.

Army Response
The text in Section 4.6.1.3 will be revised.

USEPA Comment 16
Table 4-27: shows the risk evaluation for invertebrates exposed to sediment. The table lists freshwater sediment screening values, however, no source of the values is provided. The sources for the Freshwater Sediment Screening Values should be provided and listed in the table.

Army Response
Sources for Freshwater Sediment Screening Values will be added to the notes at the end of Table 4-27.

USEPA Comment 17
Section 5.1: discusses site background and environmental setting for SWMUs 37, 38 and AOC Q. On page 5-2, the section states that monitoring well data indicates that groundwater flow is northwest toward the New River. Based on this statement, it appears that the migration pathway to the New River may be complete. The section should state how this migration pathway will be addressed.

Army Response
SSP soil investigations at SWMUs 37 and 38 and AOC Q were extended to the depth of groundwater and included an evaluation of potential releases to groundwater through soil sampling, comparison of chemical data to RBCs, SSLs, etc, and physical soil testing. At these sites, it was concluded that the potential for impact to groundwater was low based on the SSP screening results (cumulative risk screenings, SSLs, background comparisons, etc.).

Potential impacts to groundwater from SWMU 38 and AOC Q will be addressed further in the proposed RFI to be conducted for these sites. At SWMU 37, one direct-push groundwater sample for VOC analysis is proposed to evaluate potential leaching of TCE (single constituent exceeding its site-specific SSL) to groundwater. The objective of the groundwater sampling is to confirm that TCE (and other VOCs) has not impacted groundwater at a level above its tap water RBC, thereby, confirming the appropriateness of the no futher action recommendation at SWMU 37.

USEPA Comment 18
Section 5.7.4.3, Page 5-16: states that "nutrients", including calcium, were not considered contaminants of potential concern in the risk screening in accordance with the Site Screening Process and Master Work Plan. However, because these sites specifically received calcium sulfate sludge, calcium and sulfate are considered COPCs given the operational history of the sites. Additionally, the concentrations of calcium are extremely elevated (i.e., 106,000 mg/kg at SWMU 37) in the soil, and the potential risk from this elevated calcium should be evaluated. "Nutrients" can be toxic at high enough concentrations. The potential risk from elevated sulfate concentrations in soil should also be evaluated. Until this issue is addressed, EPA does not support the conclusion of no further action.

Army Response

A quantitative assessment of risk posed by calcium and sulfate in sludge at SWMU 37 is not appropriate given that published toxicity data for these constituents is lacking. The recent study conducted at other RFAAP $CaSO_4$ areas (same process and waste) SWMU 8 ($CaSO_4$ treatment/disposal area) and SWMU 36 ($CaSO_4$ drying beds) support the conclusion that this sludge has low toxicity. EPA concurred with the conclusion of the soil screening investigation (Soil Screening Report-SWMUs 8 and 36, January 2004) at SWMUs 8 and 36 that the $CaSO_4$ sludge and associated soil poses low risk to human health and the environment. This conclusion was based on the lack of constituent detections above residential RBCs, ecological screening benchmarks, and/or background point estimates and waste characterization of sludge, which indicated that the $CaSO_4$ sludge was a non-hazardous waste with low toxicity (URS Soil Screening Report, August 2003).

USEPA Comment 19

Section 5.7.5.1, Page 5-18: states that in the refined food chain model for SWMU 37, SWMU 38 and AOC Q, a realistic area use factor (AUF) was calculated as the ratio of the size of each of the site areas to the average home range of the receptor. Based on information presented in Appendix I, food chain risk was evaluated for each site separately by calculating a site-specific AUF. Because these three sites are in close proximity to each other, it would be more appropriate to calculate an AUF based on the total area of the three sites together, and evaluate food chain risk from the three sites collectively. SWMU 9 should also be considered in this evaluation. Otherwise, the cumulative risk from these sites would be underestimated. Until this issue is addressed, EPA does not support the conclusion of no further action for these sites.

Army Response

SWMU 9 is outside the purview the facility's Installation Restoration Program (IRP) due to its operational history. Since this site was active after 1986, it therefore is ineligible for funding from the Army IRP, and thus this site cannot be evaluated as part of this SSP effort. SWMU 37 should not be evaluated collectively with SWMU 38/AOC Q given its 420-foot+ distance from these sites. Given the adjacent location of SWMU 38 and AOC Q, an AUF based on the total area of the sites will be used to evaluate the food chain risk from SWMU 38 and AOC Q collectively in the proposed RFI for these sites.

SWMU 9 involved the same process and produced the same waste as SWMU 8. See response to Comment 18.

USEPA Comment 20

Table 5-39: provides the results of the preliminary and refined ecological risk characterization for SWMU 38. The maximum surface soil concentration for chromium is listed as 114 mg/kg. This is actually the maximum detected concentration for SWMU 37. The maximum detected concentration of chromium at SWMU 38 is actually 82 mg/kg. Please correct in the draft *SSP Report.*

Army Response

Table 5-39 will be revised to show the correct maximum chromium concentration of 82 mg/kg.

USEPA Comment 21

Section 7.7.5, Page 7-10: states that the maximum surface soil concentrations for aluminum, antimony, cadmium, chromium, iron, lead, manganese, zinc and cyanide in surface soil exceed their respective direct contact toxicity reference values at SWMU 57 and therefore, may pose risk to soil invertebrates and microbes. Only aluminum was below the background concentration. The last paragraph of this section states that based on the ecological risk screening results, there is adequate information to conclude that ecological risk is negligible at SWMU 57. This conclusion is not supported based on the exceedances of metals in surface soil. Based on this information, the no further action for ecological risk recommended in Section 7.9 on page 7-11 is not supported.

Army Response

The refined risk characterization at SWMU 57 resulted in HQs greater than 1 (NOAEL) for chromium and zinc (HQs less than 2). The bioavailability of chromium and zinc will be evaluated further using site-specific physical soil data as discussed in Response to Comments 13 and 14. As appropriate, the SSP recommendation in Section 7-9 will be revised to reflect the results of this evaluation.

USEPA Comment 22

Section 8.7.1.1, Page 8-7: states that observations made during site reconnaissance indicate that a viable community of transitional vegetation occurs at SWMU 68, and there were no signs of vegetative stress. This is not supported by the photograph on page 8-1 which shows large areas of dead or sparse vegetation. This issue should be clarified in the draft *SSP Report.*

Army Response

The area shown in the photograph contains sparse vegetation due to traffic unrelated to SWMU 68. The parallel tracks are due to wear from tires. The photograph in the report will be replaced with a photograph of SWMU 68 that is more representative of site conditions.

USEPA Comment 23

Section 9.7.2, Page 9-8: states that SWMU 69 is comprised exclusively of terrestrial habitat, and soil represents the only exposure media to ecological receptors. This is not supported by Section 9.2 on page 9-1 which states that the supernatant from SWMU 69 was discharged to a perennial stream that flows to the New River, and Section 9.3.4 on page 9-3 which states that the New River and Tributaries Study conducted in 1997 found ten metals in excess of EPA BTAG screening values in sediment collected from the perennial stream downgradient of SWMU 69. EPA recommends that this perennial stream be evaluated for potential ecological risk. EPA does not agree with the no further action recommendation in Section 9.9 until this migration pathway is evaluated.

Army Response

Per the approved SSP work plan, the potential migration pathway to the perennial stream was evaluated by collecting two soil samples between SWMU 69 and the stream in the area that would have most likely have received discharge from this SWMU. Additional ecological evaluation or further action was not proposed given that the ecological screening conducted in the most likely release/discharge area and the HQs for the refined risk characterization were less than 1, as presented in Section 9.7.5 of the SSP report.

USEPA Comment 24

Section 10.1, Page 10-1: states that Area of Concern A consists of a concrete-lined ditch that collected runoff from the Nitrocellulose A-Line. The section states that runoff appears to flow northward along the ditch and percolate into the soil at the terminus of the concrete swale. However, Section 10.5 on page 10-2 states that as part of the SSP, three samples were collected adjacent to the swale. Based on the photograph on page 10-1, these appear to be upgradient of the swale. It is unclear why soil samples were not collected at the terminus of the concrete where runoff percolated into the ground. EPA believes that this represents a data gap. Because of this data gap, the no further action recommendation provided in Section 10.9 is not supported.

Army Response

Two additional soil samples will be collected from AOC A to address the data gaps identified by EPA and VDEQ and provide further support for the no further action recommendation. One sample will be collected at the terminus of the ditch and one at the midpoint of the concrete ditch below the concrete.

USEPA Comment 25

Section 11.7.2, Page 11-6: states that Area of Concern F is comprised exclusively of terrestrial habitat, and soil represents the only exposure media to ecological receptors. This is not supported by Section 11.1 on page 11-1 which states that the runoff from AOC F flows northwest across the site toward a well-defined drainageway that flows west eventually discharging into the New River. Section 11.5 on page 11-2 states that samples were only collected within the gravel area. Despite the proximity of the ditch (Figure 11-1), no samples have been collected from this drainageway. An explanation should be provided stating why this drainageway has not been sampled. Until this issue is addressed, EPA does not agree with the no further action recommendation provided in Section 11.9.

Army Response

One additional soil sample will be collected in the ditch located adjacent to AOC F to address the data gap identified by the EPA and VDEQ and provide further support for the no further action recommendation.

USEPA Comment 26

Appendix F – Site-specific SSLs for Groundwater: EPA recommends that a risk-based tap water concentration be used in the calculations of the SSLs, not the MCL. The MCL might not be protective enough, especially when multiple contaminants are present in the soil. Additionally, the MCL is an ARAR not a risk-based clean-up goal (PRG), and not necessarily wholly derived from a risk-based perspective.

Army Response

The tap water RBC was used in the calculations of site-specific SSLs where multiple constituents exceeded their default or site-specific SSL. At SWMUs 37 and 46, the MCL was used to calculate the site-specific SSLs for trichloroethene given the lack of other site-related constituents exceeding SSLs; this is consistent with EPA's default SSL calculation for a single constituent, which uses the MCL as its target soil leachate concentration (Soil Screening Guidance, Users Guide, 1996, Section 2.5.3 and Appendix A.).

At SWMUs 37 and 46, where TCE concentrations in soil exceed the site-specific SSL (calculated using the tap water RBC as the target leaching concentration), it is proposed that the soil to groundwater migration pathway be further evaluated as part of the SSP. One direct-push groundwater sample for VOC analysis is proposed at each site. The objective of the groundwater sampling is to confirm that TCE (and other VOCs) has not impacted groundwater at a level above its tap water RBC, thereby, confirming the appropriateness of the no further action recommendations at SWMUs 37 and 46.

USEPA Comment 27

Table I-22 in Appendix I provides wildlife receptor profiles for the different receptors evaluated in the preliminary ecological effects evaluation. In the Refinement Assessment section of table, the body weights for the American robin and the short-tailed shrew should actually be 0.08 and 0.022 kg wet weight, instead of 0.8 and 0.22 kg. The food chain models should be reviewed to ensure that the appropriate values are considered. References should also be provided for the home range values and large and small area use factors shown in the table.

Army Response

The body weights for the American robin and short-tailed shrew in Table I-22 will be revised to 0.08 and 0.022 kg wet weight, respectively. Table I-22 will be revised to include references for the home range values and large and small area use factors shown in the table. The values used in the food chain models will be reviewed and verified.

SUMMARY OF ACTION ITEMS FOR SSP REVISION

In response to the EPA/VDEQ comments received on the SSP Report (September 2004), the Army proposes the following revision recommendations to further assess sites as necessary and /or provide additional support for no further action recommendations:

SSP Site - Proposed RFI

Site	Proposed Action	Goal of Action
SWMU 13	Focused RFI	Provide further assessment.
SWMU 38	Focused RFI	Provide further assessment. Due to the proximity of the site to AOC Q, SWMU 38 and AOC Q will be assessed as one site.
SWMU 57	Focused RFI	Provide further assessment.
AOC Q	Focused RFI	Provide further assessment. Due to the proximity of the site to SWMU 38, SWMU 38 and AOC Q will be assessed as one site.

SSP Sites – Proposed Further Action in Support of NFAs

Site	Proposed Action	Goal of Action	Results Necessary to Achieve Goal
SWMU 37	Collect one groundwater sample for VOC analysis	Assess presence or absence of TCE in groundwater	TCE concentration < Tap Water RBC
SWMU 46	Collect one groundwater samples for VOC analysis	Assess presence or absence of TCE in groundwater	TCE concentration < Tap Water RBC
AOC A	Two additional soil samples (one at ditch terminus and one at midpoint of ditch under concrete)	Fill data gap and assess presence or absence of chemicals	Revised cumulative risk screens demonstrate that site-attributable risks are below the SSP thresholds.
AOC F	One additional soil sample in the ditch located adjacent to the AOC	Fill data gap and assess presence or absence of chemicals	Revised cumulative risk screens demonstrate that site-attributable risks are below the SSP thresholds

Upon concurrence from the EPA/VDEQ, the additional field activities with the exception of activities associated with the RFIs will be conducted and incorporated into the SSP Report prior to resubmission.

Response to VDEQ Comments Dated 29 March 2005
Received via email on 29 March 2005
Radford Army Ammunition Plant, Radford, Virginia
SWMUs 13, 37, 38, 46, 57, 68, 69 and AOCs A, F, & Q
Draft *Site Screening Process Report*

GENERAL COMMENTS

VDEQ Comment 1

Although a facility-wide ground water study is forthcoming the SSP should discuss the potential for ground water contamination based on the soil data. Specifically, the significance of SSL data should be discussed and compared to any historical ground water data that is available.

Army Response

SSP soil investigations at each of the sites were extended to the depth of groundwater and included an evaluation of potential releases to groundwater through soil sampling, comparison of chemical data to RBCs, SSLs, etc, and physical soil testing. At SWMUs 38, 68, and 69 and AOCs A, F, and Q, it was concluded that the potential for impact to groundwater was low based on the SSP screening results (cumulative risk screenings, SSLs, background comparisons, etc.), and therefore, no further evaluations of the groundwater migration pathway were proposed for these sites. Additional comparisons of SSLs to historical groundwater data are not possible for SWMUs 37, 38, 68, and 69 and AOCs A, F, and Q given the lack of historical groundwater data proximate to these sites.

The groundwater pathway for SWMU 13 is being evaluated as part of the RCRA permitting for this active area (hazardous waste management permit with VDEQ). These data will also be incorporated into facility-wide groundwater study. As discussed in Response to EPA Comments on the SSP Work Plan dated June 16, 2004 (Comment 1), SSP investigative activities for SWMU 13 focused on the area between the New River and the earthen berm that borders the southern portion of the active operational area. The objective of the SSP was to evaluate soil, sediment, and surface water migration pathways at the perimeter of SWMU 13 rather than groundwater within the active operational area.

One groundwater sample will be collected at SWMUs 37 and 46 and analyzed for VOCs to assess the potential migration of TCE to groundwater. The SSP report will be revised to include an evaluation of the groundwater data (using the SSP process) collected at SWMUs 37 and 46. The SSP Report will also be revised to discuss how the groundwater migration pathway will be evaluated at SWMU 13 (VDEQ permit, facility-wide groundwater study, and the proposed RFI) and SWMU 57 (as part of the proposed RFI).

SPECIFIC COMMENTS

VDEQ Comment 2

SWMU 37, 38, AOC Q - PCB's were detected in all samples that were analyzed for these compounds. Additional samples are required to better define the impact of PCB's in this area. Since SWMU 9 represent the source for the sludge present in the above-referenced units, it

would be helpful to include any available data from that unit in order to present a more complete conceptual model of potential contaminant sources and pathways. The area drainage results in a permitted discharge at Outfall #5. Have PCB's been detected at that location(Note that due to the fish tissue advisory for this section of the New River VDEQ is interested in any potential source for PCBs)?

Army Response
Although one PCB (Aroclor 1254) was detected in the samples collected from SWMU 37, SWMU 38, and AOC Q, the concentration detected for SWMU 37 was below the R-RBC and when taking background into consideration the site passed the human health cumulative risk screening. In addition, Aroclor 1254 was not identified as a COPC for AOC Q, which also passed the human health risk screening. The concentration detected at SWMU 38 exceeded the non-adjusted R-RBC. Due to the detection at SWMU 38, further assessment of this SWMU in the form of a focused RFI was recommended as part of RAAP 10. SWMU 9 is outside the purview of the facility's Installation Restoration Program (IRP) due to its operational history. Since this site was active after 1986, it therefore is ineligible for funding from the Army IRP, and thus this site cannot be evaluated as part of this SSP effort. Minimal data is available regarding SWMU 9 in the RCRA Facility Assessment Report and the Verification Investigation Report. Analysis of a sludge sample from SWMU 9 resulted in the classification of the sludge as non-hazardous for toxicity, reactivity, corrosivity, and ignitability. In addition, stormwater runoff drains internally for SWMU 37, SWMU 38, and AOC Q. The units are not equipped with overflow wiers; therefore, the runoff from the units does not discharge into Outfall #5. The concentrations of Aroclor 1254 at the three SSP sites in question are below the generic Region III SSLs.

SWMU 9 involved the same process and produced the same waste as SWMU 8. See response to EPA Comment 18.

VDEQ Comment 3

SWMU 57 - Chromium was detected (sample 57SB1C) well outside the pond boundary. It is not clear if this sample is related to the SWMU or if it indicates another source. Since the condition and permeability of the asphalt bottom is not known additional soil samples from beneath the bottom are required for a complete characterization of the soil. Site specific ground water investigation will eventually be required at this location.

Army Response
Boring 57SB1 was advanced in the location of the underground pipe that discharged into SWMU 57. The proposed RFI for SWMU 57 will include additional soil sampling below the asphalt liner and a site-specific groundwater investigation.

VDEQ Comment 4

SWMU 69 - Site specific ground water data will eventually be required at this location.

Army Response
SSL exceedances were limited to arsenic, antimony, chromium, manganese, and methylene chloride. The SSL exceedances of arsenic, chromium, and manganese were below the

facility background point estimate. The SSP was designed to evaluate whether releases of hazardous constituents occurred at sites and as such, Section 6.1.5 of the SSP guidance specifies a conservative comparison of MDCs to background point estimates can be used to qualitatively assess the data. The SSL exceedance for antimony was limited to one surface sample for which the intermediate sample was below the generic SSL. The methylene chloride exceedance was detected at a concentration below the reporting limit and is considered an artifact of analysis. At this site, it was concluded that the potential for impact to groundwater was low based on the SSP screening results (cumulative risk screenings, SSLs, background comparisons, etc.), and therefore, no further evaluations of the groundwater migration pathway were proposed for these sites.

VDEQ Comment 5

AOC A - The SSP indicated that the stained dirt ditch that was observed at this location was covered over with concrete. Samples of this stained soil under the concrete are required for a complete characterization of this area.

Army Response
Two additional soil samples will be collected from AOC A to address the data gaps identified by EPA and VDEQ and provide further support for the no further action recommendation. One sample will be collected at the terminus of the ditch and one at the midpoint of the concrete ditch below the concrete.

VDEQ Comment 6

AOC F - The drainageway receiving stormwater runoff from this area should also be sampled.

Army Response
One additional soil sample will be collected in the ditch located adjacent to AOC F to address the data gap identified by the EPA and VDEQ and provide further support for the no further action recommendation.

SUMMARY OF ACTION ITEMS FOR SSP REVISION

In response to the EPA/VDEQ comments received on the SSP Report (September 2004), the Army proposes the following revision recommendations to further assess sites as necessary and /or provide additional support for no further action recommendations:

SSP Site - Proposed RFI

Site	Proposed Action	Goal of Action
SWMU 13	Focused RFI	Provide further assessment.
SWMU 38	Focused RFI	Provide further assessment. Due to the proximity of the site to AOC Q, SWMU 38 and AOC Q will be assessed as one site.
SWMU 57	Focused RFI	Provide further assessment.
AOC Q	Focused RFI	Provide further assessment. Due to the proximity of the site to SWMU 38, SWMU 38 and AOC Q will be assessed as one site.

SSP Sites – Proposed Further Action in Support of NFAs

Site	Proposed Action	Goal of Action	Results Necessary to Achieve Goal
SMWU 37	Collect one groundwater sample for VOC analysis	Assess presence or absence of TCE in groundwater	TCE concentration < Tap Water RBC
SWMU 46	Collect one groundwater sample for VOC analysis	Assess presence or absence of TCE in groundwater	TCE concentration < Tap Water RBC
AOC A	Two additional soil samples (one at ditch terminus and one at midpoint of ditch under concrete)	Fill data gap and assess presence or absence of chemicals	Revised cumulative risk screens demonstrate that site-attributable risks are below the SSP thresholds.
AOC F	One additional soil sample in the ditch located adjacent to the AOC	Fill data gap and assess presence or absence of chemicals	Revised cumulative risk screens demonstrate that site-attributable risks are below the SSP thresholds

Upon concurrence from the EPA/VDEQ, the additional field activities with the exception of activities associated with the RFIs will be conducted and incorporated into the SSP Report prior to resubmission.

Radford Army Ammunition Plant
Route 114, P.O. Box 1
Radford, VA 24143-0100
USA

May 3, 2005

Mr. Robert Thomson
U. S. Environmental Protection Agency
Region III
1650 Arch Street
Philadelphia, PA 19103-2029

Subject: Site Screening Process Report for Solid Waste Management Units 13, 37, 38, 46, 57, 68, 69 and Areas of Concern A, F, Q
Draft Document, September 2004
Radford Army Ammunition Plant
EPA ID# VA1 210020730

Dear Mr. Thomson:

We request an extension to July 12, 2004 to respond to your March 7, 2005 letter on the subject report. We will include a response to Mr. Cutler's letter of March 29, 2005 as his comments are similar.

Please coordinate with and provide any questions or comments to myself at (540) 639-8266, Jerry Redder of my staff (540) 639-7536 or Jim McKenna, ACO Staff (540) 639-8641.

Sincerely,

C. A. Jake

C. A. Jake, Environmental Manager
Alliant Ammunition and Powder Company LLC

c: Russell Fish, P.E., EPA Region III
Jim Cutler
Virginia Department of Environmental Quality
P. O. Box 10009
Richmond, VA 23240-0009

Durwood Willis
Virginia Department of Environmental Quality
P. O. Box 10009
Richmond, VA 23240-0009

E. A. Lohman
Virginia Department of Environmental Quality
West Central Regional Office
3019 Peters Creek Road
Roanoke, VA 24019

Tony Perry
U.S. Army Environmental Center
5179 Hoadley Road, Attn: SFIM-AEC-CDN
Aberdeen Proving Ground, MD 21010-5401

05-815-98
JMcKenna/JJRedder

McKenna, Jim

From: Druck, Dennis E Mr USACHPPM [dennis.druck@us.army.mil]
Sent: Thursday, April 14, 2005 6:10 AM
To: McKenna, Jim
Cc: Tony Perry (E-mail); Stephen. C. Wood (E-mail); jim spencer (E-mail); Parks Jeffrey N (E-mail)
Subject: RE: Response to USACPPM comments on the SSP Report

Jim, Thanks for the responses. They explain my concerns and I concur with them. Dennis

---

From: McKenna, Jim [mailto:Jim_McKenna@ATK.COM]
Sent: Monday, April 11, 2005 9:19 AM
To: Druck, Dennis E Mr USACHPPM
Cc: Tony Perry (E-mail); Stephen. C. Wood (E-mail); jim spencer (E-mail); Parks Jeffrey N (E-mail)
Subject: Response to USACPPM comments on the SSP Report

Dennis, attached file contain the above subject.

Jim Spencer, note I edited the response to the last comment.

<<11 Apr 05 JJM edits RTC CHPPM Comments SSP Report 05.doc>>

Jim McKenna
IMPORTANT NOTE: When replying to this message please cut and paste Jim_McKenna@ATK.com into the address line. Please do not hit the reply button. Thanks.

McKenna, Jim

From: McKenna, Jim
Sent: Monday, April 11, 2005 8:19 AM
To: USACHPPM Druck (E-mail)
Cc: Tony Perry (E-mail); Stephen. C. Wood (E-mail); jim spencer (E-mail); Parks Jeffrey N (E-mail)
Subject: Response to USACPPM comments on the SSP Report

Dennis, attached file contain the above subject.

Jim Spencer, note I edited the response to the last comment.



11 Apr 05 JJM edits RTC CHPPM ...

Jim McKenna
IMPORTANT NOTE: When replying to this message please cut and paste Jim_McKenna@ATK.com into the address line. Please do not hit the reply button. Thanks.

Response to U.S. Army Center for Health Promotion and Preventive Medicine (CHPPM) Comments
Received via email on 02 February 2005
Radford Army Ammunition Plant, Radford, Virginia
SWMUs 13, 37, 38, 46, 57, 68, 69 and AOCs A, F, & Q
Draft *Site Screening Process Report*

COMMENTS

CHPPM Comment 1 Page 3-7, Section 3.3.1

Scope of Work

Comment: This paragraph only mentions Steps 1 and 2 and does not include Step 3a.

Recommendation: Suggest including a brief description of Step 3a.

Radford Response

The SSP process (see Appendix B page 6-11 of the SSP Report) focuses on Steps 1 and 2 of the 8-step ecological risk assessment process for Superfund. A brief description of Step 3a will be included in the revised SSP submitted to EPA and VDEQ.

CHPPM Comment 2 - Page 4-16, Section 4.7.2.2

Background Concentrations of Metals

Comment: On page 4-6, section 4.5.2 discusses taking both upstream and downstream surface water and sediment samples. However, this section only gives the results of background screening for soil.

Recommendation: A discussion of upstream vs. downstream surface water and sediment sample results should be included here.

RFAAP Response

A discussion of upstream vs. downstream surface water and sediment results will be added to Section 4.5.2 of the revised SSP to be submitted to EPA and VDEQ.

CHPPM Comment 3 - Page 10-6, Section 10.7.1.1

Ecological Site Characterization

Comment: If the description of AOC A as a concrete ditch that precludes the presence of any habitat is correct, what value is provided by evaluating plants, soil invertebrates and microbial

communities, and terrestrial wildlife (robin, vole, and shrew)?

Recommendation: To retain the technical veracity of the other portions of this report, suggest removing any quantitative ecological risk screening for this site and simply state the obvious, namely that concrete ditches are not appropriate for such ecological evaluations.

RFAAP Response

The EPA and VDEQ have identified data gaps at AOC A with regard to identifying potential releases/discharges in this area, specifically at the terminus of the concrete where runoff percolates into the ground (EPA) and stained soil underlying the concrete (VDEQ). Additional soil sampling is proposed at the terminus of the concrete where runoff would percolate into surface soil to fill the identified data gaps in the SSP evaluation and associated human health and ecological risk screening.

CHPPM Comment 4 - Page 12-3, Section 12.3

Recommendations

Comment: Sites 38 and 57 only presented a potential health threat for the hypothetical residential future use scenario, not the industrial scenario. If the reasonably anticipated future use of Sites 38 and 57 will remain the same as the current use, namely industrial, then why does the report recommend "further investigation and human health risk assessment" for these sites?

Recommendation: Unless there is some justification that was not given in the report, these two sites should not be recommended for further investigation.

RFAAP Response

The SSP requires additional action or investigation (i.e., completion of a focused RCRA Facility Investigation (RFI) with appropriate risk assessments) if the conservative risk screening fails under the residential scenario. Although the future land use for these sites is expected to be industrial, the Army is evaluating the residential exposure pathways at these sites (through a focused RFI) to assess what the effort would be to obtain clean close out under a future residential scenario. Clean closeout has potential cost advantages over waste in place close out (under a future industrial scenario) by eliminating long term costs and allowing for tenant use.

DEPARTMENT OF THE ARMY
US ARMY CENTER FOR HEALTH PROMOTION AND PREVENTIVE MEDICINE
5158 BLACKHAWK ROAD
ABERDEEN PROVING GROUND MD 21010-5403

17 MAR 2005

MCHB-TS-REH

MEMORANDUM FOR Office of Environmental Quality (SJMRF-OP-EQ/Mr. Jim McKenna), Radford Army Ammunition Plant, P.O. Box 2, Radford, VA 24143-0002

SUBJECT: Review of the Draft Site Screening Process Report for Solid Waste Management Units 13, 37, 38, 46, 57, 68, 69, and Areas of Concern A, F, Q, Radford Army Ammunition Plant, Virginia, September 2004

1. The U.S. Army Center for Health Promotion and Preventive Medicine reviewed the subject document on behalf of the Office of The Surgeon General pursuant to Army Regulation 200-1 (Environmental Protection and Enhancement). Thank you for the opportunity to review this report.

2. Comments are enclosed that recommend text to improve clarity and focus of the subject document. We are also concerned about the necessity of further study for sites 38 and 57.

3. The document was reviewed by Mr. Dennis Druck, Environmental Health Risk Assessment Program. He can be reached at DSN 584-2953, commercial (410) 436-2953 or electronic mail "dennis.druck@us.army.mil".

FOR THE COMMANDER:

Encl

JACK M. HELLER, Ph.D.
Director, Health Risk Management

CF:
HQDA (DASG-HS-PE) (w/o encl)
IMA, NERO (SFIM-NE-PW-ER) (w/encl)
USACE (CENWO-HX-H) (w/encl)
USAEC (SFIM-AEC-CD/Mr. Tony Perry) (w/encl)
Steve Wood, CENAB
J. M. Spencer, URS

Comments and Recommendations
Review of the Draft Site Screening Process Report for Solid Waste Management Units 13, 37, 38, 46, 57, 68, 69, and Areas of Concern A, F, Q, Radford Army Ammunition Plant, Virginia, September 2004

1. Page 3-7, Section 3.3.1
   Scope of Work
   Comment: This paragraph only mentions Steps 1 and 2 and does not include Step 3a.
   Recommendation: Suggest including a brief description of Step 3a.

2. Page 4-16, Section 4.7.2.2
   Background Concentrations of Metals
   Comment: On page 4-6, section 4.5.2 discusses taking both upstream and downstream surface water and sediment samples. However, this section only gives the results of background screening for soil.
   Recommendation: A discussion of upstream vs. downstream surface water and sediment sample results should be included here.

3. Page 10-6, Section 10.7.1.1
   Ecological Site Characterization
   Comment: If the description of AOC A as a concrete ditch that precludes the presence of any habitat is correct, what value is provided by evaluating plants, soil invertebrates and microbial communities, and terrestrial wildlife (robin, vole, and shrew)?
   Recommendation: To retain the technical veracity of the other portions of this report, suggest removing any quantitative ecological risk screening for this site and simply state the obvious, namely that concrete ditches are not appropriate for such ecological evaluations.

4. Page 12-3, Section 12.3
   Recommendations
   Comment: Sites 38 and 57 only presented a potential health threat for the hypothetical residential future use scenario, not the industrial scenario. If the reasonably anticipated future use of Sites 38 and 57 will remain the same as the current use, namely industrial, then why does the report recommend "further investigation and human health risk assessment" for these sites?
   Recommendation: Unless there is some justification that was not given in the report, these two sites should not be recommended for further investigation.

Encl

Rec'd ENV 4-4-05

05-40

c: Jake Ledder McKenna ENV file

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

W. Tayloe Murphy, Jr.
Secretary of Natural Resources

Street address: 629 East Main Street, Richmond, Virginia 23219
Mailing address: P.O. Box 10009, Richmond, Virginia 23240
Fax (804) 698-4500 TDD (804) 698-4021
www.deq.state.va.us

Robert G. Burnley
Director

(804) 698-4000
1-800-592-5482

March 29, 2005

Mr. Jim McKenna
Radford Army Ammunition Plant
Route 114, P.O. Box 1
Radford, Virginia 24143-0100

Re: Draft Site Screening Process Report, Radford Army Ammunition Plant

Dear Mr. McKenna:

The Virginia Department of Environmental Quality(VDEQ) has reviewed the Draft Site Screening Process Report (SSP) for Radford Army Ammunition Plant and offer the following comments.

General

Although a facility-wide ground water study is forthcoming the SSP should discuss the potential for ground water contamination based on the soil data. Specifically, the significance of SSL data should be discussed and compared to any historical ground water data that is available.

SWMU 37, 38, AOC Q

PCB's were detected in all samples that were analyzed for these compounds. Additional samples are required to better define the impact of PCB's in this area. Since SWMU 9 represent the source for the sludge present in the above-referenced units, it would be helpful to include any available data from that unit in order to present a more complete conceptual model of potential contaminant sources and pathways. The area drainage results in a permitted discharge at Outfall #5. Have PCB's been detected at that location(Note that due to the fish tissue advisory for this section of the New River VDEQ is interested in any potential source for PCBs)?

SWMU 57

Chromium was detected (sample 57SB1C) well outside the pond boundary. It is not clear if this sample is related to the SWMU or if it indicates another source. Since the condition and permeability of the asphalt bottom is not known additional soil samples from beneath the bottom

are required for a complete characterization of the soil. Site specific ground water investigation will eventually be required at this location.

SWMU 69

Site specific ground water data will eventually be required at this location.

AOC A

The SSP indicated that the stained dirt ditch that was observed at this location was covered over with concrete. Samples of this stained soil under the concrete are required for a complete characterization of this area.

AOC F

The drainageway receiving stormwater runoff from this area should also be sampled.

Please contact me at (804) 698-4498 if you have any questions or comments regarding the above site.

Sincerely,

James L. Cutler, Jr., CPG
Federal Facilities Project Manager

cc: C.A. Jake, ATK
Robert Thompson, US EPA Region 3
Durwood Willis, DEQ
Norman Auldridge, VDEQ-WCRO

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

March 7, 2005

In reply
Refer to 3HS13

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Commander,
Radford Army Ammunition Plant
Attn: SIORF-SE-EQ (Jim McKenna)
P.O. Box 2
Radford, VA 24141-0099

C.A. Jake
Environmental Manager
Alliant Techsystems, Inc.
Radford Army Ammunition Plant
P.O. Box 1
Radford, VA 24141-0100

Re: Radford Army Ammunition Plant, Radford, Virginia
SWMUs 13, 37, 38, 46, 57, 68, 69 and AOCs A, F, & Q
Draft *Site Screening Process Report*

Dear Mr. McKenna and Ms. Jake:

The U.S. Environmental Protection Agency (EPA) has reviewed the U.S. Army's (Army's) September, 2004 draft *Site Screening Process Report* (SSP Report) for the investigation of SWMUs 13, 37, 38, 46, 57, 68, 69 and Areas of Concern (AOCs) A, F, and Q, located at the Radford Army Ammunition Plant (RFAAP). Outlined below, please find EPA's comments based upon that review:

GENERAL COMMENTS

1. The draft *SSP Report* does not explain why the potential for groundwater contamination has not been evaluated for the Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) identified. Site related soil screening levels (SSLs) for migration to groundwater were exceeded at SWMUs 13, 37, 46 and 57 for bromodichloromethane, 1,3-dinitrobenzene, chloroform and trichloroethylene (TCE). It is understood that, based on Work Plan Addendum No. 16 - *Site Screening Process for Solid Waste*

Management Units 13, 37, 38, 46, 57, 68, 69, 75, 76 and Areas of Concern A, F and Q, Work Plan Addendum 016 (URS 2003) - the site screening process is geared toward a screening-level evaluation of constituent concentrations in soil and that Radford Army Ammunition Plant (RFAAP) is assessing subsurface flow characteristics and constituent concentrations in groundwater on a site-wide, holistic basis through the implementation of Area Groundwater Studies. This approach has been utilized at other Federal facilities, even to the extent of separating the groundwater and soils into separate operable units. It has also been utilized in other work plan addendums for RFAAP (e.g., Work Plan Addendum No. 12). However, the characterization of individual SWMUs and AOCs (and thus, determination of future actions) is not complete until the groundwater investigation at each SWMU or AOC is completed. This facility-wide groundwater investigation must be comprehensive enough to characterize the groundwater at the individual SWMUs and AOCs. EPA recognizes the complex nature (karst) of the groundwater at the site and will consider the groundwater concerns at individual SWMUs during review of the site-wide groundwater study. However, it is recommend that the groundwater pathway be evaluated for SWMUs and AOCs that have groundwater monitoring data (e.g., SWMU 13, for which extensive quarterly monitoring data are available). In addition, please revise the draft *SSP Report* to include a summary discussion of groundwater conditions at these SWMUs and AOCs. The investigative sections of the draft *SSP Report* should at least discuss how potential groundwater contaminations at these SWMUs and AOCs will be addressed.

2. The tables included in the draft *SSP Report* do not provide definitions for all data qualifiers used. As examples, Table 4-3 includes a column for laboratory qualifiers, validation qualifiers and reason codes. However, the qualifiers used ("E", "N", "J", "B", "t" and "x") are not defined on the table. Table 4-8 includes data flags "A" and "J", however, definitions for "A" and "J" are not included on the table. Please revise the draft *SSP Report* to include definitions for all data qualifiers used.

3. Several references appear throughout the document to background concentrations of organic constituents. For example, it is stated on page 5-21 that, "the MDCs [maximum detected concentration] for COPCs [constituent of potential concern] detected above background (chromium and Aroclor 1254) are below their unadjusted R-RBCs [Residential Risk Based Concentration]." It is further stated on page 10-5 that, "the MDC for the COPC detected above background (2,4-DNT) is below the unadjusted R-RBC." Constituents that are not naturally-occurring, such as 2,4-DNT and Aroclor 1254, should **not** have a background concentration, since their presence in environmental media implies an anthropogenic impact. In addition, the *Facility-Wide Background Study, Final Document* (December 2001) indicates that explosives and organic compounds were used as background markers to discern potential contamination associated with selected background sample locations, and background concentrations are only provided for a select group of metals. Although the draft *SSP Report* only provides background data for metals, these statements imply that

background comparisons were made for all detected constituents. Revise the draft *SSP Report* to remove all references to background comparisons for organic constituents.

4. It is stated in Section 3.2.2, Cumulative Risk Screen, that "if the cumulative HI [hazard index] for a site is greater than or equal to 0.5 for a target organ, then a quantitative RA [risk assessment] would be recommended for the site." However, with the exception of SWMU 57, it does not appear that quantitative RAs were conducted (or recommended) for units where the HI was greater than or equal to 0.5 for one or more target organs. These elevated HIs were determined to be the result of exposure to constituents detected at concentrations less than their site-wide background concentrations, and these units were recommended for no further action (NFA). Please provide information to justify the NFA recommendation for units that appear to meet the criteria for quantitative RA recommendations, as described in Section 3.2.2.

5. The quantitative estimates of risk and hazard are, in some cases, provided in up to three significant figures. However, this may imply a greater degree of certainty in the estimate than actually exists, since the precision of a risk assessment can be no better than the least certain input parameter. Therefore, it is usually only appropriate to use one significant figure when presenting quantitative estimates of risk and hazard. Please consider revising the level of certainty reported for the quantitative estimates of risk and hazard.

6. The ecological site characterization for many of these sites states that the lack of habitat and the disturbed nature of the site greatly limit its capacity to support wildlife. This is generally not supported by accompanying text which states that observations made during site reconnaissance indicate that a viable herbaceous vegetation community occurs at the site, and there are no signs of stressed vegetation. This conclusion of the lack of habitat is also not supported by the pictures of the site, which show viable productive grassland communities. These types of communities would support valuable habitat for many different wildlife receptors.

7. The tables showing the results of food chain modeling (i.e., Tables 4-29 through 4-31 for SWMU 13) show a much smaller list of chemicals than the list of bioaccumulative chemicals that should be evaluated by food chain modeling. An explanation should be provided stating why the other bioaccumulative chemicals were not evaluated or if they were, why the results do not appear in the tables.

8. Tables 4-26, 5-32, 5-33, 5-34, 6-12 and 7-13 contain the preliminary soil invertebrate risk characterization for different sites. The direct contact TRVs listed are from one of three sources. Of the values selected from the EPA Region III BTAG screening level document, only one (cyanide) appears to be correct. Chromium, iron, mercury, nickel and zinc values are inconsistent

from table to table. The purpose of these tables is not clear since essentially this information is presented in the COPEC Selection tables. Please correct.

SPECIFIC COMMENTS

9. **Section 1.0, Introduction, page 1-1:** The first paragraph of this section states that this Report presents the results and findings of the RCRA investigations conducted at Radford Army Ammunition Plan (RFAAP) for nine SWMUs and three AOCs. However, results are presented for seven SWMUs and three AOCs. Work Plan Addendum No. 16 listed SWMUs 75 (Used Oil Storage Tank) and SWMU 76 (Oil Tanks) as units not requiring field activities because either impact was to groundwater only (SWMU 75), which will be evaluated on a site-wide basis or the unit will be addressed by another regulatory mechanism (SWMU 76 State closure). Please revise the draft *SSP Report* to resolve this discrepancy and state that SWMUs 75 and 76 were not investigated for the SSP.

10. **Section 3.2.7, Page 3-4:** The background and onsite comparison should be based on a statistical analysis of comparison of the mean concentration, not just the UTLs.

11. **Section 3.3.4.1, Page 3-8:** presents the approach used to collect and analyze data for evaluation of ecological risk. The section states that the soil layer from 0 to 1 foot below ground surface (bgs) is the most appropriate data set to assess potential terrestrial exposure. If this is the most appropriate layer for evaluating ecological risk, it is unclear why soil was collected from 0 to 6 inches bgs for evaluation of ecological risk (Section 2.5.1 on page 2-3.) In lieu of site specific data pertaining to the depths of the O and A soil horizons, the EPA BTAG generally recommends the use of soil from 0 to 6 inches and 6 to 24 inches bgs for the evaluation of ecological risk. This issue should be clarified.

12. **Section 3.3.7.3** states that to evaluate direct toxicity to soil invertebrates and microbial communities, toxicity reference values were selected. The section provides references to values other than the EPA BTAG screening values, including Oak Ridge National Laboratory (ORNL) microbial and earthworm values, and ORNL preliminary remediation goals. A review of site specific evaluations indicates that these values were often used instead of the EPA BTAG screening values. Please note that if the EPA Eco-SSLs or the EPA BTAG screening values exist, they are to be utilized for the evaluation of direct toxicity to invertebrates and microbial communities.

13. **Section 3.3.9.2, Page 3-14** discusses the uncertainty with the risk characterization because the bioavailability of the chemicals of concern is unknown, and it is assumed that the total concentrations are bioavailable and toxic. The EPA agrees that this creates uncertainty. In order to begin to reduce this uncertainty, the EPA has recommended the collection of soil for pH, organic carbon and grain size. These can be used to more quantitatively

evaluate bioavailability of specific chemicals. While these were measured at every site, no effort was made at specific sites to evaluate bioavailability on a site-specific basis.

14. **Section 3.3.9.6, Page 3-15:** discusses the uncertainty with the hazard quotient (HQ) method, and that uncertainty is primarily associated with the assumption that a HQ greater than 1 is an adequate indicator of the potential for ecological risk of individual chemicals. EPA agrees that a HQ greater than one does not necessarily mean there is risk for individual receptors. However, a HQ greater than one indicates the potential for risk, and, thus, necessitates the need for additional ecological evaluation to reduce uncertainty.

15. **Section 4.6.1.3, Page 4-8:** The lead evaluation for SWMU 13 states that the results of the IEUBK model for the site indicated a percentage of children expected to have blood [lead] levels of 10 ug/dL or greater. However, the IEUBK model does not actually make such population estimates. Rather, the model "allows the user to estimate a plausible distribution of blood lead concentrations centered on a geometric mean blood lead concentration... From this distribution, the model estimates the probability that a child's, or population of children's, blood lead concentration will exceed a certain level of concern (typically 10 ug/dL)." Although this distinction does not change the decision outcome for SWMU 13, and does not require a revision to the draft *SSP Report*, the distinction between predicting an outcome and predicting the probability of an outcome should be made in future reports.

16. **Table 4-27:** shows the risk evaluation for invertebrates exposed to sediment. The table lists freshwater sediment screening values, however, no source of the values is provided. The sources for the Freshwater Sediment Screening Values should be provided and listed in the table.

17. **Section 5.1:** discusses site background and environmental setting for SWMUs 37, 38 and AOC Q. On page 5-2, the section states that monitoring well data indicates that groundwater flow is northwest toward the New River. Based on this statement, it appears that the migration pathway to the New River may be complete. The section should state how this migration pathway will be addressed.

18. **Section 5.7.4.3, Page 5-16**: states that "nutrients", including calcium, were not considered contaminants of potential concern in the risk screening in accordance with the Site Screening Process and Master Work Plan. However, because these sites specifically received calcium sulfate sludge, calcium and sulfate are considered COPCs given the operational history of the sites. Additionally, the concentrations of calcium are extremely elevated (i.e., 106,000 mg/kg at SWMU 37) in the soil, and the potential risk from this elevated calcium should be evaluated. "Nutrients" can be toxic at high enough concentrations. The potential risk from elevated sulfate concentrations in soil should also be evaluated. Until this issue is addressed, EPA does not support the conclusion of no further action.

19. **Section 5.7.5.1, Page 5-18:** states that in the refined food chain model for SWMU 37, SWMU 38 and AOC Q, a realistic area use factor (AUF) was calculated as the ratio of the size of each of the site areas to the average home range of the receptor. Based on information presented in Appendix I, food chain risk was evaluated for each site separately by calculating a site-specific AUF. Because these three sites are in close proximity to each other, it would be more appropriate to calculate an AUF based on the total area of the three sites together, and evaluate food chain risk from the three sites collectively. SWMU 9 should also be considered in this evaluation. Otherwise, the cumulative risk from these sites would be underestimated. Until this issue is addressed, EPA does not support the conclusion of no further action for these sites.

20. **Table 5-39:** provides the results of the preliminary and refined ecological risk characterization for SWMU 38. The maximum surface soil concentration for chromium is listed as 114 mg/kg. This is actually the maximum detected concentration for SWMU 37. The maximum detected concentration of chromium at SWMU 38 is actually 82 mg/kg. Please correct in the draft *SSP Report*.

21. **Section 7.7.5, Page 7-10:** states that the maximum surface soil concentrations for aluminum, antimony, cadmium, chromium, iron, lead, manganese, zinc and cyanide in surface soil exceed their respective direct contact toxicity reference values at SWMU 57 and therefore, may pose risk to soil invertebrates and microbes. Only aluminum was below the background concentration. The last paragraph of this section states that based on the ecological risk screening results, there is adequate information to conclude that ecological risk is negligible at SWMU 57. This conclusion is not supported based on the exceedances of metals in surface soil. Based on this information, the no further action for ecological risk recommended in Section 7.9 on page 7-11 is not supported.

22. **Section 8.7.1.1, Page 8-7:** states that observations made during site reconnaissance indicate that a viable community of transitional vegetation occurs at SWMU 68, and there were no signs of vegetative stress. This is not supported by the photograph on page 8-1 which shows large areas of dead or sparse vegetation. This issue should be clarified in the draft *SSP Report*.

23. **Section 9.7.2, Page 9-8:** states that SWMU 69 is comprised exclusively of terrestrial habitat, and soil represents the only exposure media to ecological receptors. This is not supported by Section 9.2 on page 9-1 which states that the supernatant from SWMU 69 was discharged to a perennial stream that flows to the New River, and Section 9.3.4 on page 9-3 which states that the New River and Tributaries Study conducted in 1997 found ten metals in excess of EPA BTAG screening values in sediment collected from the perennial stream downgradient of SWMU 69. EPA recommends that this perennial stream be evaluated for potential ecological risk. EPA does not agree with the no further action recommendation in Section 9.9 until this migration pathway is evaluated.

24. **Section 10.1, Page 10-1:** states that Area of Concern A consists of a concrete-lined ditch that collected runoff from the Nitrocellulose A-Line. The section states that runoff appears to flow northward along the ditch and percolate into the soil at the terminus of the concrete swale. However, Section 10.5 on page 10-2 states that as part of the SSP, three samples were collected adjacent to the swale. Based on the photograph on page 10-1, these appear to be upgradient of the swale. It is unclear why soil samples were not collected at the terminus of the concrete where runoff percolated into the ground. EPA believes that this represents a data gap. Because of this data gap, the no further action recommendation provided in Section 10.9 is not supported.

25. **Section 11.7.2, Page 11-6:** states that Area of Concern F is comprised exclusively of terrestrial habitat, and soil represents the only exposure media to ecological receptors. This is not supported by Section 11.1 on page 11-1 which states that the runoff from AOC F flows northwest across the site toward a well-defined drainageway that flows west eventually discharging into the New River. Section 11.5 on page 11-2 states that samples were only collected within the gravel area. Despite the proximity of the ditch (Figure 11-1), no samples have been collected from this drainageway. An explanation should be provided stating why this drainageway has not been sampled. Until this issue is addressed, EPA does not agree with the no further action recommendation provided in Section 11.9.

26. **Appendix F – Site-specific SSLs for Groundwater:** EPA recommends that a risk-based tap water concentration be used in the calculations of the SSLs, not the MCL. The MCL might not be protective enough, especially when multiple contaminants are present in the soil. Additionally, the MCL is an ARAR not a risk-based clean-up goal (PRG), and not necessarily wholly derived from a risk-based perspective.

27. **Table I-22 in Appendix I** provides wildlife receptor profiles for the different receptors evaluated in the preliminary ecological effects evaluation. In the Refinement Assessment section of table, the body weights for the American robin and the short-tailed shrew should actually be 0.08 and 0.022 kg wet weight, instead of 0.8 and 0.22 kg. The food chain models should be reviewed to ensure that the appropriate values are considered. References should also be provided for the home range values and large and small area use factors shown in the table.

This concludes EPA's review of the Army's September, 2004 draft *SSP Report* for the investigation of SWMUs 13, 37, 38, 46, 57, 68, 69 and AOCs A, F, and Q, located at the RFAAP. The referenced draft *SSP Report* is disapproved by EPA in its current form, and must be revised to reflect the comments above. Per Part II, Section E.4.e. of the EPA RCRA Corrective Action Permit, the Army is required to revise the draft document and submit a revised draft copy to EPA for review within 60 days of the receipt of EPA comments on the draft document. Part II, Section E.4.f. of the Permit

allows for an additional 20 days for issuing the revised draft document to EPA, provided that timely notice is given, i.e. within 10 days. Additional time extensions can be requested under Part II, Section F. of the permit.

If you have any questions, please call me at 215-814-3357.

Sincerely,

Robert Thomson, PE, REM
Federal Facilities Branch

cc: Russell Fish, EPA
Leslie Romanchik, VDEQ-RCRA
James Cutler, VDEQ-CERCLA



Radford Army Ammunition Plant
Route 114, P.O. Box 1
Radford, VA 24141
USA

November 10, 2004

Mr. Robert Thomson
U. S. Environmental Protection Agency
Region III
1650 Arch Street
Philadelphia, PA 19103-2029

Subject: Site Screening Process Report for Solid Waste Management Units 13, 37, 38, 46, 57, 68, 69 and Areas of Concern A, F, Q Draft Document, September 2004
Radford Army Ammunition Plant
EPA ID# VA1 210020730

Dear Mr. Thomson:

Enclosed is one certified copy of Site Screening Process Report for Solid Waste Management Units 13, 37, 38, 46, 57, 68, 69 and Areas of Concern A, F, Q Draft Document, September 2004 Radford Army Ammunition Plant, for your review and comment or approval. Your additional three copies will be sent under separate cover as well as additional copies to the Virginia Department of Environmental Quality (VDEQ), U.S. Army Environmental Center, U.S. Army Center for Health Promotion and Preventive Medicine.

Please coordinate with and provide any questions or comments to myself at (540) 639-8266, Jerry Redder of my staff (540) 639-7536 or Jim McKenna, ACO Staff (540) 639-8641.

Sincerely,

C. A. Jake, Environmental Manager
Alliant Ammunition and Powder Company LLC

Enclosure

w/o enclosure

c: Russell Fish, P.E., EPA Region III

w/enclosure

Durwood Willis (2 copies)
Virginia Department of Environmental Quality
P. O. Box 10009
Richmond, VA 23240-0009

E. A. Lohman
Virginia Department of Environmental Quality
West Central Regional Office
3019 Peters Creek Road
Roanoke, VA 24019

04-815-168
JMcKenna/JJRedder

Tony Perry
U.S. Army Environmental Center
5179 Hoadley Road, Attn: SFIM-AEC-CDN
Aberdeen Proving Ground, MD 21010-5401

Keith Williams
U.S. Army Center for Health Promotion and Preventive Medicine
5158 Blackhawk Road, Attn: MCHB-TS-REH
Aberdeen Proving Ground, MD 21010-5403

John Tesner
Corps of Engineers, Baltimore District
ATTN: CENAB-EN-HM
10 South Howard Street
Baltimore, MD 21201

Concerning the following:

Site Screening Process Report for Solid Waste Management Units 13, 37, 38, 46, 57, 68, 69 and Areas of Concern A, F, Q
Draft Document, September 2004
Radford Army Ammunition Plant

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

SIGNATURE:
PRINTED NAME: Anthony R. Skinner
TITLE: LTC, CM, Commanding
Radford AAP

SIGNATURE:
PRINTED NAME: for Anthony Miano
TITLE: Vice President Operations
Alliant Ammunition and Powder Company LLC

04-815-168
JMcKenna/JJRedder

RADFORD ARMY AMMUNITION PLANT
RADFORD, VIRGINIA

Site Screening Process Report for Solid Waste Management Units 13, 37, 38, 46, 57, 68, 69, and Areas of Concern A, F, Q

FINAL
MAY 2007

PREPARED BY:

URS

5540 Falmouth Street, Suite 201
Richmond, Virginia 23230
(804) 965-9000 main
(804) 965-9764 fax

ARCHITECT-ENGINEER SERVICES
CONTRACT NO. DACA31-00-0011
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EXECUTIVE SUMMARY

URS Group, Inc. (URS) conducted a Resource Conservation and Recovery Act (RCRA) Site Screening Process (SSP) at the Radford Army Ammunition Plant (RFAAP) for seven Solid Waste Management Units (SWMUs) and three Areas of Concern (AOCs). The SSP was performed in accordance with the U.S. Environmental Protection Agency (USEPA) Region III and Virginia Department of Environmental Quality (VDEQ)-approved Master Work Plan (MWP) Addendum 016 (URS 2003a) and the requirements set forth in the 2000 RCRA permit for RFAAP (USEPA, 2000a).

The SSP was designed to assess: whether releases of hazardous substances, pollutants, contaminants, hazardous wastes, or hazardous constituents have occurred to the environment at the sites evaluated, whether further investigation (i.e., risk assessment or RCRA Facility Investigation (RFI)) or an interim removal action is appropriate at a site, or whether no further action (NFA) at a site is appropriate. Five steps were completed for the SSP including: 1) performance of a desktop audit and site visit to develop the scope of the SSP Work Plan, 2) preparation of a SSP site-specific Work Plan, 3) performance of the field work in accordance with the approved SSP Work Plan, 4) evaluation of the SSP data and completion of pre-remedial risk screening, and 5) assessment of the need for further investigation, interim removal action, or preparation of a "No Further Action" Decision Document, per the RCRA Corrective Action permit based on the results of the SSP and risk screening.

The following 10 sites were evaluated for the SSP:

Site	Description
SWMU 13	Waste Propellant Burning Ground
SWMU 37	$CaSO_4$ Drying Bed
SWMU 38	$CaSO_4$ Drying Bed
AOC Q	$CaSO_4$ Treatment Disposal Area
SWMU 46	Propellant Burial Area
SWMU 57	Pond by Buildings 4931 & 4928
SWMU 68	Chromic Acid Treatment Tanks
SWMU 69	Pond by Chromic Acid Treatment Tanks
AOC A	Nitrocellulose Rainwater Ditch
AOC F	Former Drum Storage Area

Human health risk screening was conducted for each the 10 sites and metals were the primary chemicals of potential concern (COPCs). Background levels of metals were the risk and hazard drivers for each of the sites except for SWMU 13 (lead), SWMU 38 (PCBs), and SWMU 57 (antimony cadmium, chromium, iron, and manganese). With the exception of AOC A, each of the sites passed the industrial risk screenings. Six sites were considered to pass the human health risk screening process including: SWMU 37, SWMU 46, SWMU 68, SWMU 69, AOC F, and AOC Q. Four sites were considered to fail the human health risk screening including: SWMU 13 (lead), SWMU 38 (PCBs), SWMU 57 (metals), and Area A (metals and explosives).

Ecological risk screening was conducted for each of the 10 sites. Metals and cyanide were the primary constituents of potential ecological concern (COPECs). Each of the sites required a refined exposure assessment and risk characterization due to COPEC maximum detected concentrations (MDCs) above no observable adverse effects levels (NOAEL) and lowest observable adverse effects levels (LOAELs). Excluding SWMU 13 terrestrial soil for which a refined risk characterization was not completed due to due to lead levels in soil and the results of the human health lead screening.

The results of the preliminary invertebrate direct contact and refined wildlife ingestion risk characterization at each of the sites indicated there is adequate information to conclude that ecological risks are negligible at SWMUs 46, 68, 69, and AOC F, and therefore, there is no need for further action at these SSP sites on the basis of ecological risk.

Based on the results of the SSP evaluations: NFA is recommended for SWMU 46, SWMU 68, SWMU 69, and AOC F. Further investigation and completion of RFIs are recommended at SWMUs 37, 38, and AOC Q (metals, pesticides, PCBs, and VOCs), SWMU 57 (metals and VOCs); and AOC A (metals, pesticides, PCBs, and explosives).

Further investigation and risk assessment is recommended for lead in soil at locations south of the current operational area of SWMU 13 (i.e., between the earthen berm and the New River) and lead for sediment in the New River (ecological).

SOIL SCREENING PROCESS REPORT
FOR SOLID WASTE MANAGEMENT UNITS 13, 37, 38, 46, 57, 68, 69,
AND AREAS OF CONCERN A, F, Q
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LIST OF ABBREVIATIONS AND ACRONYMS

º .....Degree
°C .....Degrees Celsius
% .....Percent
ADD.....Average Daily Dose
ADI .....Allowable Daily Intake
AF .....Area Use Factor
AOC.....Area of Concern
ARAR .....Applicable Relevant and Appropriate Requirements
As.....Arsenic
AST.....Aboveground Storage Tank
ASTM .....ASTM International
ATSDR .....Agency for Toxic Substance Disease Registry
AWQC .....Ambient Water Quality Criteria
BAF.....Bioaccumulation Factor
BEF .....Bioaccumulation Equivalency Factor
bgs.....Below Ground Surface
BSAF .....Biota-Sediment Accumulation Factor
BTAG.....Biological Technical Assistance Group
$CaCl_2$.....Calcium Chloride
$CaSO_4$.....Calcium Sulfate
Cd.....Cadmium
CDD.....Chlorinated Dibenzo-p-dioxin
CDF.....Chlorinated Dibenzofuran
CDI.....Chronic Daily Intake
CERCLA.....Comprehensive Environmental Response, Compensation, and Liability Act
CFR.....Code of Federal Regulations
cfs.....Cubic feet per second
CH.....Fat Clay
CL .....Lean Clay
cm/sec .....Centimeters Per Second
CN.....Cyanide
COC .....Chemical of Concern
COPC.....Chemical of Potential Concern
COPEC.....Chemical of Potential Ecological Concern
Cr .....Chromium
CSEM.....Conceptual Site Exposure Model
CSF .....Cancer Slope Factor
CSM.....Conceptual Site Model
Cu.....Copper
DAF .....Dilution Attenuation Factor
DNT .....Dinitrotoluene
DQO.....Data Quality Objective
ECO-SSL .....Ecological Soil Screening Method
ECSM .....Ecological Conceptual Site Model
EDQL.....Ecological Data Quality Level
EPC.....Exposure Point Concentration
EPIC.....Environmental Photographic Interpretation Center
ERA .....Ecological Risk Assessment
ERAGS .....Ecological Risk Assessment Guidance for Superfund

LIST OF ABBREVIATIONS AND ACRONYMS (CONTINUED)

ERIS.....Environmental Restoration Information System
FLFA.....Former Lead Furnace Area
FOD .....Frequency of Detection
ft.....Feet
FWBSR.....Facility-Wide Background Study Report
g .....Gram
GM.....Silty Gravel
GP .....Gravel with Silt
GPS .....Global Positioning System
H_o .....Null Hypothesis
HMX .....Cyclo-1,3,5,7-tetramethylene 2,4,6,8-tetranitramine; Octogen
HSA .....Horseshoe Area
HBN.....Health-Based Number
HEAST.....Health Effects Assessment Summary Tables
HHRA .....Human Health Risk Assessment
HHRS.....Human Health Risk Screening
HI .....Hazard Index
HQ.....Hazard Quotient
HSP .....Health and Safety Plan
HSPA .....Health and Safety Plan Addendum
I-RBC.....Industrial Risk-Based Concentration
IDM.....Investigation-Derived Material
IEUBK .....Integrated Exposure Uptake Biokinetic
IRIS.....Integrated Risk Information System
LADD .....Lifetime Average Daily Dose
LC_{50} .....Lethal Concentration to 50% of the test population
LOAEL .....Lowest Observable Adverse Effect Level
M.....Molar Concentration
MCL.....Maximum Contaminant Level
MDC .....Maximum Detected Concentration
MDL.....Method Detection Limit
µg/dL.....Microgram Per Deciliter
mg/kg .....Milligrams Per Kilogram
µg/kg .....Microgram Per Kilogram
mg/L.....Milligrams Per Liter
µg/L.....Microgram Per Liter
MH .....Elastic Silt
MHSP.....Master Health and Safety Plan
ML .....Sandy Silt
MMA .....Main Manufacturing Area
Mn.....Manganese
MQAP.....Master Quality Assurance Plan
MS.....Mass Spectrometer
MS/MSD.....Matrix Spike/Matrix Spike Duplicate
msl.....Mean Sea Level
MWP.....Master Work Plan
N.....North

LIST OF ABBREVIATIONS AND ACRONYMS (CONTINUED)

NCEA.....National Center for Environmental Assessment
NEPA.....National Environmental Policy Act
NFA .....No Further Action
NOAA.....National Oceanic and Atmospheric Administration
NOAEL.....No Observable Adverse Effect Level
NRU.....New River Unit
NSV .....No Screening Value
OCDD.....Octachlorodibenzo-p-dioxin
OCDF.....Octachlorodibenzofuran
ORNL .....Oak Ridge National Laboratory
PAH .....Polynuclear Aromatic Hydrocarbon
PCB.....Polychlorinated Biphenyl
PCDD.....Polychlorinated Dibenzo-p-dioxin
PCDF .....Polychlorinated Dibenzofuran
PCE.....Tetrachloroethene
PEF.....Particulate Emission Factor
PID.....Photoionization Detector
pg/g .....Parts Per Trillion
pg/kg .....Picogram Per Kilogram
ppb .....Parts Per Billion
PPE.....Personal Protective Equipment
ppm .....Parts Per Million
PRG.....Preliminary Remediation Goal
QA.....Quality Assurance
QA/QC.....Quality Assurance / Quality Control
QAP .....Quality Assurance Plan
QAPA.....Quality Assurance Plan Addendum
QC.....Quality Control
R-RBC .....Residential Risk-Based Concentration
RA.....Risk Assessment
RAGS.....Risk Assessment Guidance for Superfund
RAIS .....Risk Assessment Information System
RBC .....Risk-Based Concentration
RCRA.....Resource Conservation and Recovery Act
RDA.....Recommended Daily Allowance
RDX.....Cyclonite, hexogen, T4, cyclo-1,3,5,-trimethylene-2,4,6,-trinitramine; hexahydro-1,3,5-trinitro-S-triazine hexahydro-1,3,5-trinitro-S-triazine
RFA.....RCRA Facility Assessment
RfC.....Risk Reference Concentration
RfD.....Risk Reference Dose
RFAAP.....Radford Army Ammunition Plant
RFI .....RCRA Facility Investigation
RL .....Reporting Limit
RME.....Reasonable Maximum Exposure
RTE.....Rare, Threatened, or Endangered
RTEC .....Registry of Toxic Effects Concentrations
S .....South

LIST OF ABBREVIATIONS AND ACRONYMS (CONTINUED)

Sb .....Antimony
SC.....Clayey Sand
SLERA.....Screening Level Ecological Risk Assessment
SM.....Silty Sand
SMDP.....Scientific/Management Decision Point
SOP .....Standard Operating Procedure
SP .....Poorly Sorted Sand with Variable Gravel
SS SSL .....Site-Specific Soil Screening Level
SSA .....Site Screening Area
SSL.....Soil Screening Level
SSP.....Site Screening Process
SVOC.....Semi-Volatile Organic Compound
SWMU .....Solid Waste Management Unit
TAL.....Target Analyte List
TCDD.....Tetrachlorodibenzo-p-dioxin
TCDF .....Tetrachlorodibenzofuran
TCE.....Trichloroethene
TCL.....Target Compound List
TCLP.....Toxicity Characteristic Leaching Procedure
TEF .....Toxicity Equivalence Factor
TEQ.....Toxicity Equivalent
TIC.....Tentatively Identified Compound
TNT.....Trinitrotoluene
TOC .....Total Organic Carbon
TOX .....Total Organic Halogen
TPH.....Total Petroleum Hydrocarbons
TRV .....Toxicity Reference Value
T-RBC.....Tap Water Risk-Based Concentration
TSV.....Toxicity Screening Value
UCL .....Upper Confidence Limit
URS.....URS Group, Inc.
USCS .....Unified Soil Classification System
USACE .....United States Army Corps of Engineers
USACHPPM...United States Army Center for Health Promotion and Preventative Medicine
USAEHA .....United States Army Environmental Hygiene Agency
USEPA.....United States Environmental Protection Agency
UST.....Underground Storage Tank
UTL.....Upper Tolerance Limit
VDEQ .....Virginia Department of Environmental Quality
VI .....Verification Investigation
VOC.....Volatile Organic Compound
VSI.....Visual Site Inspection
VPDES.....Virginia Pollutant Discharge Elimination System
WPA.....Work Plan Addendum
XRF.....X-ray Fluorescence

1.0 INTRODUCTION

This Site Screening Process (SSP) report presents the results and findings of the Resource Conservation and Recovery Act (RCRA) investigations conducted at the Radford Army Ammunition Plant (RFAAP) for seven Solid Waste Management Units (SWMUs) and three Areas of Concern (AOCs). The project sites are located in the Main Manufacturing Area (MMA) (three SWMUs and three AOCs) and Horseshoe Area (HSA) (four SWMUs) at RFAAP in Radford, Virginia (Figure 1-1). The SSP originally included two additional units, SWMU 75 (Used Oil Storage Tank) and SWMU 76 (Oil Tanks), but during the preliminary desktop investigation it was determined that these units did not require field activities because the units were addressed and closed by the Virginia Department of Environmental Quality.

The work was conducted by URS Group, Inc. (URS) to fulfill the requirements set forth in the 2000 RCRA Corrective Action permit as tasked by the United States Army Corps of Engineers (USACE), Baltimore District, in accordance with Contract Number DACA31-00-D-0011, Delivery Order No. 0046.

URS performed the SSP in accordance with the Master Work Plan (MWP) developed for RFAAP and Work Plan Addendum (WPA) 016 to the MWP, which was developed to address specific aspects of this project and to describe project-related activities not included in the MWP. These documents, approved by the United States Environmental Protection Agency (USEPA) Region III and the Virginia Department of Environmental Quality (VDEQ), contain the Master Quality Assurance Plan (MQAP), the Master Health and Safety Plan (MHSP), and associated project-specific addenda.

1.1 SSP SITES

The 10 sites evaluated for the SSP are identified below and on Figure 1-1.

SSP Sites

Site	Location	Description
AOC A	MMA	Nitrocellulose Rainwater Ditch
AOC F	MMA	Former Drum Storage Area
AOC Q	MMA	$CaSO_4$ Treatment Disposal Area
SWMU 13	HSA	Waste Propellant Burning Ground
SWMU 37	MMA	$CaSO_4$ Drying Bed
SWMU 38	MMA	$CaSO_4$ Drying Bed
SWMU 46	MMA	Propellant Burial Area
SWMU 57	HSA	Pond by Buildings 4931 & 4928
SWMU 68	HSA	Chromic Acid Treatment Tanks
SWMU 69	HSA	Pond by Chromic Acid Treatment Tanks

1.2 PURPOSE

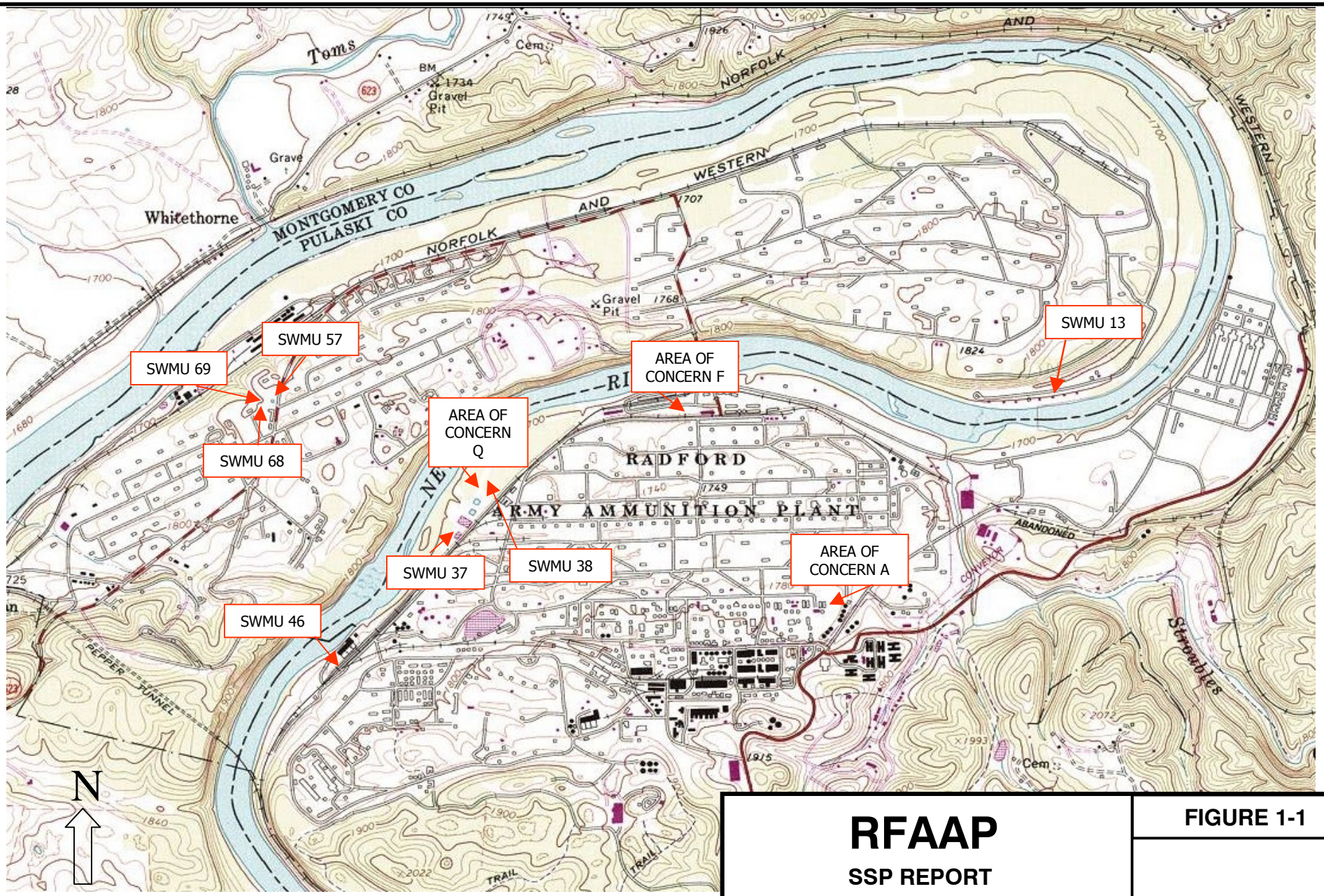
The SSP is designed to assess:

- Whether releases of hazardous substances, pollutants, contaminants, hazardous wastes, or hazardous constituents have occurred to the environment at the sites evaluated;
- Whether further investigation (i.e., risk assessment or RCRA Facility Investigation (RFI)); or
- Whether no further action (NFA) at a site is appropriate.

1.3 REPORT ORGANIZATION

Section 2 outlines the tasks completed for the SSP. SSP risk screening procedures and assumptions used in the site-specific evaluations are presented in Section 3. Historical data, SSP data, and data evaluation components for each SWMU and AOC assessed in the SSP are included in individual sections (Sections 4 through 11) with the exception of SWMU 37, SWMU 38, and AOC Q that are included in a single section (Section 5) because of the sites proximity and historical use.

Each site-specific section of this SSP Report begins with a brief description of the site and a summary of the current conditions including descriptions of the physical and natural features that may affect the migration and exposure pathways. This is followed by a summary of previous investigations, a description of the SSP field activities, and the results of the human health risk screening and ecological risk screening. The final component of each section presents the conclusions and recommendations for the site.



RFAAP

SSP REPORT

FIGURE 1-1

SITE LOCATION MAP

Date: *June 2004*	**Prepared by:** *KDC/TDH*
Scale: *1" = 2000'*	**File Name:** *Figure 1-1.ppt*

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2.0 SSP INVESTIGATION PROGRAM

The SSP consisted of the following steps (USEPA 2001a):

- Performance of a desktop audit and site visit to develop the scope of the SSP Work Plan;
- Preparation of a SSP site-specific Work Plan;
- Performance of the field work in accordance with the approved SSP Work Plan;
- Evaluation of the SSP data and completion of pre-remedial risk screening; and
- Assessment of the need for further investigation, interim removal action, or preparation of a "No Further Action" Decision Document, per the RCRA Corrective Action permit based on the results of the SSP and risk screening.

2.1 DESKTOP AUDIT AND FIELD VISIT

A desktop audit was performed for each of the 10 SSP sites. This audit evaluated and documented site use and operational history, and assessed the likelihood that these operations resulted in the release of hazardous substances/wastes to the environment.

The audit evaluated existing information and analytical data to identify historical uses and potential environmental factors, a visual inspection of each site, and the development of a site-specific Conceptual Site Model (CSM). The findings of the desktop audit and site inspection were evaluated to identify potential contaminant sources, migration pathways, potential human and ecological receptors, and receptor exposure pathways at each site. The desktop audits and site visits were conducted from 30 July through 2 August 2002.

2.2 SSP WORK PLAN

WPA 016 was finalized in August 2003. This work plan integrated information from the desktop audit and site visits to develop site-specific CSMs and identify data gaps. Field investigation plans were developed for each the 10 SSP sites based on this information.

2.3 SAMPLING AND ANALYSIS

Thirty-six surface soil samples, 71 subsurface soil samples, 2 sediment samples (SWMU 13), 2 surface-water samples (SWMU 13) were collected for chemical analysis and twenty soil samples were collected for physical soil testing during the September-October 2003 SSP sampling activities at the 10 sites (Table 2-1). A groundwater sample was collected at SWMU 46 and AOC F in November 2006 from monitoring wells 46MW1 and FMW1, which were installed for the SSP in April 2006. Field work was performed in accordance with WPA 016 except for work plan deviations described in the SSP field activities section for each site (Sections 4 through 11).

Soil, sediment, and surface water samples were analyzed for the following parameters:

- Target Compound List (TCL) volatile organic compounds (VOCs) by SW-846 Method 8260B;
- TCL semi-volatile organic compounds (SVOCs) by SW-846 Method 8270C;
- Polynuclear aromatic hydrocarbons (PAHs) by SW-846 Method 8310;
- Explosives (including nitroglycerin and PETN) by SW-846 Methods 8330 and 8332;

- Target Analyte List (TAL) inorganics by SW-846 Methods 6010B and 7470A (aqueous)/7471A (solid);
- TCL pesticides and polychlorinated biphenyls (PCBs) by SW-846 Methods 8081A and 8082 (one surface soil sample per site);
- TCL chlorinated herbicides by SW-846 Method 8151A (one surface soil sample per site);
- TCL dioxin/furans by SW-846 Method 8290 (one surface soil sample at SWMU 13); and
- Perchlorate by USEPA Method 314.0 (two surface water samples at SWMU 13).

Groundwater samples were analyzed for the following parameters:

- Trichloroethene (TCE), tetrachloroethene (PCE) and related degradation products cis-1,2-dichloroethene, trans-1,2-dichloroethene, and vinyl chloride) by SW-846 Method 8260B (SWMU 46);
- Chromium by SW-846 Method 6020A (AOC F); and
- Pesticides by SW-846 Method 8081A (AOC F).

Physical soil samples were analyzed for the following parameters:

- Grain-size analysis (ASTM D 422-98a);
- Water content (ASTM D 2216-98e1);
- Total organic content (ASTM D 2974-00a);
- pH (ASTM D 4972-01);
- Soil bulk density (ASTM D 4253-00b); and
- Soil porosity (ASTM D 854-00c).

Selected physical soil samples were also analyzed for the following parameters:

- Atterberg Limits (ASTM D 4318-00d);
- Hydrometer analysis (ASTM D 4318-00d); and
- Hydraulic conductivity (ASTM D 5084-00e1-2000e).

2.3.1 Soil Sampling

Three soil samples were collected from each soil boring location for chemical analysis (except for 13SB8, 57SB4, and ASB5 where two samples were collected) including:

- A surface sample (“A” sample);
- An intermediate depth sample (“B” sample); and
- A termination depth sample (“C” sample) typically collected at the depth immediately above refusal or above encountered groundwater.

The specific field investigation program for each SSP site is discussed within its results section (Sections 4 through 11).

2.3.2 Surface Water and Sediment Sampling

Two pairs of surface water and sediment samples (13SD2/13SW2 and 13SD3/13SW3) were collected from the New River at SWMU 13. Total and dissolved sample fractions were collected for the surface water samples for some TAL inorganics analyses. Additional information for the surface water/sediment sampling program at SWMU 13 is presented in Section 4.

2.3.3 Groundwater Sampling

One groundwater sample was collected from monitoring well 46MW1 at SWMU 46. A second groundwater sample was collected from monitoring well FMW1 at AOC F. Additional information for the groundwater sampling is included in Sections 4 (SWMU 46) and 11 (AOC F).

2.4 QUALITY ASSURANCE

Quality Assurance (QA) planning defined the overall system of activities for assuring the reliability of data produced. The system integrated the quality planning, assessment, and corrective actions of various groups in the organization to provide the independent QA program necessary to establish and maintain an effective system for collection and analysis of environmental samples and related activities. The program encompasses the generation of complete data with its subsequent review, validation, and documentation.

The accuracy and integrity of SSP data were ensured through the implementation of internal quality control (QC) measures consistent with MWP Addendum 016 (URS 2003a), as approved by USEPA Region III and the VDEQ. QA and QC procedures including field QC, laboratory QC, data management, and data validation of 100 percent (%) of chemical data used for risk screening were integrated into the investigation program to meet data quality objectives (DQOs) established and approved for the SSP. The data were evaluated for each of the DQO indicators as presented in Appendix A. Qualified data did not impact the data quality of the SSP, except as outlined in Appendix A and in data validation reports provided in Appendix K. Each data validation report includes the laboratory analytical data sheets with the validation flagging and notes.

2.5 INVESTIGATION METHODOLOGY

2.5.1 Soil Sampling

Surface and subsurface soil samples were collected for chemical and physical analysis during the SSP consistent with standard operating procedure (SOP) 30.1 included in Appendix C and as described in Section 5.2.9 of the MWP (URS 2003b). Soil sampling procedures for analysis of VOCs followed MWP SOP 30.9 (Appendix C).

Surface soil samples were collected from 0 to 6-inches below ground surface (bgs) below gravel or organic layers at the surface except for VOC samples, which were collected from 6 to 12-inches bgs.

Upon retrieval of soil for sample processing, the soil was field screened for the presence of VOCs using a photoionization detector (PID). Field screening consisted of cutting a cross-sectional slice from the core or center of the sample with a decontaminated stainless steel knife or trowel and inserting the PID probe. PID readings were recorded in the field logbook and on the boring log for soil boring samples. After the PID readings were recorded, a sample for VOC analysis was immediately collected from the appropriate interval using a disposable EnCore® sampler.

Once the fraction for VOC analysis was collected, the soil core interval was examined and classified by the site geologist and recorded in the field logbook and on the boring log consistent with SOPs 10.1 and 10.3, respectively (Appendix C). Soil for non-VOC analysis was then extracted from the appropriate interval, placed in a stainless steel bowl, and homogenized. The appropriate sample containers were filled, labeled, and placed into coolers with ice and maintained at 4 degrees Celsius (^{o}C).

2.5.2 Soil Borings

Five borings at SWMU 13 (13SB8, 13SB9, 13SB10, 13SB11, and 13SB12), two borings at SWMU 38 (38SB1 and 38SB2), one boring at SWMU 57 (57SB4), and one boring at Area A (ASB5) were advanced via hand auger to collect subsurface soil samples. A stainless steel hand auger with an 8-inch long, 3.25-inch diameter core sampler was used to advance each boring and collect each sample.

The remaining subsurface samples were collected from soil borings advanced using a tractor-mounted direct push rig (Geoprobe®). This rig was equipped with 1.25-inch diameter push rods, 4-ft long, 2-inch diameter, stainless steel closed solid barrel sampler (Macro-Core®) with a disposable liner, and stainless steel cutting shoes. A percussion hammer was used to advance the sampling assembly. Following withdrawal of the Macro-Core® and removal of the liner, a cutting device was used to open the liner prior to inspection and processing of the sample cores.

Once the termination depth of the hand auger or direct push boring was reached and sample collection was completed, the borehole was backfilled with bentonite chips. Excess soil cuttings remaining after sample processing were temporarily accumulated in 55-gallon drums and staged at an Installation-approved area.

Boring logs prepared by the site geologist are included in Appendix D.

2.5.3 Sediment Sampling

Sediment samples were collected by the scoop method as outlined in SOP 30.4 included in Appendix C and as described in Section 5.4 of the MWP (URS 2003b). Sediment samples were field screened for VOCs using a PID.

2.5.4 Surface Water Sampling

Surface water samples were collected by submerging and directly filling the sample containers as outlined in SOP 30.1 included in Appendix C and as described in Section 5.3.1 of the MWP (URS 2003b). Total and dissolved fractions of TAL inorganics were collected for each surface water sample. Sample filtration for the dissolved fraction was performed immediately after sample collection using a peristaltic pump and 0.45- micron in-line filter following the procedures outlined in Section 3.5 of SOP 30.1.

2.5.5 Monitoring Well and Groundwater Sampling

On April 18 and 19, 2006, two-inch diameter monitoring wells were installed at SWMU 46 (46MW1) and AOC F (FMW1) to evaluate potential releases to groundwater at these sites. Monitoring well borings were advanced using 4 1/4-inch hollow stem augers in the soil overburden and a 4-inch air rotary bit in bedrock. Drilling, well installation, and well development procedures followed SOPs 20.1 and 20.2 included in Appendix C. Monitoring well boring logs and construction diagrams for 46MW1 (installed to 32 ft bgs) and FMW1 (installed to 55 ft bgs) are included in Appendix D.

On November 28 and 29, 2006, groundwater samples were collected from 46MW1 and FMW1 using a submersible pump and the low-flow purge and sampling method as outlined in SOP 30.2 included in Appendix C.

2.5.6 Sample Locations

The location and elevation of the sample points were obtained with a Trimble Pathfinder Pro XRS global positioning system (GPS) unit. The GPS unit was used to ascertain horizontal position with sub-meter accuracy, and elevation position with 1.5 to 2.0 times horizontal accuracy. Sample location maps are contained in individual site sections.

Horizontal location data were recorded in the U.S. State [Virginia (South)] Plane Coordinate System (measured in U.S. survey feet) using the North American Datum 1983. Vertical control data were measured in feet using the National Geodetic Vertical Datum of 1929.

2.5.7 Management of Investigation-Derived Material

Investigation-derived materials (IDM) management activities were conducted consistent with the procedures outlined in WPA 016 (URS 2003a). IDM management was documented in the field logbook and conducted as described below.

2.5.7.1 Accumulation

IDM accumulated during field sampling activities included the following materials and containers:

Initial Investigation

- Soil cuttings – one 55-gallon drum;
- Personal protective equipment (PPE), probe liners, plastic sheeting, sample filters – four 55-gallon drums; and
- Decontamination water – two 55-gallon drums.

Additional Investigation

- Soil cuttings – six 55-gallon drums; and
- Decontamination and purge water water – three 55-gallon drums.

IDM accumulation and labeling was conducted as outlined in MWP SOP 70.1 (Appendix C). Drums were transferred to the Installation's approved container accumulation area at SWMU 17.

2.5.7.2 Material Characterization

Separate IDM characterization samples were collected for the soil cuttings and the drummed decontamination water contained in 55-gallon drums. IDM was characterized to evaluate whether it was a RCRA characteristic hazardous waste as described in Part 40 of the Code of Federal Regulations (CFR) Part 261, Subpart C (as referenced in the Virginia Hazardous Waste Management Regulations). The analytical results of this characterization indicated the IDM was non-hazardous material (Appendix K)

2.5.7.3 Transporter, Storage, and Disposal Facility (Soil and PPE)

Prior to disposal, waste analytical results were provided to the Installation, IDM management subcontractor, and the disposal facilities for review and approval. Manifests were reviewed and signed by Installation personnel prior to loading and transport of the IDM. The Installation maintains a record of the manifests and related information including analytical testing results and waste profiles.

First Piedmont transported the 55-gallon drums containing the soil cuttings and PPE to the First Piedmont Landfill on Clark Mill Road, Ringold, Virginia.

2.5.7.4 Decontamination Water

Following the waste characterization sample analysis, the Installation and RFAAP Process Water Treatment Plant engineers were provided a copy of the decontamination water IDM sample results. After receiving approval, decontamination water was discharged into the collection system of the Process Water Treatment Plant.

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Table 2-1
Summary of Sample Analyses
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		Chemical Analysis													Physical Analysis										
Sample ID	Depth (ft bgs)	SW-846 Method 8260B (TCL VOCs)	SW-846 Method 8270C (TCL SVOCs)	SW-846 Method 8310 (PAHs)	SW-846 Method 8081A (TCL Pesticides)	SW-846 Method 8082 (TCL PCBs)	SW-846 Methods 8330/8332 (Explosives)	SW-846 Method 8290 (TCL Dioxins/Furans)	SW-846 Method 6010B/7471A/9010 (TAL Metals including cyanide)	SW-846 Method 314.0 (Perchlorate)	SW-846 Method 8151 (TCL Chlorinated Herbicides)	TCLP Full List	SW-846 Method 410 Chemical Oxygen Demand	SW-846 Method 9095B Paint Filter	USCS Classification	Water Content ASTM D2216-98	Atterberg Limits ASTM D4318-00	Grain Size ASTM D422-63(2002)	Hydrometer ASTM D422-63(2002)	pH ASTM D4972-01	Organic Content ASTM D2974-00	Specific Gravity ASTM D854-02	Bulk Density ASTM D2937-00e1	Hydraulic Conductivity ASTM D 5084-00e1
SWMU 13																									
Surface Soil																									
13SB7A	0-0.5 (0.5-1 for VOCs)	X	X	X			X		X																
13SB8A	0-0.5 (0.5-1 for VOCs)	X	X	X			X		X																
13SB9A MS/MSD	0-0.5 (0.5-1 for VOCs)	X	X	X	X	X	X	X	X		X														
SBD-9	0-0.5 (0.5-1 for VOCs)	X	X	X	X	X	X	X	X		X														
13SB10A	0-0.5 (0.5-1 for VOCs)	X	X	X			X		X																
13SB11A	0-0.5 (0.5-1 for VOCs)	X	X	X			X		X																
13SB12A	0-0.5 (0.5-1 for VOCs)	X	X	X			X		X																
Intermediate Subsurface Soil																									
13SB7B	5-6	X	X	X			X		X																
13SB8B	3.5-3.7	X	X	X			X		X																
13SB9B	1.5-2	X	X	X			X		X																
13SB10B	2.5-3	X	X	X			X		X																
13SB10	2-3														X	X	X	X		X	X	X	X	X	
13SB11B	4.5-5	X	X	X			X		X																
13SB12B	2-3	X	X	X			X		X																
SBD-8	2-3	X	X	X			X		X																
Termination Subsurface Soil																									
13SB7C MS/MSD	10-12	X	X	X			X		X																
13SB7	12.7														X	X		X		X	X	X	X		
13SB9C	3.5-4	X	X	X			X		X																
13SB10C	4.5-4.8	X	X	X			X		X																
13SB11C	8-8.5	X	X	X			X		X																
13SB12C	3.5-4	X	X	X			X		X																
Surface Water																									
13SW2 MS/MSD	-	X	X	X			X		X	X															
13SW3	-	X	X	X			X		X	X															
SWD-1	-	X	X	X			X		X	X															
Sediment																									
13SD2 MS/MSD	-	X	X	X			X		X																
13SD3	-	X	X	X			X		X																
SDD-1	-	X	X	X			X		X																

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SWMU 37, SWMU 38, and AOC Q																								
Surface Soil																								
37SB1A	0-0.5 (0.5-1 for VOCs)	X	X	X	X	X	X		X		X													
37SB2A MS/MSD	0-0.5 (0.5-1 for VOCs)	X	X	X			X		X															
37SB3A	0-0.5 (0.5-1 for VOCs)	X	X	X			X		X															
38SB1A	0-0.5 (0.5-1 for VOCs)	X	X	X	X	X	X		X		X													
38SB2A	0-0.5 (0.5-1 for VOCs)	X	X	X			X		X															
38SB3A	0-0.5 (0.5-1 for VOCs)	X	X	X			X		X															
QSB1A	0-0.5 (0.5-1 for VOCs)	X	X	X	X	X	X		X		X													
SBD-3	0-0.5 (0.5-1 for VOCs)	X	X	X	X	X	X		X		X													
QSB2A	0-0.5 (0.5-1 for VOCs)	X	X	X			X		X															
QSB3A	0-0.5 (0.5-1 for VOCs)	X	X	X			X		X															
Intermediate Subsurface Soil																								
37SB1	6-6.5														X	X	X	X		X	X	X	X	X
37SB1B	14-16	X	X	X			X		X															
37SB2B	10-12	X	X	X			X		X															
37SB3B MS/MSD	10-12	X	X	X			X		X															
38SB1B	3.5	X	X	X			X		X															
38SB2B	10-12	X	X	X			X		X															
SBD-4	10-12	X	X	X			X		X															
38SB3B	4	X	X	X			X		X															
QSB1	9.5-10														X	X	X	X		X	X	X	X	X
QSB1B	10-12	X	X	X			X		X															
QSB2B	10-12	X	X	X			X		X															
QSB3B	10-12	X	X	X			X		X															
Termination Subsurface Soil																								
37SB1C	18-20	X	X	X			X		X															
37SB2	15.5-16														X	X		X		X	X	X	X	X
37SB2C	18-20	X	X	X			X		X															
37SB3C	22-24	X	X	X			X		X															
38SB1	7														X	X		X		X	X	X	X	
38SB1C	7-7.5	X	X	X			X		X															
38SB2	15.5														X	X		X		X	X	X	X	X
38SB2C	18-20	X	X	X			X		X															
38SB3C	6	X	X	X			X		X															

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SWMU 37, SWMU 38, and AOC Q (Con't)																									
Termination Subsurface Soil (Con't)																									
QSB1C	17-19	X	X	X			X		X																
QSB2C	18-20	X	X	X			X		X																
QSB2	24														X	X		X		X	X	X	X		
QSB3C	17-19	X	X	X			X		X																
SWMU 46																									
Surface Soil																									
46SB1A	0-0.5 (0.5-1 for VOCs)	X	X	X	X	X	X		X		X														
46SB2A	0-0.5 (0.5-1 for VOCs)	X	X	X			X		X																
Intermediate Subsurface Soil																									
46SB1B	8-10	X	X	X			X		X																
46SB2	9.5-10														X	X		X		X	X	X	X		
46SB2B	10-12	X	X	X			X		X																
Termination Subsurface Soil																									
46SB1C	14-16	X	X	X			X		X																
46SB1	14.5														X	X	X	X	X	X	X	X	X	X	X
46SB2C	14-16	X	X	X			X		X																
SBD-2	14-16	X	X	X			X		X																
Groundwater																									
46MW1 MS/MSD	--	X																							
DUP-1	--	X																							
SWMU 57																									
Surface Soil																									
57SB1A	0-0.5 (0.5-1 for VOCs)	X	X	X			X		X																
57SB2A	0-0.5 (0.5-1 for VOCs)	X	X	X			X		X																
57SB3A	0-0.5 (0.5-1 for VOCs)	X	X	X			X		X																
SBD-6	0-0.5 (0.5-1 for VOCs)	X	X	X			X		X																
57SB4A	0.5	X	X	X	X	X	X		X		X														

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SWMU 57 (Con't)																								
Intermediate Subsurface Soil																								
57SB1B	10-12	X	X	X			X		X															
57SB2	7.5-8														X	X		X		X	X	X	X	
57SB2B MS/MSD	8-12	X	X	X			X		X															
57SB3B	14-16	X	X	X			X		X															
57SB3	16.5-17														X	X	X	X	X	X	X	X	X	X
57SB4B	1.5	X	X	X			X		X															
Termination Subsurface Soil																								
57SB1C	18-20	X	X	X			X		X															
57SB2C	33-35	X	X	X			X		X															
57SB3C	29-31	X	X	X			X		X															
SWMU 68																								
Surface Soil																								
68SB1A	0-0.5 (0.5-1 for VOCs)	X	X	X	X	X	X		X		X													
68SB2A MS/MSD	0-0.5 (0.5-1 for VOCs)	X	X	X			X		X															
68SB3A	0-0.5 (0.5-1 for VOCs)	X	X	X			X		X															
Intermediate Subsurface Soil																								
68SB1B	7-9	X	X	X			X		X															
68SB2B	7-9	X	X	X			X		X															
68SB3	7-7.5														X	X	X	X	X	X	X	X	X	X
68SB3B	8-10	X	X	X			X		X															
Termination Subsurface Soil																								
68SB1C	18-20	X	X	X			X		X															
68SB2	18-18.5														X	X		X		X	X	X	X	
68SB2C	21-23	X	X	X			X		X															
SBD-5	21-23	X	X	X			X		X															
68SB3C	18-20	X	X	X			X		X															

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SWMU 69																								
Surface Soil																								
69SB1A	0-0.5 (0.5-1 for VOCs)	X	X	X			X		X															
69SB2A	0-0.5 (0.5-1 for VOCs)	X	X	X	X	X	X		X		X													
69SB3A	0-0.5 (0.5-1 for VOCs)	X	X	X			X		X															
SBD-7	0-0.5 (0.5-1 for VOCs)	X	X	X			X		X															
Intermediate Subsurface Soil																								
69SB1B	5-6	X	X	X			X		X															
69SB2B	4-5	X	X	X			X		X															
69SB3B	5-6	X	X	X			X		X															
69SB3	7.5-8.5														X	X		X		X	X	X	X	X
Termination Subsurface Soil																								
69SB1	11-12														X	X	X	X		X	X	X	X	
69SB1C	14-15	X	X	X			X		X															
69SB2C	9-10	X	X	X			X		X															
69SB3C	11-12	X	X	X			X		X															
Area of Concern A																								
Surface Soil																								
ASB1A	0-0.5 (0.5-1 for VOCs)	X	X	X			X		X															
ASB2A	0-0.5 (0.5-1 for VOCs)	X	X	X	X	X	X		X		X													
ASB3A	0-0.5 (0.5-1 for VOCs)	X	X	X			X		X															
ASB4A	0-0.5 (0.5-1 for VOCs)	X	X		X	X	X		X															
DUP-1	0-0.5 (0.5-1 for VOCs)	X	X		X	X	X		X															
ASB5A	0-0.5 (0.5-1 for VOCs)	X	X		X	X	X		X															
Intermediate Subsurface Soil																								
ASB1B	10-12	X	X	X			X		X															
ASB2B	10-12	X	X	X			X		X															
SBD-10	10-12	X	X	X			X		X															
ASB2	14-16														X	X	X	X		X	X	X	X	X
ASB3B	6-8	X	X	X			X		X															
ASB4B	10-11	X	X		X	X	X		X															
ASB5B	7	X	X		X	X	X		X															

Table 2-1
Summary of Sample Analyses
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

		Chemical Analysis													Physical Analysis									
Sample ID	Depth (ft bgs)	SW-846 Method 8260B (TCL VOCs)	SW-846 Method 8270C (TCL SVOCs)	SW-846 Method 8310 (PAHs)	SW-846 Method 8081A (TCL Pesticides)	SW-846 Method 8082 (TCL PCBs)	SW-846 Methods 8330/8332 (Explosives)	SW-846 Method 8290 (TCL Dioxins/Furans)	SW-846 Method 6010B/7471A/9010 (TAL Metals including cyanide)	SW-846 Method 314.0 (Perchlorate)	SW-846 Method 8151 (TCL Chlorinated Herbicides)	TCLP Full List	SW-846 Method 410 Chemical Oxygen Demand	SW-846 Method 9095B Paint Filter	USCS Classification	Water Content ASTM D2216-98	Atterberg Limits ASTM D4318-00	Grain Size ASTM D422-63(2002)	Hydrometer ASTM D422-63(2002)	pH ASTM D4972-01	Organic Content ASTM D2974-00	Specific Gravity ASTM D854-02	Bulk Density ASTM D2937-00e1	Hydraulic Conductivity ASTM D 5084-00e1
Area of Concern A (Con't)																								
Termination Subsurface Soil																								
ASB1	22-24														X	X	X	X		X	X	X	X	
ASB1C	26-28	X	X	X			X		X															
ASB2C MS/MSD	21-23	X	X	X			X		X															
ASB3C	13-14	X	X	X			X		X															
ASB4C	20	X	X		X	X	X		X															
Area of Concern F																								
Surface Soil																								
FSB1A	0-0.5 (0.5-1 for VOCs)	X	X	X			X		X		X													
FSB2A MS/MSD	0-0.5 (0.5-1 for VOCs)	X	X	X	X	X	X		X		X													
FSB3A	0-0.5 (0.5-1 for VOCs)	X	X	X			X		X															
FSB4A	0-0.5 (0.5-1 for VOCs)	X	X	X	X	X	X		X															
Intermediate Subsurface Soil																								
FSB1B	10-12	X	X	X			X		X		X													
FSB2	7.5-8														X	X		X		X	X	X	X	
FSB2B	8-10	X	X	X			X		X		X													
SBD-1	8-10	X	X	X			X		X		X													
FSB3B	10-12	X	X	X			X		X															
FSB4B	7	X	X	X	X	X	X		X															
Termination Subsurface Soil																								
FSB1C	14-16	X	X	X			X		X		X													
FSB1	18.5-19														X	X	X	X	X	X	X	X	X	X
FSB2C	12-13	X	X	X			X		X															
FSB3C	14-15.5	X	X	X			X		X															
FSB4C	10-11	X	X	X	X	X	X		X															
Groundwater																								
FMW1 MS/MSD	--				X				X															
DUP-2	--				X				X															

Table 2-1
Summary of Sample Analyses
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

		Chemical Analysis													Physical Analysis									
Sample ID	Depth (ft bgs)	SW-846 Method 8260B (TCL VOCs)	SW-846 Method 8270C (TCL SVOCs)	SW-846 Method 8310 (PAHs)	SW-846 Method 8081A (TCL Pesticides)	SW-846 Method 8082 (TCL PCBs)	SW-846 Methods 8330/8332 (Explosives)	SW-846 Method 8290 (TCL Dioxins/Furans)	SW-846 Method 6010B/7471A/9010 (TAL Metals including cyanide)	SW-846 Method 314.0 (Perchlorate)	SW-846 Method 8151 (TCL Chlorinated Herbicides)	TCLP Full List	SW-846 Method 410 Chemical Oxygen Demand	SW-846 Method 9095B Paint Filter	USCS Classification	Water Content ASTM D2216-98	Atterberg Limits ASTM D4318-00	Grain Size ASTM D422-63(2002)	Hydrometer ASTM D422-63(2002)	pH ASTM D4972-01	Organic Content ASTM D2974-00	Specific Gravity ASTM D854-02	Bulk Density ASTM D2937-00e1	Hydraulic Conductivity ASTM D 5084-00e1
IDM Samples																								
IDMSSPS	--						X					X		X										
IDMSSPW	--						X					X	X											
IDM	--						X					X		X						X				
IDM-1	--						X					X	X							X				

Notes:

ft bgs = Feet Below Ground Surface
IDM = Investigation-Derived Material
AOC = Area of Concern
SWMU = Solid Waste Management Unit
TCLP = Toxicity Characteristic Leaching Procedure
USCS = Unified Soil Classification System
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon
PCB = Polychlorinated Biphenyls
ASTM = ASTM International (formerly American Society for Testing and Materials)
Con't = Continued
MS = Matrix Spike
MSD = Matrix Spike Duplicate
ID = Identification
SBD = Soil Duplicate Sample
SWD = Surface Water Duplicate Sample
SDD = Sediment Duplicate Sample
-- = Not Applicable

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3.0 SSP DATA EVALUATION AND PRE-REMEDIAL RISK SCREENING

3.1 ANALYTICAL RESULTS

Historical investigation results and SSP investigation results are summarized in each site-specific section of this report (Sections 4 through 11). Summary tables of historical analytical results (pre-SSP) and summary tables of SSP analytical results (detected chemicals) are included at the end of each site-specific section; these tables include sample information, laboratory and data validation flags, sample MDLs and RLs, and risk screening criteria.

Physical soil testing results for the SSP are summarized in Table 3-1. Complete physical soil testing results are included in Appendix E.

3.2 HUMAN HEALTH RISK SCREENING

The purpose of the SSP human health risk screening is to evaluate site data using conservative criteria so sites requiring NFA can be eliminated from further consideration. This process will also be used to identify sites requiring further evaluation. The screening procedures include the following five steps:

- Identification of chemicals of potential concern (COPCs) and cumulative risk screening;
- Chemical specific screening for lead and iron;
- Comparison to soil screening levels (SSLs);
- Comparison to applicable relevant and appropriate requirements (ARARs); and
- Comparison to background point estimates (available for select metals).

3.2.1 Identification of COPCs

COPCs were identified for each site by comparing the maximum detected concentration (MDC) for detected chemicals or tentatively identified compounds (TICs) in a specific medium to USEPA Region III Residential risk-based concentrations (R-RBCs) and Industrial risk-based concentrations (I-RBCs), if available. In accordance with USEPA Region III guidance, R-RBCs and I-RBCs for noncarcinogenic chemicals were adjusted downward to a Hazard Quotient (HQ) of 0.1 to ensure that chemicals with additive effects were not prematurely eliminated during screening.

For the purpose of COPC identification and risk screening, data from duplicate sample pairs were averaged and treated as one result. If a chemical was detected in one of the sample pair, half the detection limit of the non-detect was averaged with the detected result, and the result was considered detected.

Chemicals that had a MDC greater than the adjusted USEPA Region III R-RBC or for which no screening value (NSV) existed were selected as COPCs and retained for quantitative assessment. For compounds identified as COPCs for total soil that displayed the statistical properties required to calculate a 95% upper confidence limit (UCL), a 95% UCL was calculated in accordance with "Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites"(USEPA 2002a) and used as the maximum Exposure Point Concentration (EPC) for the cumulative risk screening. For those COPCs identified in total soil for which a valid 95% UCL could not be calculated and for the COPCs identified in surface soil, the MDC was used as the maximum EPC for the cumulative risk screening.

3.2.2 Cumulative Risk Screen

The cumulative human health risk screen consisted of calculating the ratios between the maximum EPC of COPCs in each medium and the corresponding R-RBC and I-RBC. Both carcinogenic and noncarcinogenic effects were evaluated in accordance with Section 6.1.1.2 of the SSP Guidance (USEPA

2001b). If the cumulative excess cancer risk was greater than or equal to $1x10^{-5}$ then a quantitative risk assessment should be performed, but if the cumulative excess cancer risk is below $1x10^{-5}$ and no other screening criteria have been exceeded then NFA would be recommended for the site.

If the noncarcinogenic cumulative hazard index (HI) exceeds 1, there is a potential for adverse noncarcinogenic health effects (USEPA 1989a). Generally, the more the HI exceeds unity, the greater the potential for future adverse health effects. When the HI exceeds 1 and multiple chemicals contribute to the exceedance, the HI is segregated based on toxicity and target organs (USEPA 2001b).

For the cumulative risk screening, HI segregation involves obtaining the most recent and reliable noncarcinogenic health data for COPCs including data in the Integrated Risk Information System (IRIS) and databases developed by the Agency for Toxic Substances and Disease Registry (ATSDR). Health effects are considered for chronic effects. For COPCs with multiple target organs, the organ that the chemical primarily targets will be considered in HI segregation (USEPA 2001b). The results of the cumulative risk screens are interpreted as follows:

- If the cumulative HI for a site is greater than or equal to 0.5 for a target organ, then a quantitative risk assessment would be recommended for the site; or
- If the cumulative HI for a site is less than 0.5 for each target organ, and other screening criteria evaluated for the SSP are not exceeded, then NFA would be recommended for the site.

3.2.3 Lead and Iron Screening

If the lead concentration in soil exceeds 400 milligrams per kilogram (mg/kg) or the lead concentration in surface water exceeds 15 micrograms per liter (µg/L), then the potential risk is evaluated using USEPA's Integrated Exposure Uptake Biokinetic (IEUBK) Model (USEPA 2004a). If the percentage of children expected to have blood lead levels is greater than 10 micrograms per deciliter (µg/dL), then further investigation or response action will be required for the site (USEPA 2001b).

If iron concentrations in soil or water result in an HQ of 0.5 or higher, then further assessment is required; this assessment consists of a "margin of exposure evaluation" where the estimated intake of iron is compared to the recommended daily allowance (RDA) and concentrations known to cause adverse health effects in children (USEPA 2001b).

For the margin of exposure evaluation, the estimated iron intakes at the sites for the future resident child scenario for surface soil and total soil are calculated using the assumptions and equations provided in Appendix H. These estimated iron intake levels are then compared to the RDA for children (6 months to 10 years old) of 10 mg/day (NCEA 1996). In addition, utilizing an average child weight of 15 kg (USEPA 1989a), the child intakes for surface soil and total soil are calculated and compared to the calculated provisional (risk reference dose) RfD of 0.66 mg/kg-day. If the estimated intake levels are below the RDA and calculated provisional RfD, the site passes the margin of exposure evaluation for iron. The calculations for these evaluations are summarized in Appendix H.

3.2.4 SSL Comparison

3.2.4.1 Generic SSLs

SSL screening is conducted for detected chemicals in soil and sediment to evaluate the potential for leaching of chemicals from soil to groundwater. The MDC for each detected chemical in subsurface soil is compared to USEPA SSLs (soil to groundwater screening levels) included in the USEPA Region III RBC Table. A dilution attenuation factor (DAF) of 20 is used. In the case of PCBs/pesticides/herbicides, surface soil concentrations were used for comparison to the USEPA SSLs if subsurface samples were not analyzed for these chemicals. Chemicals that exceed their SSLs are then qualitatively evaluated to assess

the need for further investigation or evaluation. Site-specific information collected during the SSP, such as physical soil testing data, is considered in the qualitative evaluation (USEPA 2001c).

3.2.5 Site-specific SSL Comparison

Site-specific SSLs were calculated for selected organic COPCs exceeding generic SSLs (DAF 20) using site-specific soil organic carbon data collected during the SSP. Site-specific SSLs were calculated using the USEPA Soil Screening Guidance and Equation 3-1 shown below (USEPA 2001b). The calculations and summary table are presented in Appendix F.

$$C_t = C_w(K_{oc} * f_{oc} + \frac{\theta_a + \theta_w * H'}{\rho_b}) \qquad \text{Equation } 3-1$$

Where:

Parameter	Definition (Units)	Value
C_t	Screening level in soil, (mg/kg)	
C_w	Target leachate concentration (mg/L): (Tap Water Risk-based Concentration (T-RBC) * 20 (DAF)	Chemical-specific
K_{oc}	Soil organic carbon-water partition coefficient (L/kg)	Chemical-specific
f_{oc}	Organic carbon content of soil, (kg/kg)	Site specific (geotechnical samples)
θ_w	Water-filled soil porosity, (L_{water}/L_{soil})	0.3 (U.S. USEPA, 1991b)
θ_a	Air-filled soil porosity, (L_{air}/L_{soil}), ($\eta - \theta_w$)	0.13 (U.S. USEPA, 1991b)
η	Total soil porosity, (L_{pore}/L_{soil}), ($1 - \rho_b/\rho_s$)	0.43 (U.S. USEPA, 1991b)
ρ_b	Dry soil bulk density	1.5 kg/L (U.S. USEPA, 1991b)
ρ_s	Soil particle density	2.65 kg/L (U.S. USEPA, 1991b)
H’	Henry's law constant	Chemical-specific

3.2.6 Comparisons to ARARs

Based on the scope of sampling (media and constituents), ARARs potentially applicable to the SSP are associated with aqueous media sampled at SWMU 13 (surface water), SWMU 46 (groundwater), and AOC F (groundwater) and include Federal Maximum Contaminant Levels (MCLs) under the Safe Drinking Water Act and Virginia Water Quality Criteria (9 VAC 25-260-140).

MDCs of detected chemicals in aqueous samples at SWMU 13, SWMU 46, and AOC F are compared to appropriate ARARs, if the MDC is greater than one or more ARARs, then a recommendation is made whether further evaluation, investigation, etc. is appropriate.

3.2.7 Background Comparison

The final step in the risk screening process is the comparison of the MDCs of COPCs identified in soil to the established Facility-wide inorganic background point estimate concentrations for metals as shown in the following table (IT 2001a).

Facility-Wide Point Estimates for Soil

Chemical	Minimum Concentration (mg/kg)	Maximum Concentration (mg/kg)	95% Upper Tolerance Limit (UTL) of the Mean (mg/kg)
Aluminum	3,620	47,900	40,041
Arsenic	1.2	35.9	15.8
Chromium	6.3	75.8	65.3
Iron	7,250	67,700	50,962
Manganese	16.7	2,040	2,543
Thallium	1.3	5	2.11
Vanadium	12.2	114	108

Based on the background comparison and other relevant information, a recommendation will be made as whether further investigation, response action, or NFA is appropriate for a site.

3.2.8 Uncertainties Analysis

Cumulative risk screening involves the use of assumptions, judgments, and incomplete data to varying degrees that contribute to the uncertainty of the final estimates of risk. Uncertainties result both from the use of assumptions or models in lieu of actual data and from the error inherent in the estimation of risk related parameters and may cause risk to be overestimated or underestimated. Based on the uncertainties described below, this risk screening should not be construed as presenting an absolute estimate of risk to persons potentially exposed to COPCs.

Consideration of the uncertainty associated with various aspects of the cumulative risk screening allows better interpretation of the risk screening results and understanding of the potential adverse effects on human health. In general, the primary sources of uncertainty are associated with environmental sampling and analysis, selection of chemicals for evaluation, toxicological data, and exposure assessment. The effects of these uncertainties on the risk estimates are discussed below.

3.2.8.1 Environmental Sampling and Analysis

Uncertainty in environmental chemical analysis can stem from several sources including errors inherent in the sampling or analytical procedures. Analytical accuracy errors or sampling errors can result in rejection of data, which decreases the available data for use in the human health risk screening, or in the

qualification of data, which increases the uncertainty in the detected chemical concentrations. There is uncertainty associated with chemicals reported in samples at concentrations below the reported reporting limit (RL) but still included in data analysis and with those chemicals qualified with the letter J, indicating that the concentrations are estimated. Another issue involves the amount of blank-related (i.e., B-qualified) data in the data set. The effects of using data with these uncertainties may overestimate or underestimate risks.

Another uncertainty associated with sampling and analysis concerns the inclusion of chemicals that are potentially present in the environment due to anthropogenic sources. For example, PAHs are considered ubiquitous in soil from anthropogenic sources, such as the burning of fossil fuels, forest fires, and airborne particulates eroded from roadways and automobile tires. If such chemicals are not site-related, the risks attributable to site activities may be overestimated. This uncertainty may have a low-to-moderate effect on overestimating risks.

3.2.8.2 Selection of Chemicals for Evaluation

A comparison of MDCs to USEPA Region III RBCs was conducted for surface soil, subsurface soil, and sediment. Chemicals whose MDCs were below their respective R-RBCs were not carried through the risk screening. It is unlikely that this risk-based screening excluded chemicals that should be included, based on the conservative exposure assumptions and conservatively derived toxicity criteria that are the basis of the RBCs. Although following this methodology does not provide a quantitative risk estimate for every chemical, it focuses the assessment on the chemicals accounting for the greatest risks (i.e., chemicals whose MDCs exceed their respective RBCs) and the cumulative risk screening estimates would not be expected to be significantly greater.

Background concentrations of metal constituents in soil have been previously calculated and are available for use in the cumulative risk screening. However, as a conservative measure in the SSP, COPC selection excludes consideration of background data. Thus, it is unlikely that this risk-based screening excluded chemicals that should be included. Uncertainties associated with excluding the use of background data may lead to low-to-moderate overestimation of risks due to metals.

Uncertainty is introduced at the COPC selection step for chemicals that have adjusted RBCs or SSLs lower than the method detection limit (MDL). Specialized low-level analytical methods for PAH, explosive, and dioxin/furan compounds implemented for the SSP minimize this uncertainty. As revealed by Tables 2-5 through 2-12 in WPA 016, most of the uncertainty is attributable to the conservative downward adjustment of Tap Water RBCs by a factor of 10.

Essential nutrients, calcium, magnesium, potassium, and sodium were eliminated as COPCs per the SSP guidance (USEPA 2001b).

3.2.8.3 Exposure Point Concentrations

In establishing EPCs, the concentrations of chemicals in the media evaluated are assumed to remain constant over time. Depending on the properties of the chemical and the media in which it was detected, this assumption could overestimate risks, depending on the degree of chemical transport to other media.

When calculating EPCs from sample data, one half of the MDL was sometimes used for non-detect samples in the calculation of the 95% UCL of the mean. Approaches which substitutes values for non-detected chemical concentrations is associated with uncertainty, because chemicals that were not detected at the specified sample MDL may be absent from the medium or may be present at a concentration below the sample MDL. The uncertainty of the EPC will increase as the number of non-detects in a data set increases and the uncertainty could result in either the overestimation or underestimation of EPCs.

The 95% UCL is used as the EPC for each medium if at least five samples are available. If the 95% UCL exceeds the MDC or if fewer than five samples are available, the maximum is conservatively used as a

default EPC. Using a value that is based on one sampling location (i.e., the maximum) has associated uncertainty and it adds a great deal of conservatism to the assessment.

3.2.8.4 Toxicological Data

Toxicological factors contributing to uncertainties associated with the human health risk screening process include the use of RBC age-adjusted ingestion and inhalation rates, the lack of toxicity criteria for some chemicals, and uncertainty associated with the lack of dermal risk estimates.

For chemicals without RBCs, provisional toxicity criteria were used where available. Provisional toxicity criteria present a source of uncertainty because USEPA has evaluated the compound, but consensus has not been established on the toxicity criteria. For this assessment, use of provisional toxicity criteria was preferable to not evaluating the chemical in order to limit data gaps. However, because these toxicity criteria have not been formally accepted by USEPA, there is uncertainty with these values and, therefore, with the risks calculated using these toxicity criteria.

For some chemicals, toxicity criteria were unavailable. Although lack of published toxicity data could result in an underestimation of risk, this uncertainty is likely to be balanced by the conservative nature of the verified toxicity values that were available for use.

Uncertainty is associated with using RBCs and SSLs because they do not consider dermal uptake. Given the conservative nature of the screening process, such as the use of the MDCs and R-RBCs, it is unlikely that omission of the dermal exposures in the risk screening process will result in the failure to misidentify require further evaluation or a response action.

3.3 ECOLOGICAL RISK SCREENING

The purpose of the ecological risk screening is to provide conclusions and recommendations regarding potential ecological risk associated with the 10 SSP sites discussed below. The media of concern for SWMUs 37, 38, 46, 57, 68, and 69, and AOCs A, F, and Q is surface soil. Owing to its proximity to the New River, SWMU 13 includes sediment and surface water as media of concern. In accordance with the approved SSP Guidance, the ecological risk screening for these sites includes site reconnaissance, screening-level problem formulation, exposure assessment, ecological effects assessment, and risk calculation. The findings of this ecological risk screen are used as input to risk management decision-making for the site. The scientific/management decision point (SMDP) reached from the ecological risk screening concludes that one of the following statements is true:

- There is adequate information to conclude that ecological risks are negligible and therefore there is no need for further action at the SSA on the basis of ecological risk;
- The information is not adequate to make a decision at this point and further refinement of data is needed to augment the ecological risk screening; or
- The information collected and presented indicates that a more thorough assessment is warranted.

In an effort to reduce redundancy, the approach to the risk screening, along with elements of the process that are common to the site areas, are summarized in the following sections and referred to in the document as appropriate.

3.3.1 Scope of Work

This ecological screening risk process includes Steps 1 and 2 of the Ecological Risk Assessment Guidance for Superfund (ERAGS) (USEPA 1997). Step 1 includes a site visit, screening-level problem formulation, and ecological effects evaluation. Step 2 includes a preliminary exposure estimate and risk

calculation. This approach will provide information pertinent to the potential interactions between site-related contamination and ecological resources upon which risk managers will be able to make conservative decisions regarding the ecological risk at individual SSAs.

3.3.2 Screening-Level Problem Formulation

The objectives of the ecological risk screening are to:

- Identify potentially complete exposure pathways between chemicals of potential ecological concern (COPECs) and receptors;
- Assess whether the COPECs exceed toxicological screening values that are considered to be protective of ecological receptors;
- Identify uncertainty and/or data gaps in the ecological risk screening; and
- Identify an appropriate SMDP for each SWMU or AOC based on the ecological risk screening results.

3.3.3 Site Characterization

In addition to the information contained within the Site Background-Environmental Setting section for each site, additional site characterization is required for the ecological risk screening, which includes local ecological receptors (threatened and endangered species) and ecological resources. The results of the site reconnaissance for each site are also incorporated as part of the site characterization section.

A discussion of potential biota likely to use the site areas, and area-specific observations recorded as part of the site reconnaissance performed on April 7, 2004, are included in each section. In addition, the Virginia Department of Game and Inland Fisheries (1999) survey recorded various species associated with the grassland communities at RFAAP. Based on their survey of the grassland habitats, the invertebrates (approximately 250 species) and birds (83 species) accounted for the majority of species observations at RFAAP (Virginia Department of Game and Inland Fisheries, 1999). Site-specific observations of wildlife are discussed in each site section.

The Virginia Department of Conservation, Division of Natural Heritage and U.S. Fish and Wildlife Service were contacted to gather information regarding the potential for threatened or endangered species to utilize the RFAAP. Results of these inquiries are provided in Appendix J. Another inquiry was submitted in 2004. The results of this inquiry will be provided when they become available.

The Virginia Department of Game and Inland Fisheries 1999 Installation-Wide Biological Survey identified three threatened wildlife species and two rare plant species (currently not on the 2002 Plant Watch List; http://www.dcr.state.va.us/dnh/plantlist02.pdf) associated with RFAAP grassland communities. They include:

- Regal Fritillary Butterfly (*Speyeria idalia*);
- Henslow's Sparrow (*Ammodramus henslowii*);
- Loggerhead Shrike (*Lanius ludovicianus*);
- Midland Sedge (*Carex mescochorea*); and
- Shaggy False Gromwell (*Onosmodium hispidissimum*).

Threatened wildlife observations in 1999 at RFAAP included the Regal Fritillary Butterfly (Virginia Department of Game and Inland Fisheries, 1999). The Regal Fritillary Butterfly was documented in the east-central and eastern edges of the MMA.

3.3.4 Identification of Chemicals of Potential Ecological Concern

With the exception of SWMU 13, the sites consist of exclusively terrestrial grassland habitat or developed industrial areas, and soil represents the potential exposure medium to ecological receptors. SWMU 13 is located adjacent to the New River; hence, surface water and sediment media were also assessed for this SWMU.

3.3.4.1 Approach

Specific data sets collected from each site area were used to identify COPECs for that area because factors such as size, historical use, and current use affect potential habitat quality of the individual sites. The sites range in size from approximately 0.012 acres for SWMU 69 to 0.67 acres for SWMU 37.

Soil samples were collected from 0 to 6-inches below ground surface (bgs) below gravel or organic layers at the surface except for VOC samples, which were collected from 6 to 12-inches bgs. This layer contains the zone of highest biological activity of soil organisms and the soil that is most frequently contacted by terrestrial biota. Although fossorial wildlife may be in contact with soil below 1 ft bgs, the preys of these animals are primarily associated with surficial soil. Furthermore, incidental exposure to the soil below 1 ft bgs is likely to be insignificant relative to surface soil exposure.

Similarly, the sediment layer from 0 to 6 inches is considered the surface sediment and is used in the COPEC identification for SWMU 13. As with soil, this surficial sediment layer is the biologically active zone.

3.3.5 Identification of Exposure Pathways and Potential Receptors Analysis

Figure 3-1 provides the ecological conceptual site model (ECSM) developed for the terrestrial sites to identify potentially complete exposure pathways and potential receptors at the site. Figure 3-2 provides the aquatic ECSM for SWMU 13. Because 9 of 10 sites are solely terrestrial with similar potential pathways and receptors, this description is referred to in the screening evaluation for the terrestrial areas.

3.3.5.1 Terrestrial

With the exception of SWMU 13, the sites identified in this study are exclusively upland habitats that lack wetland and significant drainage features. Therefore, soil represents the potential exposure medium for ecological receptors. Potential ecological receptors may be exposed to COPECs in soil through the following exposure routes:

- Direct contact/absorption from soil;
- Direct ingestion of soil;
- Incidental ingestion of soil; and
- Direct ingestion of biota with accumulated COPECs.

Although receptors may be exposed to COPECs through inhalation or drinking surface water, sufficient literature regarding toxicity due to inhalation is lacking to evaluate such an exposure route. Given the potential mobility of COPECs between food web trophic levels, a number of terrestrial categories were selected. Individual receptor species were selected to represent five wildlife receptor categories and these species possess the following characteristics that are essential for assessing COPEC mobility within the food web:

- Highly likely to occur at the site in relatively high abundance;
- Limited home range;
- Important role in the local food web; and
- Sufficient toxicological information is available in the literature.

Receptor categories and the species selected to represent the wildlife categories include:

- Plant communities;
- Soil invertebrate/microbial communities;
- Omnivorous birds: American Robin (*Turdus migratorius*);
- Carnivorous birds: Red-Tailed Hawk (*Buteo jamaicensis*);
- Herbivorous animals: Meadow Vole (*Microtus pennsylvanicus*);
- Omnivorous mammals: Red Fox (*Vulpes vulpes*); and
- Carnivorous mammals: Short-Tailed Shrew (*Blarina brevicauda*).

Specific species relevant to each site are identified in the individual ecological risk screening sections for each site where sampling occurred for the SSP.

3.3.5.2 Aquatic Pathways

SWMU 13 is located on the New River. Hence, in addition to terrestrial pathways associated with the land portion of the SWMU, aquatic pathways associated with the New River are also considered. Earthen berms that effectively control surface runoff to the river surround the SWMU on the southern (riverward), eastern (downstream), and western (upstream) sides. Storm-water runoff inside the SWMU discharges into a settling lagoon located at the eastern perimeter that discharges directly to the New River via the Virginia Pollutant Discharge Elimination System (VPDES) Outfall 017.

Surface water and sediment of the New River are potential exposure media for aquatic ecological receptors through the following exposure routes:

- Direct contact/absorption from surface water and/or sediment;
- Direct ingestion of surface water or sediment;
- Incidental ingestion of surface water and/or sediment; and
- Direct ingestion of biota with accumulated COPECs.

Receptor categories and the species selected to represent each of the wildlife categories include:

- Macroinvertebrate communities;
- Fish communities;
- Omnivorous birds: Mallard (*Anas platyrhynchos*);
- Piscivorous birds: Belted Kingfisher (*Ceryle alcyon*); and
- Semi-aquatic mammals: Raccoon (*Procyon lotor*).

3.3.6 Identification of Assessment and Measurement Endpoints

Assessment endpoints are explicit statements of ecological resources (entities) and attributes of those entities that are important to protect (USEPA 1998). Measurement endpoints represent quantifiable ecological characteristics that can be measured, interpreted, and related to ecological resources chosen as assessment endpoints. Assessment and measurement endpoints for the resources in the terrestrial sites are outlined below.

3.3.6.1 Terrestrial

Assessment and measurement endpoints for terrestrial receptors are as follows:

Assessment Endpoints	Measurement Endpoints
• Survival, growth, and reproduction of terrestrial plants	• No quantitative measurement endpoint is identified for plant communities. Plant communities will be evaluated qualitatively based on field observations of the vitality of these communities
Assessment Endpoints	**Measurement Endpoints**
• Survival, growth, and reproduction of soil invertebrates and microbial communities	• MDCs for soil COPECs will be compared to concentrations representing no adverse effects thresholds to the survival of soil invertebrates or microbial communities reported in the scientific literature
• Survival, growth, and reproduction of terrestrial wildlife (birds and mammals) populations and communities	• MDCs for soil COPECs (non dioxin/furan) will be compared to no observable adverse effects levels (NOAELs) and lowest observable adverse effects levels (LOAELs) associated with effects on growth, reproduction, or survival of terrestrial wildlife • Comparison of the maximum additive dose of dioxin/furan congeners ingested from soil and food to NOAEL and LOAEL doses associated with effects on growth, reproduction, or survival of terrestrial wildlife

3.3.6.2 Aquatic

Assessment and measurement endpoints for aquatic receptors are discussed in Section 4.7.13 as part of the SWMU 13 ecological risk screening.

3.3.7 Preliminary Exposure Estimate and Risk Characterization

3.3.7.1 Preliminary Exposure Estimate and Ecological Effects Evaluation

The preliminary exposure estimate and ecological effects evaluation considers the most conservative risk scenario. Highly conservative assumptions are used to estimate COPEC exposure to receptors for quantitatively evaluated pathways, and conservative toxicity reference values (TRVs) are used to evaluate the ecological effects of exposure.

The following two approaches are used to estimate exposure and evaluate ecological effects:

1) Invertebrate-derived TRVs to address the *Direct Contact* pathway to invertebrates and microbial communities for COPECs.

2) *Dose Rate Models* to calculate maximum concentrations of COPECs that would result in a dose equivalent to a NOAEL or LOAEL. Modeled COPEC concentrations are then used as TRVs to evaluate whether preliminary exposure estimates exceed concentrations representative of NOAEL or LOAEL doses.

The sites investigated include terrestrial exposure pathways, which include vegetative communities as a receptor category. The preliminary risk characterization for terrestrial plants is qualitative in nature. As stated in the RFAAP Final Master Work Plan, plants commonly do not warrant a detailed examination of risk owing to the invasive and successive nature of plant communities (URS 2003b). Therefore, direct contact/absorption of COPECs by plants was identified in the ECSM as a potentially complete pathway that would be qualitatively evaluated. Stressed or dead vegetation was not observed in the site areas during the site reconnaissance that could be attributed to chemical stress. Several of the areas had poor quality substrate or fill that resulted in the development of sparse herbaceous vegetation. Most of the grassed areas observed are typical of regularly mowed areas at RFAAP. Reduced plant density is likely due to poor physical substrate quality and not a response to COPEC concentrations in the surface soils.

3.3.7.2 Direct Contact Approach

MDCs for detected chemicals in soil are used as the preliminary exposure estimate to evaluate a conservative risk scenario for the direct contact pathway to soil invertebrates. Other potentially complete exposure pathways to soil invertebrate and microbial communities include direct ingestion of soil and biota. Due to insufficient information to quantify these pathways, and they are likely secondary to the direct contact/absorption pathway, their omission should not substantially alter the risk characterization.

To evaluate the preliminary exposure estimates, the TRVs that were protective of soil invertebrate and microbial communities were selected from a review of invertebrate-derived toxicological benchmarks for soil. The TRV for direct contact to soil invertebrate/microbes was established as follows:

- USEPA Ecological Soil Screening Level (ECO-SSL): soil invertebrate;
- USEPA Region III Biological Technical Assistance Group (BTAG) faunal soil value;
- EPA EcoTox Thresholds;
- National Oceanic and Atmospheric Administration (NOAA) Squirt values;
- Canadian Environmental Quality Guidelines; and
- Oak Ridge National Laboratory (ORNL): microbial community and earthworm values (Efroymson *et al*. 1997a).

Risk is assessed by comparing the preliminary exposure estimate (i.e., MDC) of each detected chemical to established the TRV (detailed above). The resulting risk is characterized in terms of a hazard quotient (HQ), which is expressed as:

$$\mathbf{HQ = Emax/TRV}$$

Where **HQ** = Ecological Effects Quotient for the contaminant (unitless)

Emax = Maximum concentration for contaminant (mg/L or mg/kg)

TRV = Toxicity Reference Value for contaminant (mg/L or mg/kg)

An HQ of less than 1 indicates no or negligible risk. The potential for risk increases as the HQ increases above unity. However, this result should be considered in the context of other characteristics of the exposure area.

3.3.7.3 Dose Rate Models

Preliminary risk characterization for wildlife receptors uses the conservative preliminary exposure estimate and ecological effects evaluation to characterize risk to potential terrestrial receptors. As presented in Appendix I, risk is assessed by comparing the preliminary exposure estimate of each detected bioaccumulative chemical, as defined in Table 4-2 in *Bioaccumulative Testing and Interpretation for the Purpose of Sediment Quality Assessment, Status and Needs*, EPA-823-R-00-001, to the TRV developed in the ecological effects evaluation. In the preliminary model, minimum body weight, maximum ingestion rates, an area use faction of 1 were used to calculate the exposure dose. The resulting risk is characterized in terms of a hazard quotient (HQ), as outlined in Section 3.3.7.2.

3.3.8 Refined Exposure Estimate and Risk Characterization

The refined exposure and risk characterization, step 3a of ERAGS, reviews and refines the conservative assumptions used in the risk calculation (USEPA 1997). In step 3a, conservative assumptions used in the preliminary exposure and risk characterization are replaced with more environmentally realistic assumptions to evaluate risk posed by COPECs identified in the preliminary risk characterization. The addition of step 3a focuses the outcome of the ecological screening, streamlines the review process and functions as the initial basis for ecological risk management decision-making at each site.

3.3.8.1 Refined Exposure Estimate and Ecological Effects Evaluation - Dose Modeling

This step replaces the conservative assumptions used in the preliminary exposure estimate and ecological effects evaluation with more environmentally realistic assumptions resulting in a more realistic estimate of potential risk including the use of average body weight, average dietary intake, and the use of realistic area use factor.

In the refined model, a realistic area use factor ($AF_{refined}$) was used to calculate the ratio of the area of each site to the average home range of the receptor:

$$AF_{refined} = AOC\ F\ Area/Home\ Range\ Area$$

Other assumptions in the refined model remain conservative. The major assumptions are summarized as follows:

- Receptors assimilate 100% of the maximum concentrations of COPECs detected in the food and soil; and
- Receptors forage in the site for a proportion of the time as established by $AF_{refined}$.

3.3.8.2 Natural Site Constituents (Background and Essential Nutrients)

Background point estimates for metals were incorporated in the ecological risk management decision to assess site soil concentrations in the context of facility background levels (IT 2001a). The 95% UTL of background was used as the representative background concentration (IT 2001a). Essential nutrients, including calcium, magnesium, potassium, and sodium were not considered to be COPECs in the risk screening as recommended by the Site Screening Process (USEPA 2001a) and the MWP (URS 2003b) with the exception of SMWUs 37, 38, and AOC Q for which a qualitative assessment of calcium was conducted due to the nature of the material placed at these sites (Calcium Sulfate).

3.3.8.3 Risk Management Decision

The refined risk characterization, the background comparison, and site characterization form the basis of the risk management decision.

3.3.9 Uncertainties Analysis

Assumptions and other factors that tend to overestimate, underestimate, or have an unknown effect on the findings of the ecological risk screening are presented below with a discussion of their uncertainty.

3.3.9.1 Data Quality

Insufficient sampling density or the analyte list may not provide a representative estimate of exposure to COPECs. Misrepresentation of exposure results in uncertainty and may lead to an overestimation or underestimation of risk. Three or more sampling locations at each of the sites under consideration reduces this uncertainty. Moreover, the extensive list of constituents analyzed reduces the likelihood of failing to identify a COPEC. Therefore, the uncertainty in the ecological risk screening results associated with data quality is likely minimal.

3.3.9.2 COPEC Bioavailability

Chemical analyses of exposure media measured the total levels of the COPECs rather than the more bioavailable toxic forms. The availability of the total concentrations alone assumes that the entire fraction is bioavailable and toxic. This is likely to be a very conservative assumption that varies from constituent to constituent. It was also assumed that no geochemical factors limited receptor exposure to, or the potential for toxic expression of COPECs. It is likely that COPECs may, to some degree, adsorb to fine-grained particles and/or complex with chemical complexing agents and organic ligands in the exposure media. Such actions may change the chemical speciation of the COPECs to a less toxic form, or reduce the concentrations of bioavailable chemicals and subsequent uptake by receptors. Therefore, risk is likely to be overestimated.

3.3.9.3 Wildlife Profile Assumptions

Dose rate models require a number of assumptions, which could result in either an overestimation or underestimation of risk to receptors. For example, body weights and ingestion rates are estimated from limited information. In addition, receptors are assumed to feed on specified food sources, although some such as the Red Fox may feed opportunistically on a greater variety of food types.

AFs were estimated based on the size of the site relative to the home ranges of the receptors. However, the foraging of birds and mammals is not assessed simply by size, but rather a function of habitat

suitability, habitat productivity, and species-specific foraging behaviors. Therefore, because habitat quality is not accounted for in estimating AF, the risk to terrestrial receptors in this assessment is likely to be overestimated.

3.3.9.4 Lack of Toxicological Data

The evaluation of ecological effects was limited in the direct contact and wildlife ingestion pathways due to limited toxicological data of the COPECs. The effects of many COPECs evaluated for the direct contact pathway to invertebrates and microbial communities were not quantified due to the lack of invertebrate derived TRVs. In addition, NOAEL and LOAEL TRVs were not available for receptors exposed to multiple COPECs. Therefore, due to the lack of toxicological data, the risk to potential receptors may be overestimated or unknown.

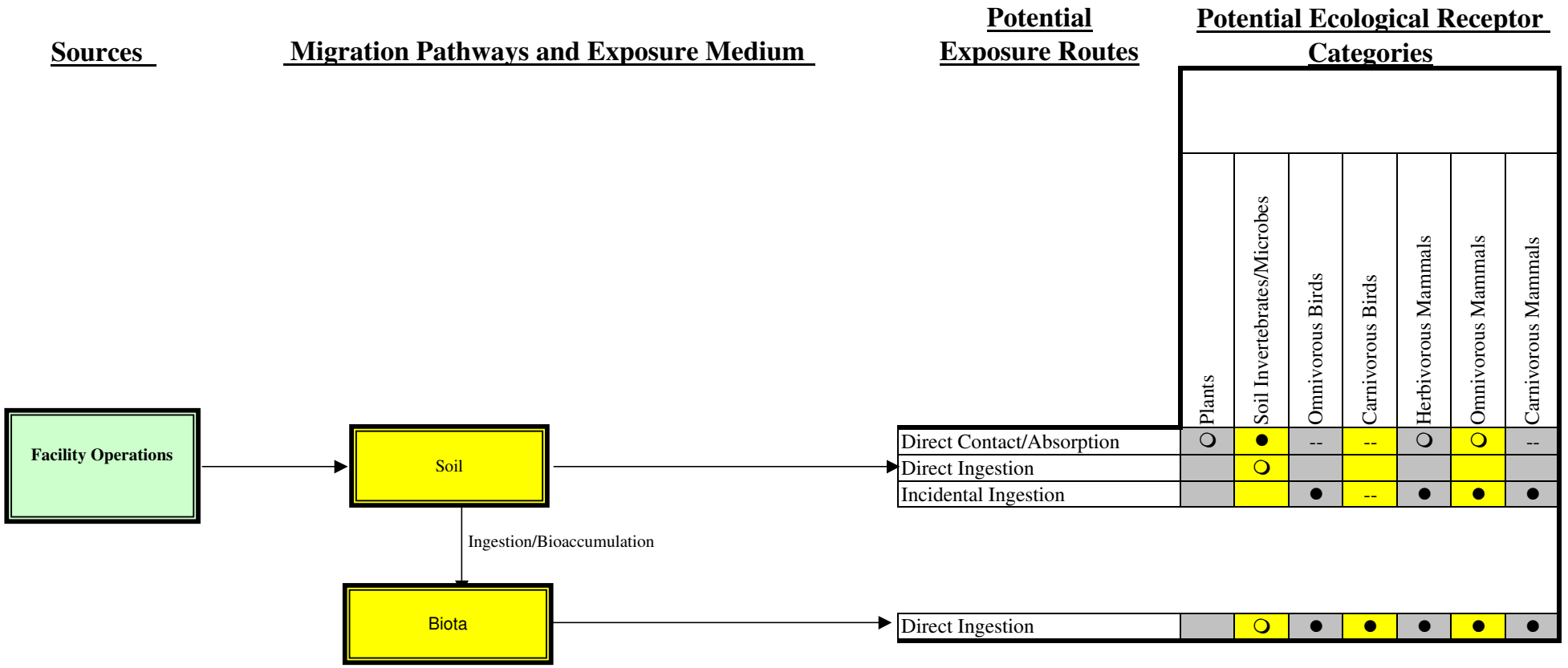
3.3.9.5 TRVs

NOAEL and LOAEL TRVs identified for wildlife receptors represent the most conservative application of toxicity test results identified from the literature. High uncertainty factors were used to provide TRVs representative of chronic exposure and sub-lethal effects. This approach is likely to overestimate the sensitivity of many ecological receptors and likely overestimates risk to potential receptors.

3.3.9.6 Hazard Quotients

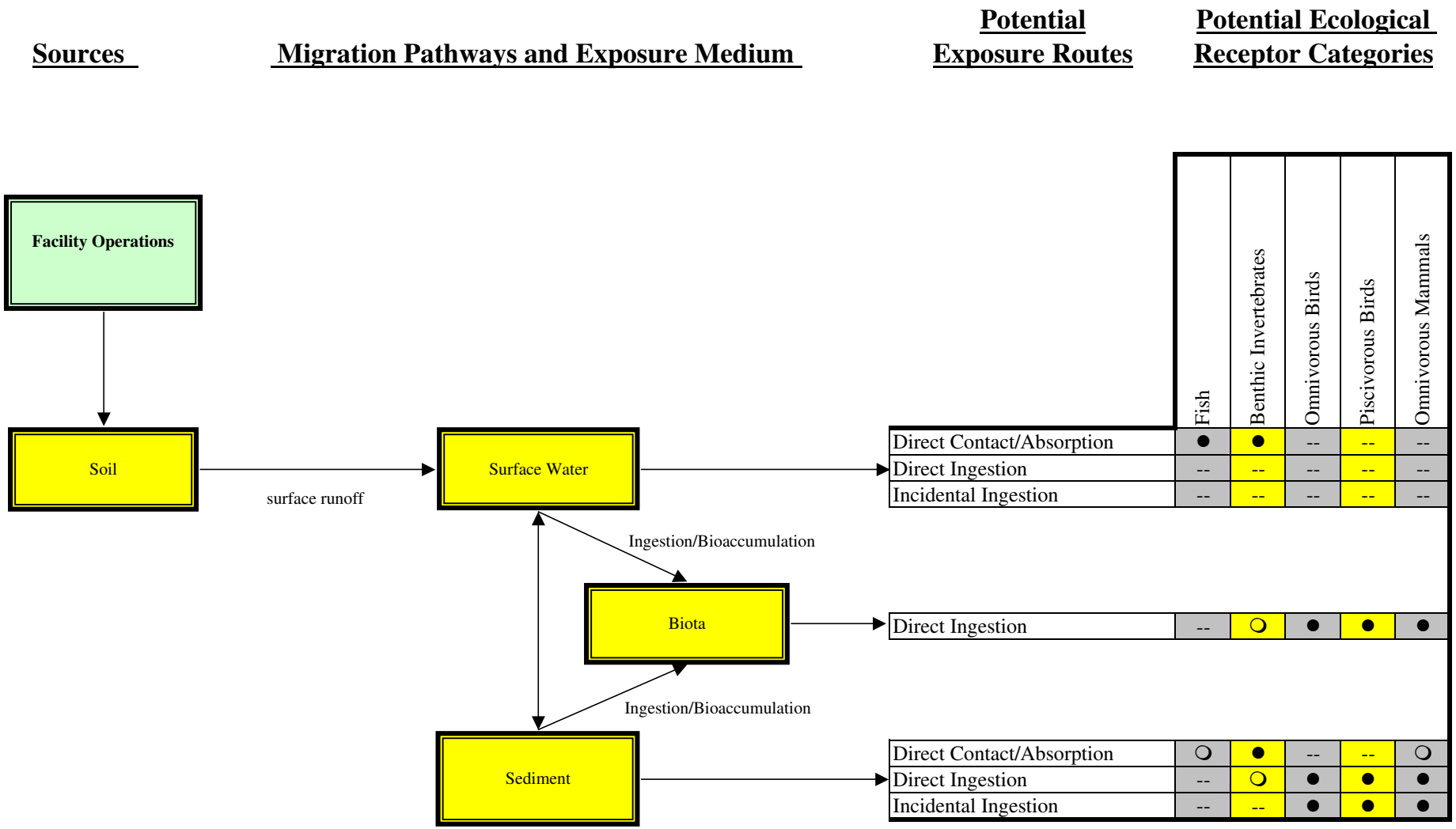
Uncertainties in characterizing risks are primarily associated with the assumption that an HQ greater than 1 is an adequate indicator of the potential for ecological risks of individual chemicals. Given the use of conservative and realistic exposure and effects assumptions previously discussed, there is minimal uncertainty that the potential for ecological risks of individual chemicals are not identified in the ecological risk screening of the sites. Conversely, there is a strong possibility for false positive identification of ecological risks for some individual chemicals.

FIGURE 3-1
TERRESTRIAL ECOLOGICAL CONCEPTUAL SITE MODEL
SSP REPORT
RADFORD ARMY AMMUNITION PLANT, RADFORD, VA



Notes:
● = COMPLETE PATHWAY EVALUATED QUANTITATIVELY
❍ - COMPLETE PATHWAY EVALUATED QUALITATIVELY
-- - PATHWAY IS INSIGNIFICANT
BLANK = INCOMPLETE PATHWAY

FIGURE 3-2
AQUATIC ECOLOGICAL CONCEPTUAL SITE MODEL
SSP REPORT
RADFORD ARMY AMMUNITION PLANT, RADFORD, VA



Notes:
● = COMPLETE PATHWAY EVALUATED QUANTITATIVELY
❍ - COMPLETE PATHWAY EVALUATED QUALITATIVELY
-- - PATHWAY IS INSIGNIFICANT
BLANK = INCOMPLETE PATHWAY

Table 3-1
Physical Soil Testing Results
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Soil Sample			Physical Soil Testing Results												
Location	Depth Collected (ft bgs)	USCS Soil Type	Water Content (D2216-98)	Liquid Limit (D4318-00)	Plastic Limit (D4318-00)	Plastic Ind. (D4318-00)	Grain Size Minus No. 200 (D422-63 2002)	Hydrometer % Minus 2 μm (D422-63 2002)	pH Distilled Water (D4972-01)	pH 0.01 M CaCl Solution (D4972-01)	Organic Content (D2974-00)	Specific Gravity (D854-02)	Total Bulk Density (D2937-00e1)	Dry Bulk Density D2937-00e1)	Hydraulic Conductivity (D5084-00e1)
			%	--	--	--	%	%	SU	SU	%	--	pcf	pcf	cm/sec
SWMU 13															
13SB7	12.7	GC	16.0	nt	nt	nt	13.3	nt	6.3	6.2	1.1	2.711	130.0	112.0	nt
13SB10	2 - 3	SM	29.6	nt	np		28.6	nt	6.9	6.6	3.5	2.688	115.9	89.4	1.3E-05
SWMU 37, SWMU 38, and Area of Concern Q															
37SB1	6 - 6.5	SC-SM	21.8	22	18	4	43.0	nt	6.3	6.0	1.5	2.677	130.1	106.8	1.6E-07
37SB2	15.5 - 16	SM	17.0	nt	nt	nt	33.7	nt	5.1	5.4	1.6	2.746	122.7	104.9	2.3E-04
38SB1	7	SM	20.9	nt	nt	nt	34.8	nt	7.1	6.6	1.7	2.713	125.8	104.1	nt
38SB2	15.5	SM	3.7	nt	nt	nt	13.8	nt	6.8	6.3	1.1	2.702	116.0	111.9	2.0E-03
QSB1	9.5 - 10	CL	26.4	31	21	10	52.6	nt	6.4	6.5	1.8	2.717	123.8	97.9	1.2E-07
QSB2	24	GP	6.2	nt	nt	nt	3.9	nt	6.4	6.2	0.6	2.692	121.6	114.6	nt
SWMU 46															
46SB1	14.5	SC	24.5	32	18	14	50	23	5.7	5.9	2.2	2.729	127.5	102.4	3.0E-08
46SB2	9.5 - 10	SM	20.4	nt	nt	nt	26.9	nt	6.2	5.7	1.8	2.735	123.4	102.5	nt
SWMU 57															
57SB2	7.5 - 8	CL-ML	28.4	nt	nt	nt	70.2	nt	5.6	3.9	2.6	2.701	94.1	73.3	nt
57SB3	16.5 - 17	CH	46.4	83	29	54	89.6	46	5.3	nt*	3.6	2.694	106.4	72.7	1.8E-07

Table 3-1 (Continued)
Physical Soil Testing Results
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Soil Sample			Physical Soil Testing Results												
Location	Depth Collected (ft bgs)	USCS Soil Type	Water Content (D2216-98)	Liquid Limit (D4318-00)	Plastic Limit (D4318-00)	Plastic Ind. (D4318-00)	Grain Size Minus No. 200 (D422-63 2002)	Hydrometer % Minus 2 μm (D422-63 2002)	pH Distilled Water (D4972-01)	pH 0.01 M CaCl Solution (D4972-01)	Organic Content (D2974-00)	Specific Gravity (D854-02)	Total Bulk Density (D2937-00e1)	Dry Bulk Density D2937-00e1)	Hydraulic Conductivity (D5084-00e1)
			%	--	--	--	%	%	SU	SU	%	--	pcf	pcf	cm/sec
SWMU 68															
68SB2	18 - 18.5	CL-ML	30.4	nt	nt	nt	54.9	nt	6.8	6.2	1.5	2.680	100.2	76.8	nt
68SB3	7 - 7.5	ML	35.8	49	29	20	75.9	26	5.2	3.8	3.6	2.744	115.4	85.0	1.9E-06
SWMU 69															
69SB1	11 - 12	CL	34.1	34	19	15	74.1	nt	9.5	7.8	3.3	2.688	128.2	95.6	nt
69SB3	7.5 - 8.5	CL	32.7	nt	nt	nt	77.7	nt	7.1	6.0	3.5	2.707	117.7	88.7	6.6E-09
Area of Concern A															
ASB1	22 - 24	CH	36.6	63	30	33	58.8	nt	4.2	3.8	3.6	2.735	115.6	84.7	nt
ASB2	14 - 16	MH	43.4	56	35	21	78.4	nt	4.3	3.9	2.5	2.662	110.2	76.8	6.7E-07
Area of Concern F															
FSB1	18.5 - 19	CL	30.6	47	20	27	79.2	30	7.1	iq*	1.4	2.628	119.2	91.2	8.6E-08
FSB2	7.5 - 8	SM	15.6	nt	nt	nt	19.9	nt	6.8	6.3	1.4	2.807	111.0	96.1	nt

Notes:

iq* = Not tested because of insufficient sample quar
bgs = Below ground surface
pcf = Pounds per cubic foot
cm/sec = centimeters per second
USCS = Unified Soil Classification System
(D2216) = ASTM Test Method
SU = Standard Units
-- = Unitless
np = Not plastic
GC = Gravel with clayey fines
SM = Sand with silty fines
SC = Sand with clayey fines
CL = Clay low plasticity
GP = Gravel poorly graded
ML = Silt low plasticity
MH = Silt high plasticity
g/cm^3=Grams per cubic centimeter
nt = Not tested

4.0 SWMU 13 – WASTE PROPELLANT BURNING GROUND

4.1 SITE BACKGROUND – ENVIRONMENTAL SETTING

Physiography

SWMU 13 is an active 20-acre unit located in the southeastern portion of the HSA. The SWMU is situated on the 100-year flood plain on the northern bank of the New River. Earthen berms surround the site on the southern (riverward), eastern (downstream), and western (upstream) sides.



SWMU 13 – August 2002 – Looking West

Excluding the berms, topography slopes to the south toward the river with an elevation of approximately 1,700 ft mean sea level (msl) in the northern (landward) portion and approximately 1,695 ft msl in the southern (riverward) part (Figure 4-1). Topography south (riverward) of the site is moderately to steeply sloping towards the New River, which is located approximately 50 ft from the site. The New River flows east prior to turning north around the HSA.

The RFAAP perimeter fence runs along the crest of the southern earthen berm between the site and the New River. To the north, two parallel asphalt access roads border the SWMU. Steep, densely wooded slopes terminate the flood plain area north of the access roads and west of the SWMU. The site appears to have been constructed by leveling an existing fluvial terrace/floodplain along the New River during the early 1940s (USEPA 1987).

SWMU 13 consists of eight pairs of burning pads (Figure 4-2). Each burning pad contains a metal burning pan, approximately 18 ft long by 6 ft wide by 1 ft deep, and a mobile temporary storage unit (wheeled covers to prevent rainwater accumulation in the pans). A maximum of 1,000 pounds of waste is burned in a pan at a time.

Tanks/Structures

An office trailer is present east of the site in addition to the burning pads and the RFAAP perimeter fence. Other tanks or structures are not located in or near the site.

Surface Water

The site is surrounded on three sides by berms to protect it from New River floods. Storm-water runoff inside of the site initially flows southward toward the river and then eastward along the southern (riverside) berm finally discharging into a settling lagoon located at the eastern perimeter. Excavated below grade, the settling lagoon is approximately 35 ft long by 20 ft wide and is neither bermed nor lined. The settling lagoon discharges directly to the New River via VPDES Outfall 017.

Soil and Geology

The site is underlain by the Wheeling sandy loam soil. This soil has moderate permeability and medium-to-strong acidity (IT 2001a). The geology of SWMU 13 was previously explored during an RFI

conducted by Dames & Moore in 1992, through the drilling of 22 soil borings and installation of seven monitoring wells. Additional investigations were conducted for the SSP outside of the current site operating area: 1) south of the berm and fence bordering the site to the south (borings 13SB7, 13SB8, 13SB9, 13SB10, and 13SB11) and 2) east of the berm bordering the site to the east within the settling lagoon (boring 13SB12).

Approximately 13 to 22 ft of unconsolidated soil (fill material and alluvial deposits) is present above carbonate bedrock of the Elbrook Formation. The alluvial deposits generally thicken toward the New River and consist of micaceous reddish brown sandy clay/sandy silt (CL/ML) and/or silty sand (SM). In the southern half of the site, 2 to 6 ft of yellowish brown silty gravel (GM) overlies bedrock.

Physical soil testing of two representative soil samples at the site during the SSP investigation indicated acidic GC and SM soil, with organic content in the range of 1.1 to 3.5%, and a vertical hydraulic conductivity of 1.3E-05 cm/sec for the SM sample (Table 3-1).

Groundwater

An unconfined aquifer is present within unconsolidated soil (alluvium) and in underlying bedrock at depths ranging from approximately 12 to 20 ft bgs. The thickness of the unconfined aquifer within the alluvium increases toward the New River (3+ ft thick). RFI data indicated that groundwater flow at the site is toward the south and the New River (Dames & Moore, 1992a). Perched water was encountered at a depth of 4 ft below the bottom of the settling lagoon, which was dry at the time of boring completion.

4.2 SITE BACKGROUND - HISTORY

Open burning of waste and off-specification energetic products has been performed continuously at SWMU 13 since manufacturing operations began in 1941. Open detonation has not been conducted. The site is an interim status RCRA Subpart X treatment unit; a Part B application was submitted in 1988, and an updated Part B application was submitted to VDEQ in 2000.

Material open burned at the site has consisted of waste explosives, propellants, and laboratory wastes. According to the RFA (USEPA 1987), three types of propellant waste have been burned at the site including single base (nitrocellulose), double base (nitrocellulose and nitroglycerin), and triple base (nitrocellulose, nitroglycerin, and nitroguanidine). Burning of other energetic materials or burning-rate modifiers, such as lead, dinitrotoluene (DNT), or other organic and inorganic chemicals, was not mentioned in the RFA.

Use of the current eight pairs of burning pads and their appurtenances started in 1985 (Dames and Moore 1992a). Previously, wastes were burned in earthen pits (i.e., burn pits) at the same locations currently occupied by the burning pads. After burning, residue is removed from the pans, and the surrounding areas are inspected for burn residue. Burn residue is then moved to the designated accumulation area, inspected, and unburned energetic material returned to the pans for re-burning. A composite sample of burn residue is analyzed approximately every two months for disposal characterization (ATK 2002).

During the 1987 USEPA RFA site visit, various signs of releases were evident and included remnants of incompletely combusted propellant throughout the area and several hundred charred containers described as “scintillation vials” at the mouth of the culvert pipe to the settling lagoon (USEPA 1987). RFAAP personnel were unaware of the use of such “vials” either past or present, and scintillation measurements have not been made at RFAAP. These “vials” may have been sampling containers. Neither incompletely combusted propellant nor “scintillation vials” were observed during the URS site visit in August 2002.

4.3 PREVIOUS INVESTIGATIONS

Five environmental assessments have included the site as part of their study area including: a Soil Sampling Study (1987), RFI Program (1992), EPIC Aerial Photo Report (1992), New River and Tributaries Study (1997), and Current Conditions Report (2002).

4.3.1 Soil Sampling Study at the RFAAP Open Burning Ground – 1987

In 1987, the US Army Environmental Hygiene Agency (USAEHA) conducted a Soil Sampling Study at the site. The site was divided into 28 sections and one soil sample was collected from each section for analysis of explosives and leachable metals (Figure 4-2). USAEHA reported that the western half of the site appeared to be relatively free of impacted soil. Levels of trinitrotoluene (TNT), ranging from 5.7 to 10,900 mg/kg, were detected in samples collected from the eastern half (Sections 17 through 22 and Section 24). The soil sample collected from Sampling Section 19 also contained comparable levels of 2,6-dinitrotoluene (2,6-DNT) and 2,4-dinitrotoluene (2,4-DNT).

4.3.2 SWMU 13 RFI Program – 1992

In August 1991, Dames and Moore performed an RFI Program at SWMU 13 to evaluate potential impact to soil, sediment, surface water, and groundwater (Dames and Moore 1992a).

Soil

Four soil borings (13SB3 through 13SB6) were drilled near the boundaries of the site to collect samples to evaluate the extent of potentially impacted soil (Figures 4-3 and 4-4). Easternmost and westernmost borings 13SB3 and 13SB6 were located outside of the perimeter berms. The two southern borings (13SB4 and 13SB5) were located inside of the riverside berm. Soil borings 13SB1 and 13SB2 were drilled north of the access road to collect background soil samples. Samples for chemical analysis were collected from each boring at three depths (0.5, 5, and 10 ft bgs).

In addition, 24 composite soil samples for chemical analysis were collected from borings (13SC1 through 13SC8) adjacent to the burn pits (Figure 4-3 and 4-4) at depths of 0.5 ft (“A”), 5 ft (“B”), and 10 ft (“C”). Samples for VOC analyses were not composited. Four surface soil samples (13SS1 through 13SS4) were also collected from the drainage ditch. The soil samples were analyzed for metals, explosives, VOCs, SVOCs, and TCLP metals. Analytical results for the soil samples are summarized in Table 4-1.

Thallium concentrations in 17 soil samples were above the background point estimate and the adjusted I-RBC. Lead concentrations in seven soil samples were above the background point estimate and the EPA lead screening level of 400 mg/kg. The concentration of 2,4-DNT in surface soil sample 13SS4 was above the adjusted R-RBC. 2,4,6-trinitrotoluene (2,4,6-TNT) was detected in surface soil samples 13SB6 and 13SS1at concentration above the adjusted R-RBC and in surface soil sample 13SS2 at a concentration above the adjusted I-RBC. 1,3-Dinitrobenzene was detected in surface soil sample 13SS1D (duplicate) at a concentration above the adjusted R-RBC (Table 4-1).

Sediment

Two samples (13SE1 and 13SE2) were collected from the top 12 inches of sediment in the settling basin (Figure 4-4). One sample was collected adjacent to the influent pipe (13SE1) and the second (13SE2) was collected near the eastern end. The sediment samples were analyzed for metals, explosives, VOCs, and SVOCs. Analytical results for the sediment samples are summarized in Table 4-1.

Lead concentrations in 13SE1 and 13SE2 were above the EPA lead screening level of 400 mg/kg. Thallium was detected in sample 13SE2 at a concentration above the background point estimate and the adjusted I-RBC. 2,4,6-TNT was detected in sample 13SE2 at a concentration above the adjusted R-RBC (Table 4-1).

Surface Water

One surface water sample (13SW1) was collected from the settling basin for analysis of metals, explosives, VOCs, and SVOCs (Table 4-2). Chemicals detected in 13SW1 at concentrations above the adjusted T-RBC included: aluminum, arsenic, barium, chromium, iron, manganese, and vanadium, 2,4,6-TNT, 2,4-DNT, and 2,6-DNT. Lead was detected in sample 13SW1 at a concentration above the EPA

lead action level of 15 µg/L. Aluminum, chromium, copper, iron, lead, and zinc were detected in sample 13SW1 at a concentration above Draft BTAG screening levels.

4.3.3 Review of EPIC Aerial Photo Report

Activity within the site area was first noted on a 1949 photograph that reportedly showed that the western portion of the site had "been cleared, and seven burning pits (not annotated) divided by earthen berms are visible", but "do not appear dark-toned at this time" (USEPA 1992). USEPA could not conclude from the photograph if actual burning activities were ongoing.

Review of the 1962 photograph indicated that: "The entire area now appears to be active. Dark-toned areas (not annotated) are visible where it appears burning has taken place" (USEPA 1992). A three-sided berm was present in the center of the site, and USEPA reported that burning might have occurred within this bermed area. The photograph also showed that an area of "probable light-toned liquid" was present west of the aforementioned berm (USEPA 1992).

The 1971 photograph indicated that the burning pits had been divided by berms into eight burning areas. The photo also showed that the three-sided berm area seen in the 1962 photo had one side intact. A "light-toned" liquid/material was observed near the remaining berm and "probable liquid" was present along the southern boundary (USEPA 1992).

The 1986 photograph was interpreted to indicate that the "pit burning" method had changed to "pan burning" method using eight cells with two burning pans each. Two areas of "light-toned" material were visible near the northern edge of the site, and several areas of "staining" were visible along the northwestern and southern boundaries. The settling basin was apparently visible for the first time as a "lagoon" at the eastern edge of the SWMU (USEPA 1992).

4.3.4 New River and Tributaries Study – 1997

The objective of the New River and Tributaries Study was to provide data to evaluate migration pathways along the New River and its tributaries at RFAAP to assess potential adverse impacts to human health and the environment (Parsons 1997). One sediment sample (NRSE4) was collected from the New River near the site for analysis of VOCs, SVOCs, pesticides, PCBs, and TAL metals to assess potential impacts from the site. Chemical concentrations in the sediment sample were below their adjusted RBCs. Lead and chromium were detected at concentrations above their Draft BTAG screening levels.

One surface water sample (NRSW4) was collected from the New River near the site for analysis of VOCs, SVOCs, pesticides, PCBs, and TAL metals to assess potential impacts to surface water from the site (Figure 4-3). Chemical concentrations in the surface water sample were below their adjusted T-RBCs and MCLs.

4.3.5 Current Conditions Report – 2002

The Current Conditions Report was performed to develop a conceptual model of the geology and hydrogeology of the HSA at RFAAP. The work included: a geologic and hydrogeologic data review, detailed geologic features mapping, a groundwater elevation measurement survey, a spring survey, river flow measurements, and a review of groundwater geochemical data. The conceptual model is intended to support the development of future investigation activities.

As described in the Current Conditions Report, seven monitoring wells (13MW1 through 13MW7) were to be sampled quarterly at SWMU 13. Bis (2-ethylhexyl) phthalate was detected at concentrations above the MCL in samples collected from each of the monitoring wells, except 13MW6. Ammonia, aluminum, arsenic, iron, and manganese were detected in groundwater samples at concentrations above their adjusted T-RBCs (IT 2001b).

4.4 WORK PLAN DATA GAP ANALYSIS

It was agreed at the Installation Action Plan workshop (2003) and subsequent discussions with USEPA, that the focus of SSP investigative activities at SWMU 13 would be outside of the active operational areas, specifically, the area between the New River and the earthen berm that borders the southern portion of the active operational area. The data gap analysis presented in Section of 1.6.5 WPA 016 indicated a lack of samples in this area and at adjacent locations in the New River (URS 2003b). The following data gaps were identified:

- TCL VOCs - surface soil, subsurface soil, sediment, and surface water;
- TCL SVOCs/PAHs - surface soil, subsurface soil, sediment, and surface water;
- TCL PCBs and pesticides - surface soil;
- Explosives - surface soil, subsurface soil, sediment, and surface water;
- TAL inorganics - surface soil, subsurface soil, sediment, and surface water;
- Dioxins/furans - surface soil;
- Perchlorate - surface water; and
- Site-specific physical soil testing data.

4.5 SSP FIELD ACTIVITIES

4.5.1 Soil

Six borings (13SB7 through 13SB12) were advanced outside of the current operational area at the site to evaluate for the presence or absence of chemicals in surface and subsurface soil (Figure 4-1). Each of these borings was located between the New River and the earthen berm that borders the active operating area, except for 13SB12, which was located within the settling lagoon east of the berm.

Boring 13SB7 was advanced using a tractor mounted, direct-push Geoprobe® unit, while the remaining five borings were advanced using a hand auger. Each of the borings was advanced to refusal, except for 13SB12, which was terminated at the depth of encountered groundwater. Groundwater was encountered at the completion depth of borings 13SB7, 13SB8, and 13SB12. As summarized below, discrete samples were collected from surface, intermediate zone, and terminal zone for the borings with the exception of 13SB8 from which two samples were collected due to groundwater encountered at a depth of 3.7 ft bgs.

SWMU 13 SSP Soil Sample and Boring Information

Boring ID	Total Depth of Boring (ft bgs)	Surface Sample ID	Sample Depth (ft)	Intermediate Sample ID	Sample Depth (ft)	Terminal Sample ID	Sample Depth (ft)
13SB7	12.7	13SB7A	0.0 - 1.0	13SB7B	5.0 - 6.0	13SB7C	10.0 - 12.0
13SB8	3.9	13SB8A	0.0 - 1.0	13SB8B	3.5 - 3.7	Not Collected	
13SB9	4.0	13SB9A	0.0 - 1.0	13SB9B	1.5 - 2.0	13SB9C	3.5 - 4.0
13SB10	4.8	13SB10A	0.0 - 1.0	13SB10B	2.5 - 3.0	13SB10C	4.5 – 4.8
13SB11	8.6	13SB11A	0.0 - 1.0	13SB11B	4.5 - 5.0	13SB11C	8.0 – 8.5
13SB12	4.0	13SB12A	0.5	13SB12B	2.0 - 3.0	13SB12C	3.5 - 4.0

Soil samples were analyzed for TCL VOCs, TCL SVOCs, PAHs, explosives (including nitroglycerin and PETN), and TAL inorganics. Surface soil sample 13SB9A was also analyzed for TCL pesticides, TCL PCBs, TCL herbicides, and dioxin/furans. SSP analytical results for soil samples (detected chemicals) are summarized in Table 4-3.

Two soil samples were collected from 13SB7 (12.7 ft bgs) and 13SB10 (2-3 ft bgs) for physical testing of percent moisture, grain size, pH, TOC, specific gravity, and bulk density. Additional testing was conducted on sample 13SB10 including Atterberg limits and hydraulic conductivity. Analytical results for these samples are summarized in Table 3-1 and the complete results are provided in Appendix E.

Deviations to WPA 016 (URS 2003a) were necessary to adjust to field conditions encountered at the site. Due to access constraints for the Geoprobe, borings 13SB8 through 13SB12 were advanced using a hand auger. The use of hand augers resulted in shallower than anticipated refusal depths.

4.5.2 Sediment and Surface Water

Two pairs of surface water and sediment samples were collected from the New River adjacent to the site. Sample pair 13SW2 (surface water)/13SE2 (sediment) was collected at the western end (upstream) of the site. Sample pair 13SW3/13SE3 was collected at the eastern end (downstream) of the site at the probable point of entry for surface water runoff from the settling lagoon. The surface water and sediment samples were analyzed for TCL VOCs, TCL SVOCs, PAHs, explosives (including nitroglycerin), perchlorate (surface water), and TAL inorganics. SSP analytical results for sediment and surface water samples (detected chemicals) are summarized in Tables 4-4 and 4-5.

4.6 HUMAN HEALTH RISK SCREENING

4.6.1 Soil

4.6.1.1 Identification of COPCs

Tables 4-6 and 4-7 present the results of COPC evaluations for surface soil and total soil, respectively. Table 4-8 summarizes the dioxin/furan data and calculations for the total 2,3,7,8-TCDD equivalent concentration used for COPC screening. COPCs identified for surface soil and subsurface soil included:

- *TAL metals:* aluminum (NSV), antimony, arsenic, chromium, cobalt (NSV), iron, lead, manganese, thallium, and vanadium;
- *VOC TICs:* 1 compound (NSV);
- *TCL SVOCs:* DNT Mix, 4-chloro-3-methylphenol (NSV), benzo(a)pyrene, dibenzofuran (NSV), and dimethlyphthalate (NSV); and
- *SVOC TICs:* 16 compounds (NSVs) for surface soil, and 30 compounds (NSVs) for total soil.

4.6.1.2 Cumulative Risk Screen

Table 4-9 presents the results of the cumulative risk screening for surface soil. Tables 4-10 and 4-11 present the results of the cumulative risk screening for total soil. A summary of the results for SWMU 13 is presented below.

Cumulative Human Health Risk Screening Results for SWMU 13 - Soil

	Surface Soil			Total Soil		
Residential Excess Cancer Risk	Fail	1.E-05	As, benzo(a)pyrene, DNT Mix	Fail	2.E-05	As, benzo(a)pyrene, DNT Mix
Industrial Excess Cancer Risk	Pass	2.E-06	--	Pass	2.E-06	--
Residential Noncarcinogenic	Fail	3	As, Cr, Fe, Mn, Tl, V, 2,4-DNT	Fail	3	Sb, As, Cr, Fe, Mn, Tl, V, 2,4-DNT
Industrial Noncarcinogenic	Pass	0.3	--	Pass	0.2	--

Cumulative human health risk screens passed with the exception of the residential (carcinogenic and noncarcinogenic) scenarios for surface soil and total soil.

Noncarcinogenic residential cumulative risk screenings for surface soil and total soil resulted in HIs of 3, which exceeded the EPA target HI of 1. Due to multiple chemicals contributing to an HI greater than 1, the HIs have been segregated based on the primary target organs for chronic exposure. The following tables present the results of the HI segregation using data obtained from Oak Ridge National Laboratory's Risk Assessment Information System (RAIS), which includes data from various sources such as USEPA and the ATSDR.

HI Segregation for Target Organs – SWMU 13 -Surface Soil

Target Organ	As	Cr	Fe	Mn	V	Tl	2,4-DNT	Total HI
Skin	0.1	--	--	--	--	--	--	0.1
Central Nervous System (CNS)	0.1	--	--	0.8	--	--	0.005	***1***
Cardiovascular (CV)	0.1	--	2	--	--	--	--	***2***
Blood	--	--	--	--	0.5	--	--	***0.5***
Liver	--	--	2	--	--	0.2	0.005	***2***
Kidney	--	--	2	--	0.5	0.2	0.005	***2***
Gastrointestional (GI)	--	0.2	--	--	0.5	--	--	***0.7***
Reproductive	--	--	--	0.8	--	--	0.005	***0.8***

HI segregation for surface soil resulted in values equal to or higher than the cumulative SSP HI threshold of 0.5 for a target organs including: the CNS, CV, blood, liver, kidney, GI, and reproductive.

HI Segregation for Target Organs – SWMU 13 - Total Soil

Target Organ	Sb	As	Cr	Fe	Mn	Tl	V	2,4-DNT	2,6-DNT	Total HI
Skin	--	0.1	--	--	--	--	--	--	--	0.1
CNS	--	0.1	--	--	0.7	--	--	0.007	0.003	***1***
CV	--	0.1	--	1	--	--	--	--	--	***1***
Blood	--	--	--	--	--	0.2	0.4	0.007	0.003	***0.6***
Liver	--	--	--	1	--	0.2	--	0.007	0.003	***1***
Kidney	--	--	--	1	--	--	0.3	--	--	***1***
GI	0.04	--	0.1	--	--	--	0.4	--	--	***0.5***
Reproductive	--	--	--	--	0.7	--	--	--	--	***0.7***

HI segregation for total soil resulted in values equal to or higher than the cumulative SSP HI threshold of 0.5 for a target organs including: the CNS, CV, blood, liver, kidney, GI, and reproductive.

4.6.1.3 Lead and Iron Screening

The MDCs for lead in surface soil (8,620 mg/kg) and total soil (26,500 mg/kg) were above the lead screening level of 400 mg/kg, and therefore, the potential risk associated with lead was evaluated using the IEUBK model (USEPA 2004a). The results of the modeling presented in Appendix G predicted that the probability of children expected to have blood levels of 10 microgram per deciliter or greater exceeded the SSP threshold of 5%.

Iron concentrations at the site for surface soil and total soil resulted in HQs greater than the iron SSP threshold HQ of 0.5 for the residential scenario, and therefore, the site required further characterization for iron through a margin of exposure evaluation. Appendix H presents the margin of exposure evaluation for surface soil and total soil. A summary of the results for SWMU 13 is presented below.

Iron Margin of Exposure Evaluation – Future Child Resident

	Surface Soil			Total Soil		
		Estimated Site Intake	Exposure Screening Level		Estimated Site Intake	Exposure Screening Level
RDA Screen (mg/day)	Pass	7.0	10	Pass	6.5	10
Provisional Reference Dose (RfD) Screen (mg/kg-day)	Pass	0.46	0.66	Pass	0.43	0.66

The site passed the margin of exposure evaluation for iron in soil. In addition, the MDCs for iron in surface soil and total soil were below the background point estimate.

4.6.1.4 Comparison to Generic SSLs

MDC comparisons to generic SSLs (DAF 20) for detected chemicals indicated that TCE and 1,3-dinitrobenzene exceeded their SSLs (Table 4-12).

4.6.1.5 Comparison to Site-Specific SSLs

TCE concentrations in samples collected from boring 13SB11 exceeded the site-specific SSL of 2 µg/kg calculated using the average total organic carbon (TOC) value from the two physical soil samples collected at the site during the SSP (Appendix F). 1,3-Dinitrobenzene exceeded its site-specific SSL of 0.07 mg/kg in intermediate sample 13SB12B (Appendix F).

4.6.1.6 COPC Comparison to Background

MDCs for metals COPCs were below their background point estimates with the exception of lead (Table 4-13).

4.6.2 Sediment

4.6.2.1 Identification of COPCs

Table 4-14 presents the results COPC evaluations for sediment. COPCs identified for sediment included:

- *TAL metals:* aluminum (NSV), arsenic, chromium, cobalt (NSV), iron, manganese, and vanadium;
- *TCL SVOCs:* benzo(a)pyrene, dibenz(a,h)anthracene, and dimethylphthalate (NSV); and
- *SVOC TICs:* 6 compounds (NSVs).

4.6.2.2 Cumulative Risk Screen

Table 4-15 presents the results of the cumulative risk screening for sediment. A summary of the screening results for SWMU 13 is presented below.

Cumulative Human Health Risk Screening Results for SWMU 13 - Sediment

	Sediment	
Residential Excess Cancer Risk	Fail	1.E-05
Industrial Excess Cancer Risk	Pass	2.E-06
Residential Noncarcinogenic	Fail	3
Industrial Noncarcinogenic	Pass	0.2

The cumulative risk screen passed for sediment with the exception of the residential scenario (carcinogenic and noncarcinogenic).

Noncarcinogenic residential cumulative risk screening for sediment resulted in an HI of 3, which exceeded the EPA target HI of 1. COPCs contributing to the cumulative HI in decreasing order are iron, manganese, vanadium, chromium, and arsenic. Due to multiple chemicals contributing to an HI greater than 1, the HI was segregated based on the primary target organs for chronic exposure. The following tables present the results of the HI segregation using data obtained from Oak Ridge National Laboratory's

Risk Assessment Information System (RAIS), which includes data from various sources such as USEPA and the ATSDR.

HI Segregation for Target Organs – SWMU 13 -Sediment

Target Organ	As	Cr	Fe	Mn	V	Total HI
Skin	0.2	--	--	--	--	0.2
CNS	0.2	--	--	0.5	--	***0.7***
CV	0.2	--	2	--	--	***2***
Blood	--	--	--	--	0.5	***0.5***
Liver	--	--	2	--	--	***2***
Kidney	--	--	2	--	0.5	***3***
GI	--	0.2	--	--	0.5	***0.7***
Reproductive	--	--	--	0.5	--	***0.5***

HI segregation for surface soil resulted in values equal to or higher than the cumulative SSP HI threshold of 0.5 for a target organs including: the CNS, CV, blood, liver, kidney, GI, and reproductive.

4.6.2.3 Lead and Iron Screening

The MDC for lead in sediment at the site was 259 mg/kg, which was below lead screening level of 400 mg/kg, and therefore, further characterization for lead was not required.

Iron concentrations at the site for sediment (evaluated as soil) resulted in an HQ greater than the iron SSP threshold HQ of 0.5 for the residential scenario, and therefore, the site required further characterization for iron through a margin of exposure evaluation. Appendix H presents the margin of exposure evaluation for sediment. A summary of the results for SWMU 13 is presented below.

Iron Margin of Exposure Evaluation – Future Child Resident

	Sediment (as Soil)		
		Estimated Site Intake	Exposure Screening Level
RDA Screen (mg/day)	Pass	6.6	10
Provisional Reference Dose (RfD) Screen (mg/kg-day)	Pass	0.44	0.66

The site passed the margin of exposure evaluation for iron in sediment (evaluated as soil).

4.6.2.4 Comparison to Generic SSLs

The MDC comparisons to generic SSLs (DAF 20) for detected chemicals in sediment indicated that TCE exceeded its generic SSL (Table 4-16). Sediment specific geotechnical data were not available to calculate a site-specific SSL.

4.6.3 Surface Water

4.6.3.1 Identification of COPCs

Table 4-17 presents the results of the COPC evaluations for surface water. COPCs identified for surface water included:

- *TAL metals:* aluminum (NSV), thallium; and
- *SVOC TICs:* 9 compounds (NSVs).

4.6.3.2 Cumulative Risk Screen

Table 4-18 presents the results of the cumulative risk screening for surface water. A summary of the screening results for SWMU 13 is presented below.

Cumulative Human Health Risk Screening Results for SWMU 13 – Surface Water

	Surface Water	
Tap Water Excess Cancer Risk	Pass	N/A
Tap Water Noncarcinogenic	Pass	0.1

The cumulative human health risk screening passed for surface water at SWMU 13.

4.6.3.3 Lead and Iron Screening

The MDC for lead in surface water at the site was 0.9 micrograms per liter (μg/L), which was below the lead action level of 15 μg/L; therefore, further characterization for lead was not required.

Iron concentrations at the site for surface water resulted in HQs less than the iron SSP threshold HQ of 0.5, and therefore, further characterization for iron was not required (Table 4-18).

4.6.3.4 Comparisons to ARARs

The MDC comparisons to MCLs and Virginia Water Quality Criteria Values with respect to human health indicated no detected chemicals exceeded these criteria (Table 4-17).

4.6.3.5 Human Health Risk Screening Summary

COPCs with screening values were limited to metals, benzo(a)pyrene, and DNT mixture in soil; metals, benzo(a)pyrene, and dibenz(a,h)anthracene in sediment; and metals in surface water. The cumulative risk screens passed with the exception of residential carcinogenic and noncarcinogenic scenarios for surface soil, total soil, and sediment.

Failure of the residential carcinogenic cumulative risk screening for surface and total soil is due to the concentrations of arsenic, benzo(a)pyrene, and dinitrotoluene mix in the soil. As a result of the arsenic MDC being below its background point estimate, the site related risk for surface soil and total soil are

7.E-06 and 8.E-08, respectively, which is below a cumulative excess risk of 1.E-05; and therefore, these constituents are not of concern at the site.

Noncarcinogenic residential risk screening failed for surface soil and total soil due to metals concentrations below background point estimates. These screening results are not a concern given that the elevated HI (>1) is due to metals background levels in soil (HI of 3.4 for surface soil and HI of 3.0 for total soil). In addition, the single metal COPC without an established background point estimate (antimony) had an MDC below its unadjusted RBC (HQ <0.04).

Failure of the residential carcinogenic cumulative risk screening for sediment is due to the concentrations of arsenic, benzo(a)pyrene, and dibenz(ah)anthracene. As a result of the arsenic MDC being below its background point estimate, the site related risk for sediment is 5.E-06, which is below a cumulative excess risk of 1.E-05; and therefore, these constituents are not of concern at the site.

Noncarcinogenic residential risk screening failed for sediment due to metal concentrations, which were in the range of background point estimates for soil. This screening result is not considered a concern given the lack of COPCs other than metals and concentrations in sediments that are comparable with background levels found in soil at RFAAP.

The site failed both tiers of lead screening for soil (point comparison and IEUBK modeling) indicating that further evaluations will be required at the site. Lead screening for sediment and surface water passed. Iron concentrations in surface soil, total soil, and sediment required a margin of exposure evaluation. Surface soil, total soil, and sediment passed the margin of exposure evaluation for iron. The iron screening for surface water passed (HQ<0.5).

Generic SSL exceedances were limited to 1,3-dinitrobenzene in soil and TCE in soil and sediment. TCE concentrations in the soil boring closest to the settling lagoon also exceeded site-specific SSLs. The TCE SSL exceedance in one sediment sample is not considered a concern based on the lack of TCE detections in surface water, the low concentration detected, and likely dilution effects associated with surface water of the New River.

The 1,3-Dinitrobenzene concentration detected in soil exceeded the calculated site-specific SSL; this exceedance is not considered a concern due to its single detection in one intermediate sample (duplicate sample) of 11 subsurface samples analyzed at the site at a low estimated concentration below the laboratory RL.

4.7 ECOLOGICAL RISK SCREENING

4.7.1 Problem Formulation

4.7.1.1 Ecological Site Characterization

An overview of the site physiography, water resources, geology, and soil for SWMU 13 is presented in Section 4.1. The site is a 20-acre gravel area located within the 100-year floodplain of the New River in the southeastern portion of the HSA. The area is bordered by the river to the south and the HSA in the other directions. The site is currently operational and contains eight pairs of metal burning pads used for burning of waste and off-specification energetic products. The area is surrounded by earthen berms to the south, east, and west.

Terrestrial Habitat

Terrestrial habitat within the site is generally disturbed owing to physical operations and limited to grass areas that are maintained. Gravel substrate in a large portion of the area limits vegetation density and substrate quality. Consequently, grasses provide the cover type and shrubs or tree species are not established. Vegetation along the fringe of the site consists of transitional herbaceous species typical of disturbed communities.

The limited terrestrial habitat at the site is not likely to support a diverse and abundant wildlife community. Given its gravelly substrate and frequent disturbance related to site activities, few species would be expected to extensively utilize terrestrial areas of the site. Potential wildlife utilizing the site includes passerine bird and small mammalian species common to RFAAP grasslands (Virginia Department of Game and Inland Fisheries 1999). Wildlife species were not observed at the site during the site reconnaissance. While the reconnaissance represents one snapshot in time, it does provide evidence concerning the limited potential for wildlife use at this site.

Aquatic Habitat

The New River represents aquatic habitat located approximately 50 ft down a moderate to steep slope from the site. At Radford, Virginia, the New River drains approximately 2,700 acres. It had an annual mean discharge of approximately 2,200 cubic feet per second in 2001 (USGS 2004). The New River supports a diversity of aquatic species including fish, aquatic invertebrates, amphibians, reptiles, and piscivorous birds (IT 2001a).

Threatened, rare, or endangered species were not observed in terrestrial areas of the site during the site reconnaissance. The New River was not surveyed during the reconnaissance to identify potential aquatic threatened, rare, or endangered species. A complete discussion of threatened, rare and endangered species potentially occurring within the entire RFAAP site is provided in Section 3.3.3.

4.7.1.2 Ecological Conceptual Site Model

The ECSM for the terrestrial component and aquatic component of the site are presented on Figures 3-1 and 3-2, respectively. Surface soil is a potential exposure medium of concern based on historical activities at the site. Potential chemical transport to the New River may have resulted in the migration of site-related chemicals to associated aquatic habitats. Based on the site characterization and data, the following complete exposure pathways exist:

- Terrestrial receptor exposure to surface soil; and
- Aquatic receptor exposure to sediment and surface water.

Detected chemical occurrence and distribution tables are presented in Table 4-19, 4-22, and 4-24 for surface soil, sediment, and surface water, respectively. In addition, Tables 4-21, 4-23, and 4-25 summarize the nondetected chemicals for soil, sediment, and surface water, respectively. Potential ecological receptors may be exposed to COPECs in the soil, sediment, and surface water through the following exposure routes:

Soil

- Direct contact/absorption from soil;
- Direct ingestion of soil;
- Incidental ingestion of soil; and
- Direct ingestion of biota with accumulated COPECs.

Sediment

- Direct contact/absorption from sediment;
- Direct ingestion of sediment;
- Incidental ingestion of sediment; and
- Direct ingestion of biota with accumulated COPECs.

Surface Water

- Direct contact/absorption from surface water;
- Direct ingestion of surface water;
- Incidental ingestion of surface water; and
- Direct ingestion of biota with accumulated COPECs.

Terrestrial and aquatic receptors of concern selected to represent species in the major trophic levels likely to use the site and the adjacent New River include:

Terrestrial

- Plants;
- Soil invertebrate/microbial community;
- Omnivorous birds (American robin; *Turdus migratorius*);
- Carnivorous birds (Red-tailed hawk; *Buteo jamaicensis*);
- Herbivorous mammals (Meadow vole; *Microtus pennsylvanicus*);
- Omnivorous mammals (Red fox; *Vulpes vulpes*); and
- Carnivorous mammals (Short-tailed shrew; *Blarina brevicauda*).

Relevant assessment and measurement endpoints for the terrestrial pathway are identified in Section 3.3.6.1.

Aquatic

- Benthic community;
- Fish Community;
- Omnivorous Bird [e.g., Mallard (*Anas platyrhynchos*)];
- Piscivorous Bird [e.g., Belted Kingfisher (*Ceryle alcyon*)]; and
- Semi-Aquatic Mammals [e.g., Raccoon, (*Procyon lotor*).

Relevant assessment and measurement endpoints for the aquatic pathway are identified below:

Assessment and Measurement Endpoints for Aquatic Pathway– SWMU 13

Assessment Endpoints	Measurement Endpoints
• Survival, growth, and reproduction of benthic community in New River	• Compare MDCs for sediment/surface water COPECs to refinement screening values
• Survival, growth, and reproduction of fish community in New River	• Compare MDCs for sediment/surface water COPECs to refinement screening values

Assessment Endpoints	Measurement Endpoints
• Survival, growth, and reproduction of invertivorous waterfowl in New River	• Compare MDCs for sediment/surface water COPECs to NOAELs and LOAELs associated with effects on growth, reproduction, or survival of terrestrial wildlife
• Survival, growth, and reproduction of piscivorous birds in New River	• Compare MDCs for sediment/surface water COPECs to NOAELs and LOAELs associated with effects on growth, reproduction, or survival of terrestrial wildlife
• Survival, growth, and reproduction of omnivorous and piscivorous mammals in New River	• Compare MDCs for sediment/surface water COPECs to NOAELs and LOAELs associated with effects on growth, reproduction, or survival of terrestrial wildlife

4.7.2 Preliminary Exposure Estimate and Risk Characterization

The preliminary exposure estimate and ecological effects evaluation considers the most conservative risk scenario. Highly conservative assumptions are used to estimate COPEC exposure to terrestrial receptors and aquatic receptors for pathways to be quantitatively evaluated. Conservative TRVs are used to evaluate the ecological effects of exposure using the two approaches discussed below.

4.7.2.1 Preliminary Exposure Estimate and Ecological Effects Evaluation

Direct Contact Approach

The maximum soil and sediment concentrations for detected chemicals are used as the preliminary exposure estimate concentrations to develop a conservative risk scenario for the direct contact pathway to soil invertebrates and the benthic community.

Dose Rate Modeling Approach

In the dose rate modeling approach, the maximum COPEC concentrations for detected bioaccumulative chemicals, along with assumptions of maximum ingestion rate, minimum body weight, 100% area use, and 100% bioavailability are used in the conservative risk scenario as the preliminary exposure estimate for soil, sediment, and surface water and compared to the calculated TRVs.

4.7.2.2 Preliminary Risk Characterization

Terrestrial Pathways

Terrestrial Plants - Qualitative characterization of vegetative communities common to grassed areas at RFAAP is provided in Section 3.3.7.3. Stressed or dead vegetation was not observed in the site area during the site reconnaissance that could be attributed to chemical stress. Reduced plant density is likely

due to poor physical substrate quality or ongoing operational activities at the site, and not a response to COPEC concentrations in the surface soil.

Soil Invertebrates and Microbial Communities –Direct contact HQs calculated for soil are presented in Tables 4-26, respectively, for detected chemicals.

Of the detected chemicals for which ecological screening values were available, the concentrations of aluminum, chromium, iron, lead, manganese, zinc, cyanide, benzo(a)anthracene, benzo(a)pyrene, benzo(b)flouranthene, chrysene, fluoranthene, phenanthrene, and pyrene resulted in HQ values that were greater than 1 (Table 4-26). However, MDCs for aluminum, chromium, iron, and manganese were below their background point estimates (Table 4-27).

A separate exposure assessment was conducted for dioxin/furan congeners to evaluate whether surface soil concentrations pose a threat to soil invertebrates. The 2,3,7,8-TCDD equivalent concentration as presented in Table 4-20 of 2.39 picograms per gram (pg/g) is below the BTAG screening value of 10,000 pg/g for 2,3,7,8-TCDD.

Terrestrial Wildlife - Quantitative risk characterization for terrestrial wildlife is limited to direct ingestion of biota and incidental ingestion of soil. The ECSM identifies a potentially complete direct contact exposure pathway to herbivorous and omnivorous mammals; however, there is insufficient information to quantify this pathway. This pathway is likely secondary to the direct ingestion pathway; therefore, it should not substantially alter the risk characterization.

The risk to each potential terrestrial wildlife receptor is summarized in Tables 4-28 and 4-29 (dioxins) and characterized as follows:

Receptor	NOAEL Only Exceedances	NOAEL and LOAEL Exceedances
American Robin	cadmium, dioxins	chromium, lead, selenium, zinc
Red-tailed Hawk	chromium	lead, zinc
Meadow Vole	lead	none
Red Fox	arsenic, selenium, benzo(g,h,i)perylene	lead, mercury, zinc
Short-tailed Shrew	arsenic, cadmium	lead, selenium, zinc

Aquatic Pathways

Benthic Communities - The direct contact HQs calculated for benthic communities are presented in Tables 4-30 and 4-31.

In sediment, for the detected chemicals for which ecological screening values were available, the concentrations of antimony, cadmium, copper, iron, lead, manganese, zinc, cyanide, acenaphthylene, and indeno(1,2,3-cd)pyrene resulted in HQ values greater than 1.

For surface water, for the detected chemicals for which ecological screening values were available, the concentration of dissolved barium resulted in HQ value greater than 1.

Aquatic Wildlife - Quantitative risk characterization is limited to direct ingestion of biota and incidental ingestion of sediment. The risk to each potential aquatic wildlife receptor at the site is summarized in Table 4-32 and characterized as follows:

Receptor	NOAEL Only Exceedances	NOAEL and LOAEL Exceedances
Mallard Duck	zinc	none
Belted Kingfisher	zinc	lead, selenium
Raccoon	arsenic	none

4.7.3 Refined Exposure Estimate, Ecological Effects Evaluation, and Risk Characterization

4.7.3.1 Refined Exposure Estimate and Ecological Effects Evaluation - Dose Modeling

Refined exposure estimates and ecological effects were not developed for direct contact assessment because an appropriate 95% UCL could not be calculated using the available data.

Refined exposure estimates and ecological effects were not developed for terrestrial wildlife receptors (surface soil) and aquatic wildlife receptors given the elevated results of the human health screening for lead and the lead HQs calculated for the American Robin and Meadow Vole.

4.7.3.2 Exposure and Risk Uncertainty Analysis

A discussion of potential risk and exposure uncertainty is provided in Section 3.3.9. Based on this assessment, while factors such as lack of TSV and wildlife profile assumptions may create limited uncertainty, the overall result of the conservative nature of the process has produced a conservative assessment of potential ecological risks associated with the site.

4.7.3.3 Background Concentrations of Metals

The results of the background comparison for the site are provided in Table 4-14 and discussed in the ecological risk summary.

4.7.4 Ecological Risk Screening Summary

Due to the results of the ecological risk screening, additional ecological risk evaluations for metals will be conducted for the terrestrial and aquatic wildlife as part of future evaluations for the site (outside the current operating area of SWMU 13).

4.8 CONCEPTUAL SITE MODEL

A refined CSM for SWMU 13 is presented on Figure 4-5. The CSM focuses on migration pathways from the current operating area (burning ground) to areas south and east of the operating area located outside of the earthen berm. The earthen berm is located along the southern and eastern perimeter of the active burning ground and is approximately 50 ft north of the New River.

With the current operating area, the land surface slopes gently southward toward the New River. Topography south of the earthen berm slopes moderately to steeply toward the New River. The New River flows east past SWMU 13 prior to turning north around the HSA.

Subsurface geology at the site consists of fill material and alluvial deposits overlying carbonate bedrock of the Elbrook Formation. Groundwater is present in the lower part of the alluvium and in the underlying bedrock at a depth of approximately 12 to 20 ft bgs. Groundwater flows southward across SWMU 13 toward the New River where local discharge of groundwater occurs.

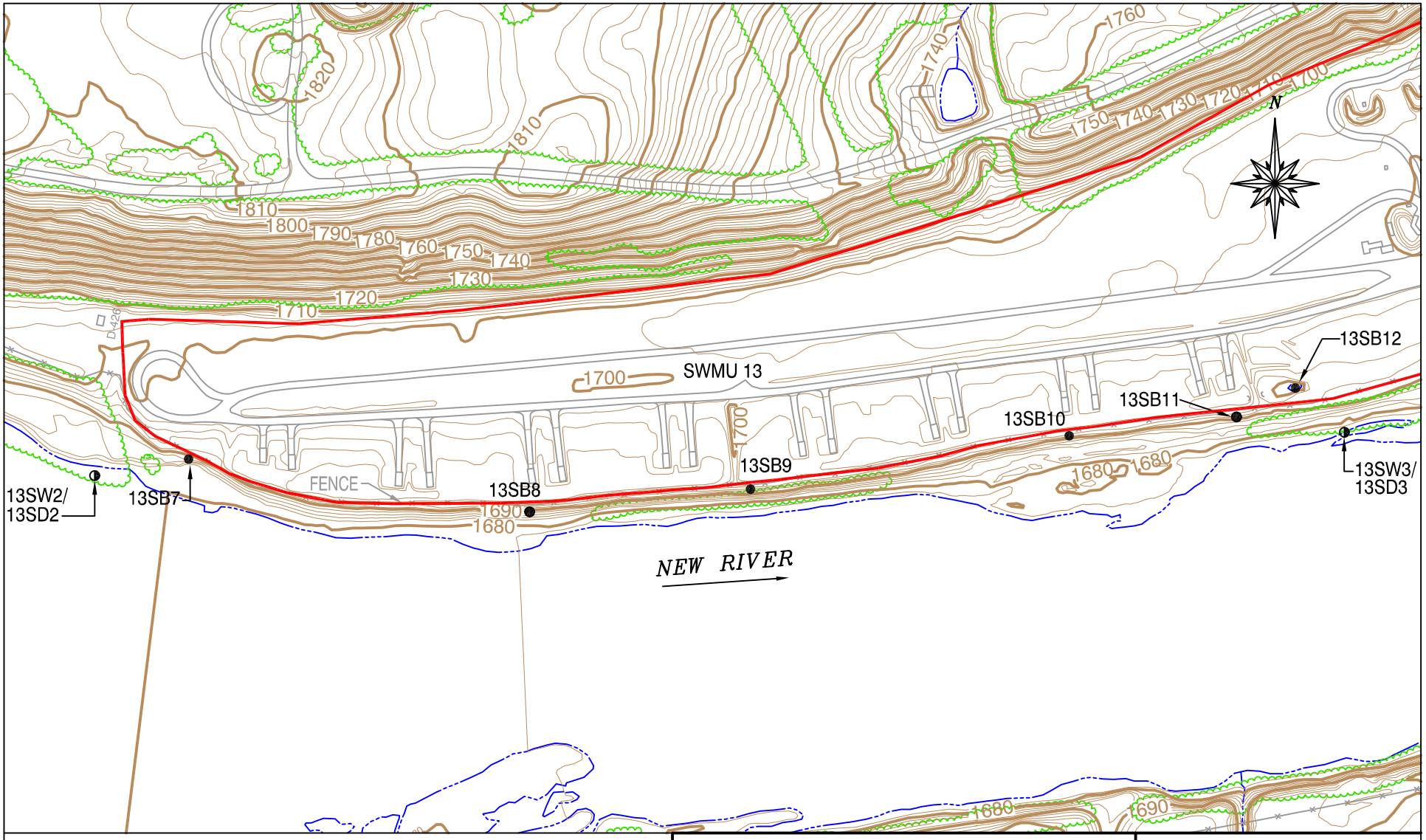
Potentially affected media include surface and subsurface soil, surface water, and groundwater. COPCs identified in soil and sediment with screening values include metals and PAHs. Thallium was identified as a COPC in surface water (New River).

Although current and likely future land-use scenarios are limited to industrial operations, both residential and industrial scenarios are evaluated. SWMU 13 is enclosed by a fence along its perimeter and by the Installation perimeter fence, and, therefore, potential receptors are limited to site workers (more conservative than trespasser scenario), future construction workers, and terrestrial biota.

Direct deposition is considered a potential release mechanism to surface soil within the current operating area and past burning operations may have affected soil outside of the earthen berm. Site workers, construction workers, and terrestrial biota could contact surface soil. Leaching of chemicals is considered a potential release mechanism to subsurface soil that may be contacted by potential future construction workers. Leaching of chemicals is considered a potential release mechanism to groundwater. In addition, the area associated with the settling lagoon may have been affected by storm water runoff from the operational area. Storm water transport of surficial materials to the settling lagoon is shown as resulting in a surface soil exposure pathway.

4.9 RECOMMENDATION FOR FUTURE ACTION

Based on the results of the SSP screening, further investigation of the nature and extent of lead in soil outside of the current operating area (south of the earthen berm) is recommended. This assessment should include completion of a human health risk assessment, SLERA, and an evaluation of the need for future actions. The SLERA should also include an assessment of metals concentrations in sediment in the New River and associated risk to aquatic receptors. In addition, current groundwater data for SWMU 13 (collected as part of the Facility's open burning permit with the VDEQ) will be reviewed and assessed as part of the RFI.



Legend

- Soil Sampling Location
- Surface Water/Sediment Sampling Location
- Approximate SWMU Boundary
- Vegetation
- Water

0 200'

1 Inch = 200 feet

(SOURCE: MODIFIED FROM HERCULES, INC., 1992)

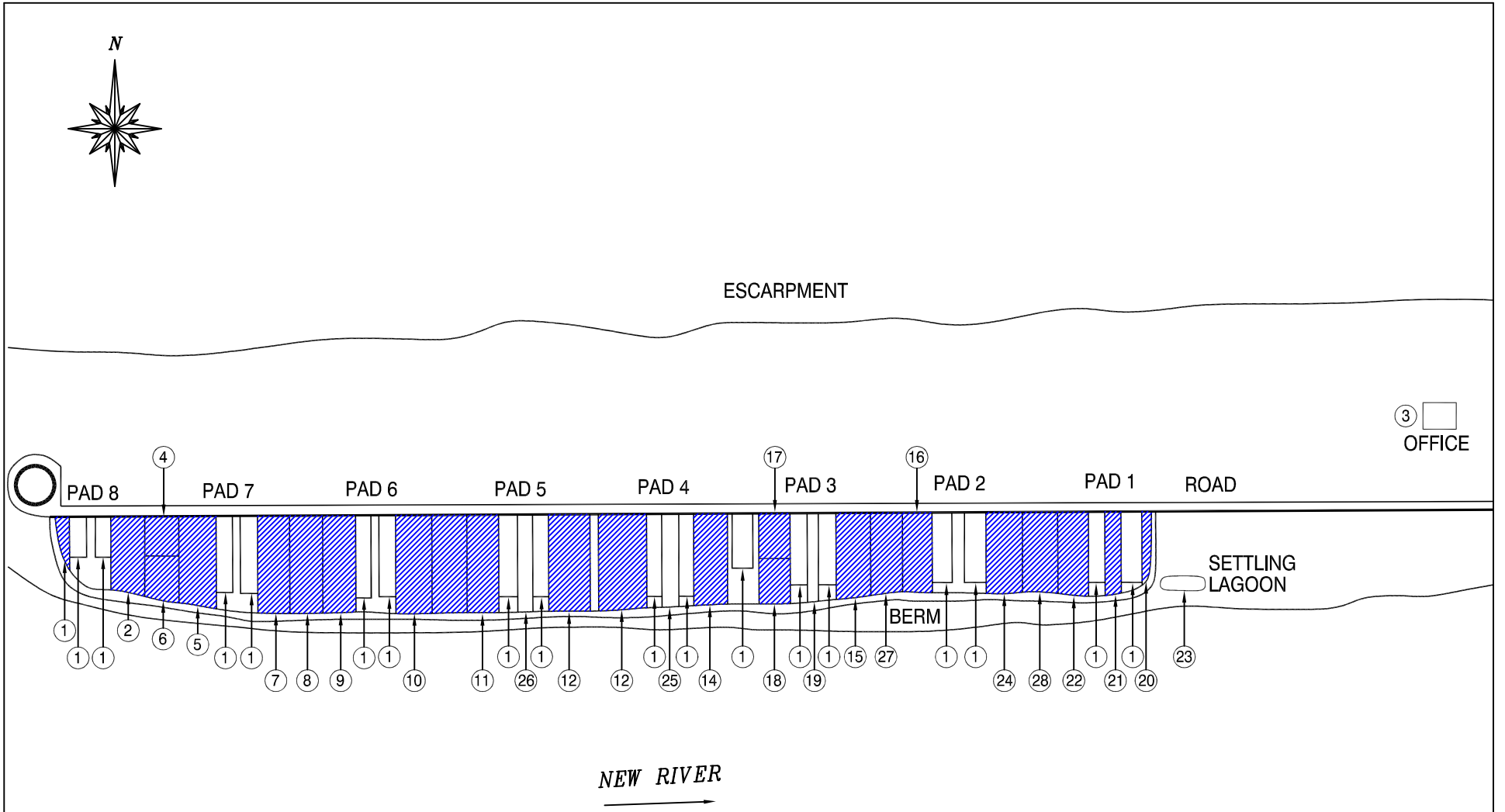
RFAAP

SSP REPORT

Date:	Prepared By:
June 2004	KDC/TDH
Scale:	**File Name:**
1"=200'	15900619

FIGURE 4-1

SSP SAMPLING LOCATION MAP
SWMU 13



Legend

Sampled Area and Sample Number

(SOURCE: MODIFIED FROM USAEHA, 1987)

0 200'

1 Inch = 200 feet

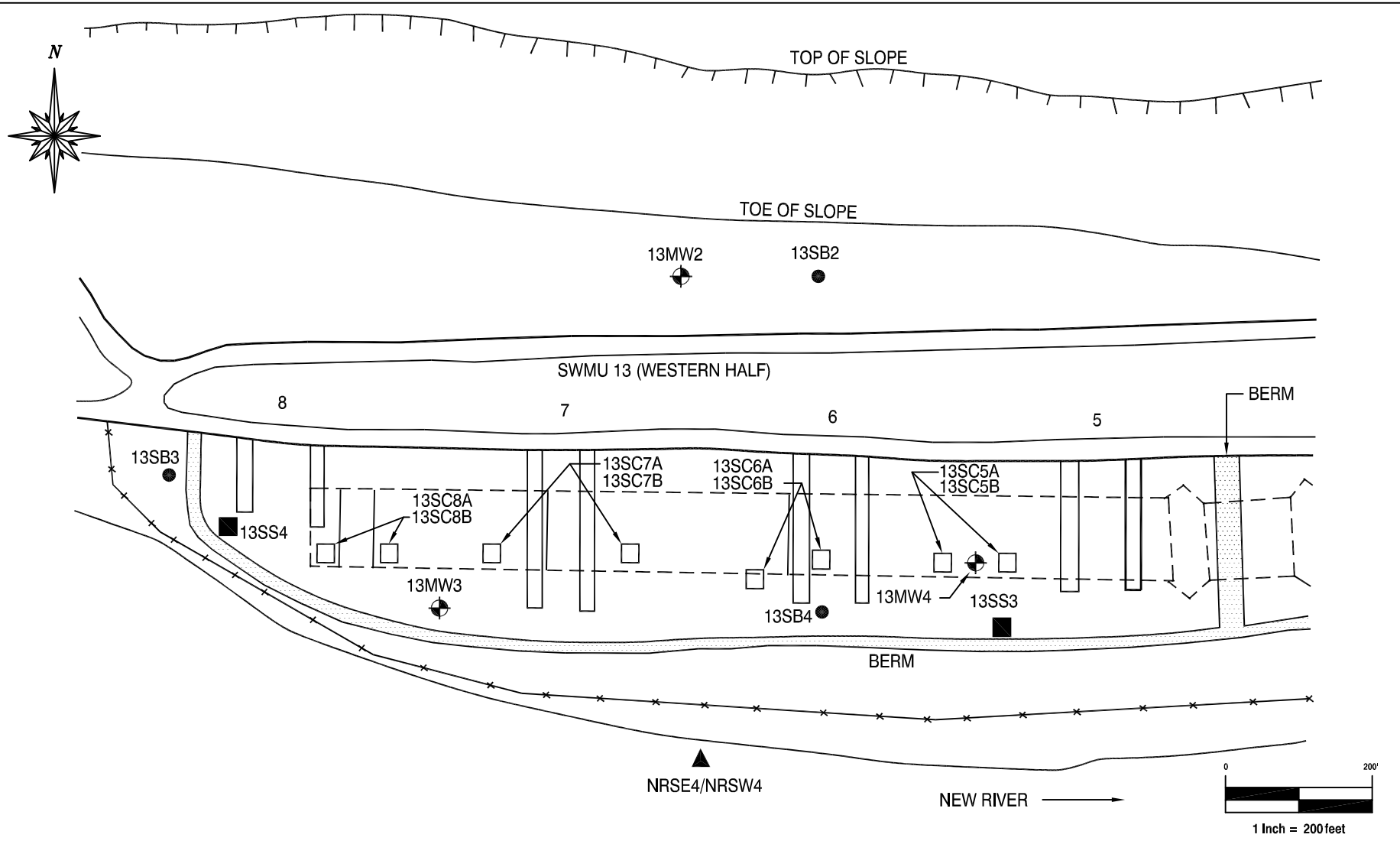
RFAAP

SSP REPORT

Date:	Prepared By:
June 2004	KDC/TDH
Scale:	**File Name:**
1"=200'	15900619

FIGURE 4-2

PREVIOUS INVESTIGATION SAMPLING LOCATIONS SWMU 13



Legend

- Soil Sampling Location
- Monitoring Well
- Soil Composite Sample
- Soil Boring
- Original Burning Pads Outline
- Surface Water/Sediment Sample

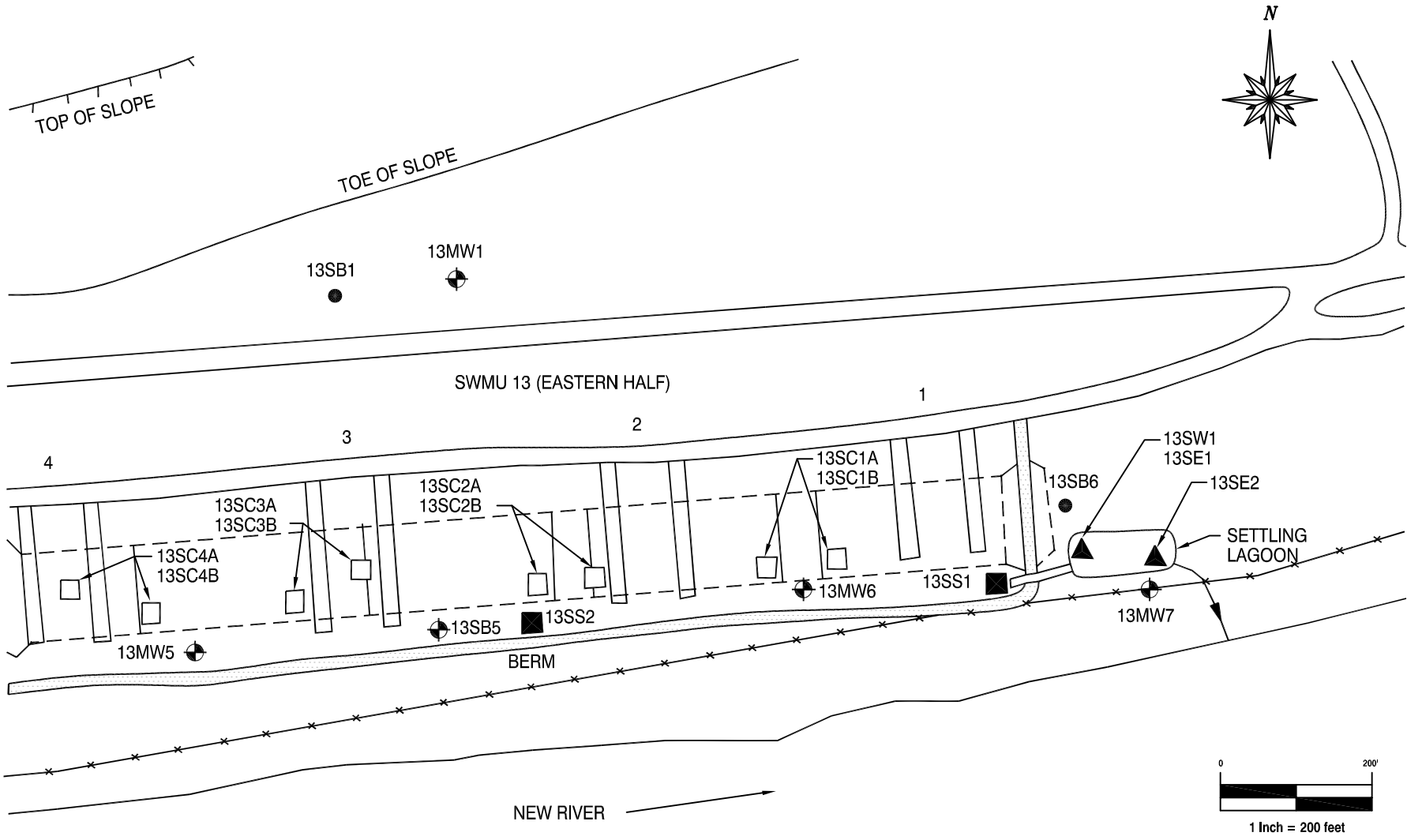
(SOURCE: FROM DAMES & MOORE, 1992b)

RFAAP
SSP REPORT

Date:	Prepared By:
June 2004	KDC/TDH
Scale:	**File Name:**
1"=200'	15900619

FIGURE 4-3

MONITORING WELL, BORINGS, AND SAMPLE LOCATIONS WESTERN HALF SWMU 13



Legend

- Soil Sampling Location
- Monitoring Well
- Soil Composite Sample
- Soil Boring
- Original Burning Pads Outline
- Surface Water/Sediment Sample

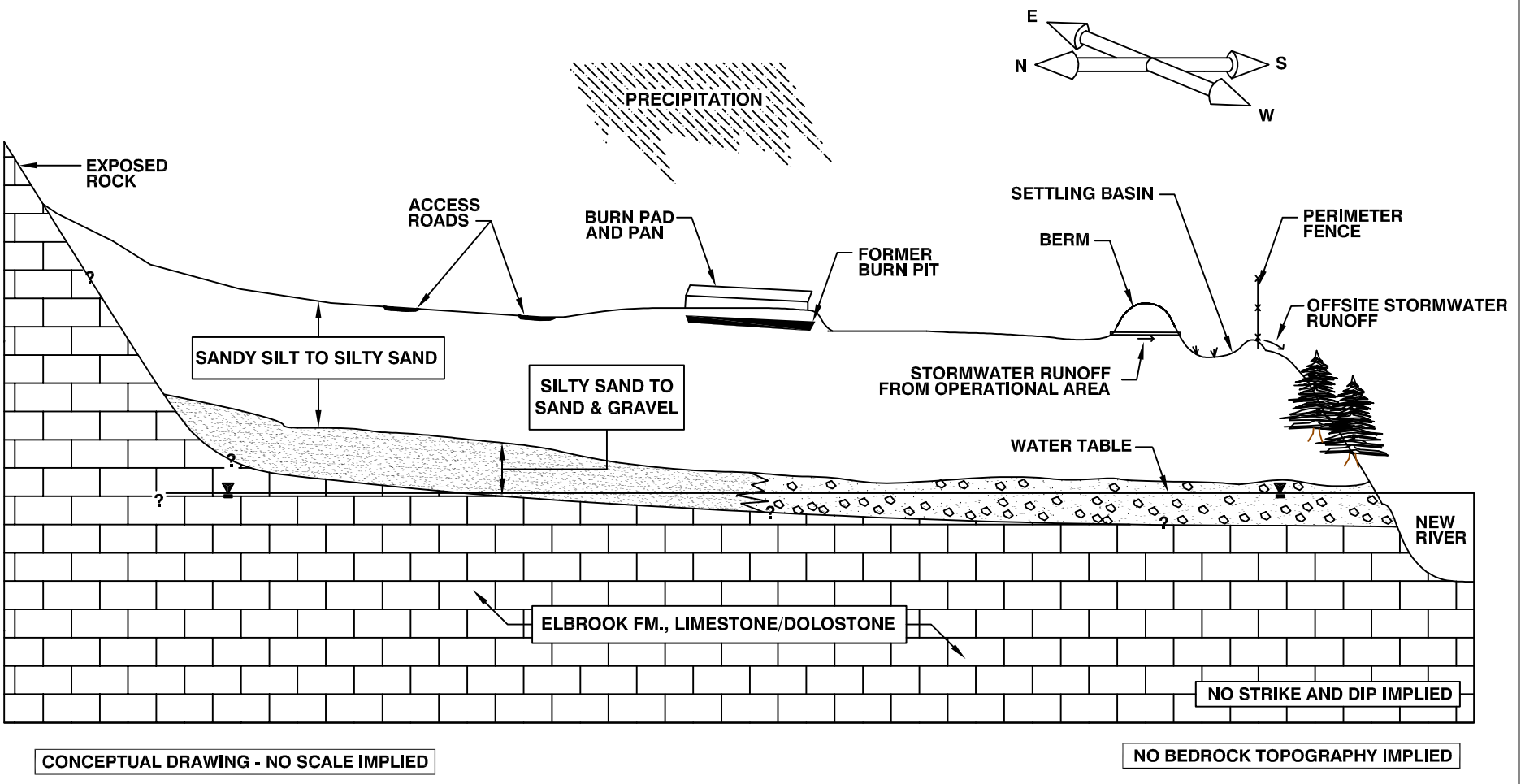
(SOURCE: FROM DAMES & MOORE, 1992b)

RFAAP
SSP REPORT

Date:	Prepared By:
June 2004	*KDC/TDH*
Scale:	**File Name:**
1"=200'	*15900619*

FIGURE 4-4

MONITORING WELLS, BORINGS, AND SAMPLE LOCATIONS EASTERN HALF SWMU 13



RFAAP

SSP REPORT

Date:	Prepared By:
June 2004	KDC/TDH
Scale:	**File Name:**
Not to Scale	15900619

FIGURE 4-5

CONCEPTUAL SITE MODEL
SWMU 13

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Table 4-1
Summary of Analytical Data for Soil Samples Collected at SWMU 13
Modified from Dames and Moore SWMU 13 RFI Investigation Report
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

SITE ID FIELD ID SAMPLE DATE DEPTH (ft bgs) MATRIX UNITS	PQLs mg/kg	13SB1 RFIS*1 20-Aug-91 0.5 CSO mg/kg	13SB1 RFIS*2 20-Aug-91 5.0 CSO mg/kg	13SB1 RFIS*3 20-Aug-91 10.0 CSO mg/kg	13SB2D RFIS*19 26-Aug-91 0.5 CSO mg/kg	13SB2 RFIS*4 26-Aug-91 0.5 CSO mg/kg	13SB2 RFIS*5 26-Aug-91 5.0 CSO mg/kg	13SB2 RFIS*6 26-Aug-91 10.0 CSO mg/kg	Adjusted Soil Industrial RBC mg/kg	Adjusted Soil Residential RBC mg/kg	Draft BTAG Screening Level mg/kg	Facility-Wide Background Point Estimates[A] mg/kg
TAL Metals												
Aluminum	14.1	14,000	12,000	19,100	12,900	12,500	11,400	16,600	102,200	7,821	1	40,041
Arsenic	30	1.2B	0.72B	1.1B	1.9B	1.4B	0.966B	1.26B	1.91	0.43	328	15.8
Barium	1	228	195	246	185	177	125	151	7,154	548	440	209
Beryllium	0.2	3.02	2.60	3.77	2.01	1.75	1.68	1.81	204	15.6	0.02	1.02
Cadmium	2	<0.7	<0.7	<0.7	<0.7	1.15	<0.7	<0.7	102	7.8	3	0.69
Calcium	100	2530	1970	2700	2850	2730	2040	2150	--	--	--	--
Chromium[1]	4	28.4	25.4	34.5	25.9	25.9	22.6	29.7	307	23.5	0.0075	65.3
Cobalt	3	14.1	14.5	18.6	11.9	11.6	11.2	16.5	2,044	156	100	72.3
Copper	7	12.7	12.4	17.7	15.4	11.3	8.17	12.4	4,088	313	15	53.5
Iron	1000	23,400	22,900	30,300	23,000	20,300	17,900	25,000	30,660	2,346	12	50,962
Lead[2]	2	33.6	16.8	20.4	98.6	65.7	<10.5	17.8	750	400	0.01	26.8
Magnesium	50	4,310	4,330	5,470	4,030	3,900	3,630	4,840	--	--	4,400	--
Manganese[3]	0.275	922	795	939	897	749	517	692	2,044	156	330	2,543
Mercury[4]	0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	31	2.3	0.058	0.13
Nickel	3	19	17.2	23.4	15.9	15.9	14.3	19.3	2,044	156	2	62.8
Potassium	37.5	1,460	1300B	1,690	1,880	1,670	1,210B	1,580	--	--	--	--
Silver	4	0.968	0.94	1.21	0.86	0.704	0.825	1.05	511	39.1	0.000098	--
Sodium	150	302B	302B	305B	268B	297B	290B	289B	--	--	--	--
Thallium	20	<6.62	<6.62	<6.62	<6.62	<6.62	<6.62	<6.62	7.15	0.548	0.001	2.11
Vanadium	0.775	37.9	36.7	51.3	34.2	32.3	31	43.2	102	7.8	0.5	108
Zinc	30.2	129	95.8	108	297	223	70.1	86.9	30,660	2,346	10	202

Table 4-1 (Continued)
Summary of Analytical Data for Soil Samples Collected at SWMU 13
Modified from Dames and Moore SWMU 13 RFI Investigation Report
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

SITE ID FIELD ID SAMPLE DATE DEPTH (ft bgs) MATRIX UNITS	PQLs mg/kg	13SB1 RFIS*1 20-Aug-91 0.5 CSO mg/kg	13SB1 RFIS*2 20-Aug-91 5.0 CSO mg/kg	13SB1 RFIS*3 20-Aug-91 10.0 CSO mg/kg	13SB2D RFIS*19 26-Aug-91 0.5 CSO mg/kg	13SB2 RFIS*4 26-Aug-91 0.5 CSO mg/kg	13SB2 RFIS*5 26-Aug-91 5.0 CSO mg/kg	13SB2 RFIS*6 26-Aug-91 10.0 CSO mg/kg	Adjusted Soil Industrial RBC mg/kg	Adjusted Soil Residential RBC mg/kg	Draft BTAG Screening Level mg/kg	Facility-Wide Background Point Estimates[A] mg/kg
Explosives												
1,3,5-Trinitrobenzene	0.488	<0.488	<0.488	<0.488	<0.488	<0.488	<0.488	<0.488	3,066	235	--	--
1,3-Dinitrobenzene	0.496	<0.496	<0.496	<0.496	<0.496	<0.496	<0.496	<0.496	10.2	0.782	--	--
2,4,6-Trinitrotoluene	0.456	<0.456	<0.456	<0.456	<0.456	<0.456	<0.456	<0.456	95	21.3	--	--
2,4-Dinitrotoluene	0.424	<0.424	<0.424	<0.424	<0.424	<0.424	<0.424	<0.424	204	16	--	--
2,6-Dinitrotoluene	0.524	<0.524	<0.524	<0.524	<0.524	<0.524	<0.524	<0.524	102	7.82	--	--
HMX	0.666	<0.666	<0.666	<0.666	<0.666	<0.666	<0.666	<0.666	5,110	391	--	--
Volatiles												
1,1,1-Trichloroethane	0.005	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	0.005	28,616	2,190	0.3	--
Acetone	0.1	<0.017	<0.017	<0.017	<0.017	<0.017	<0.017	<0.017	91,980	7039	--	--
Toluene	0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	20,440	1,564	0.1	--
Trichloroethylene	0.005	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	7.15	1.60	0.3	--
Trichlorofluoromethane	0.005	<0.006	<0.006	<0.006	<0.006	<0.006	0.006	<0.006	30,660	2,346	--	--
Semi-Volatiles												
2,4-Dinitrotoluene	0.3	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	204	16	--	--
2,6-Dinitrotoluene	0.3	<0.085	<0.085	<0.085	<0.085	<0.085	<0.085	<0.085	102	7.82	--	--
Bis(2-ethylhexyl)Phthalate	0.3	<0.62	<0.62	<0.62	<0.62	<0.62	<0.62	<0.62	410	46	--	--
Di-N-Butyl Phthalate	0.3	<0.061	<0.061	<0.061	<0.061	<0.061	<0.061	<0.061	10,220	782	--	--
Diethyl Phthalate	0.3	<0.24	<0.24	<0.24	<0.24	<0.24	<0.24	<0.24	81,760	6,257	--	--
N-Nitrosodiphenylamine	0.3	<0.19	<0.19	<0.19	<0.19	<0.19	<0.19	<0.19	0.5	0.01	--	--

Table 4-1 (Continued)
Summary of Analytical Data For Soil Samples Collected at SWMU 13
Modified from Dames and Moore RFI Investigation Report
SSP WPA for Nine SWMUs and Three AOCs
Radford Army Ammunition Plant, Radford, Virginia

SITE ID		13SB3	13SB3	13SB3	13SB4	13SB4	13SB4	13SB5	Adjusted Soil Industrial RBC mg/kg	Adjusted Soil Residential RBC mg/kg	Draft BTAG Screening Level mg/kg	Facility-Wide Background Point Estimates[A] mg/kg
FIELD ID		RFIS*7	RFIS*8	RFIS*9	RFIS*10	RFIS*11	RFIS*12	RFIS*13				
SAMPLE DATE		26-Aug-91	26-Aug-91	26-Aug-91	28-Aug-91	28-Aug-91	28-Aug-91	22-Aug-91				
DEPTH (ft bgs)		0.5	5.0	10.0	0.5	5.0	10.0	0.5				
MATRIX		CSO	CSO	CSO	CSO	CSO	CSO	CSO				
UNITS	PQLs mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg				
TAL Metals												
Aluminum	14.1	14,200	8,900	7,910	3,280B	8,120	14,100	8,840	102,200	7,821	1	40,041
Arsenic	30	**3.08**	0.436B	0.391B	0.961B	0.535B	0.92B	1.09B	1.91	0.43	328	15.8
Barium	0.2	199	96.5	74.8	43.7	98.7	175	104	7,154	548	440	209
Beryllium	0.2	2.42	1.57	1.11	<0.5	1.31	2.11	1.54	204	15.6	0.02	1.02
Cadmium	2	0.958	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	102	7.8	3	0.69
Calcium	100	2240	1920	1540	16200	1830	2930	3810	--	--	--	--
Chromium[1]	4	24.0	19.0	16.2	8.51	18.1	30	20	307	23.5	0.0075	65.3
Cobalt	3	13.9	8.63	7.01	2.64	8.01	13.1	8.02	2,044	156	100	72.3
Copper	7	16.7	6.62B	4.98B	99.5	7.99	12.2	11.5	4,088	313	15	53.5
Iron	1000	**38,500**	13,600	11,500B	6,570B	13,100	20,300	13,900	30,660	2,346	12	50,962
Lead[2]	2	258	<10.5	<10.5	367	13.7	17.9	110	750	400	0.01	26.8
Magnesium	50	3,100	2,910	2,470	3,670	2,730	3,950	3,100	--	--	4,400	--
Manganese[3]	0.275	1,650	369	282B	161B	360	690	437	2,044	156	330	2,543
Mercury[4]	0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	31	2.3	0.058	0.13
Nickel	3	16.7	12.4	9.58	3.98	11.1	18.3	11.8	2,044	156	2	62.8
Potassium	37.5	1610	1110B	1020B	707B	978B	1150B	1420	--	--	--	--
Silver	4	0.971	0.74	0.719	<0.589	0.686	0.957	0.811	511	39.1	0.000098	--
Sodium	150	272B	307B	322B	272B	333B	322B	300B	--	--	--	--
Thallium	20	<6.62	<6.62	<6.62	<6.62	<6.62	<6.62	<6.62	7.15	0.548	0.001	2.11
Vanadium	0.775	38.5	23.2	21	11.3	21.4	34.4	22.7	102	7.8	0.5	108
Zinc	30.2	821	59.2	46.2	72.5	59.5	91.3	93.5	30,660	2,346	10	202

Table 4-1 (Continued)
Summary of Analytical Data For Soil Samples Collected at SWMU 13
Modified from Dames and Moore RFI Investigation Report
SSP WPA for Nine SWMUs and Three AOCs
Radford Army Ammunition Plant, Radford, Virginia

SITE ID		13SB3	13SB3	13SB3	13SB4	13SB4	13SB4	13SB5	Adjusted	Adjusted	Draft	Facility-Wide
FIELD ID		RFIS*7	RFIS*8	RFIS*9	RFIS*10	RFIS*11	RFIS*12	RFIS*13	Soil	Soil	BTAG	Background
SAMPLE DATE		26-Aug-91	26-Aug-91	26-Aug-91	28-Aug-91	28-Aug-91	28-Aug-91	22-Aug-91	Industrial	Residential	Screening	Point
DEPTH (ft bgs)		0.5	5.0	10.0	0.5	5.0	10.0	0.5	RBC	RBC	Level	Estimates[(A)]
MATRIX	PQLs	CSO	CSO	CSO	CSO	CSO	CSO	CSO	mg/kg	mg/kg	mg/kg	mg/kg
UNITS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg				
Explosives												
1,3,5-Trinitrobenzene	0.488	<0.488	<0.488	<0.488	<0.488	<0.488	<0.488	<0.488	3,066	235	--	--
1,3-Dinitrobenzene	0.496	<0.496	<0.496	<0.496	<0.496	<0.496	<0.496	<0.496	10.2	0.782	--	--
2,4,6-Trinitrotoluene	0.456	<0.456	<0.456	<0.456	<0.456	<0.456	<0.456	<0.456	95	21.3	--	--
2,4-Dinitrotoluene	0.424	<0.424	<0.424	<0.424	<0.424	<0.424	<0.424	<0.424	204	16	--	--
2,6-Dinitrotoluene	0.524	<0.524	<0.524	<0.524	<0.524	<0.524	<0.524	<0.524	102	7.82	--	--
HMX	0.666	<0.666	<0.666	<0.666	<0.666	<0.666	<0.666	<0.666	5,110	391	--	--
Volatiles												
1,1,1-Trichloroethane	0.005	<0.004	<0.004	<0.004	<0.004B	<0.004B	<0.004B	<0.004	28,616	2,190	0.3	--
Acetone	0.1	<0.017	<0.017	<0.017	<0.017B	<0.017B	<0.017B	<0.017	91,980	7039	--	--
Toluene	0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	20,440	1,564	0.1	--
Trichloroethylene	0.005	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	7.15	1.60	0.3	--
Trichlorofluoromethane	0.005	<0.006	<0.006	<0.006	<0.006B	<0.006B	<0.006B	<0.006B	30,660	2,346	--	--
Semi-Volatiles												
2,4-Dinitrotoluene	0.3	<0.07	<0.14	<0.14	1.76	<0.14	<0.14	<0.14	204	16	--	--
2,6-Dinitrotoluene	0.3	<0.425	<0.085	<0.085	<0.425	<0.085	<0.085	<0.085	102	7.82	--	--
Bis(2-ethylhexyl)Phthalate	0.3	<3.1	<0.62	8.67	<3.1	<0.62	<0.62	<0.62	410	46	--	--
Di-N-Butyl Phthalate	0.3	<0.305	<0.061	<0.061	11.7	<0.061	<0.061	0.337	10,220	782	--	--
Diethyl Phthalate	0.3	<1.2	<0.24	<0.24	4.73	<0.24	<0.24	<0.24	81,760	6,257	--	--
N-Nitrosodiphenylamine	0.3	<0.95	<0.19	<0.19	1.29	<0.19	<0.19	<0.19	0.5	0.01	--	--

Table 4-1 (Continued)
Summary of Analytical Data For Soil Samples Collected at SWMU 13
Modified from Dames and Moore RFI Investigation Report
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

SITE ID		13SB5	13SB5	13SB6	13SB6	13SB6	13SC1	13SC1	Adjusted Soil Industrial RBC mg/kg	Adjusted Soil Residential RBC mg/kg	Draft BTAG Screening Level mg/kg	Facility-Wide Background Point Estimates[A] mg/kg
FIELD ID		RFIS*14	RFIS*15	RFIS*16	RFIS*17	RFIS*18	RFIS*21	RFIS*22				
SAMPLE DATE		22-Aug-91	22-Aug-91	21-Aug-91	21-Aug-91	21-Aug-91	20-Aug-91	20-Aug-91				
DEPTH (ft bgs)		5.0	10.0	0.5	5.0	10.0	0.5	5.0				
MATRIX		CSO	CSO	CSO	CSO	CSO	CSO	CSO				
UNITS	PQLs mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg				
TAL Metals												
Aluminum	14.1	8,270	16,400	10,100	8,080	10,800	8,420	8,430	102,200	7,821	1	40,041
Arsenic	30	<0.25B	<0.5B	1.11B	0.562B	0.507B	0.509B	0.684B	1.91	0.43	328	15.8
Barium	1	94.5	188	128	108	133	118	157	7,154	548	440	209
Beryllium	0.2	1.35	2.46	1.40	1.43	1.51	1.35	1.79	204	15.6	0.02	1.02
Cadmium	2	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	102	7.8	3	0.69
Calcium	100	1480	3330	2520	2200	2370	1750	1990	--	--	--	--
Chromium[1]	4	17.6	32.8	21.7	17.2	22.2	19	20.7	307	23.5	0.0075	65.3
Cobalt	3	8.11	14.7	9.11	7.88	10.6	8.92	10.2	2,044	156	100	72.3
Copper	7	5.89B	12.2	11.1	15	8.41	6.83B	8.24	4,088	313	15	53.5
Iron	1000	12,200B	21,900	17,800	12,600	16,200	14,200	16,100	30,660	2,346	12	50,962
Lead[2]	2	<10.5	17.3	108	<10.5	<10.5	<10.5	<10.5	750	400	0.01	26.8
Magnesium	50	2,660	4,370	2,800	2,680	3,320	2,820	3,020	--	--	4,400	--
Manganese[3]	0.275	332	586	643	363	468	514	580	2,044	156	330	2,543
Mercury[4]	0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	31	2.3	0.058	0.13
Nickel	3	11.2	21.2	12.2	11.1	14.5	11.9	13.4	2,044	156	2	62.8
Potassium	37.5	1390B	1,450	1,480	1,060B	1,290B	1,080B	915B	--	--	--	--
Silver	150	0.685	1.2	0.764	<0.589	0.89	0.67	0.717	511	39.1	0.000098	--
Sodium	4	273B	381B	261B	313B	300B	629B	463B	--	--	--	--
Thallium	20	<6.62	<6.62	<6.62	<6.62	<6.62	<6.62	<6.62	7.15	0.548	0.001	2.11
Vanadium	0.775	21	38.9	27.1	20.7	27.5	22.7	24.4	102	7.8	0.5	108
Zinc	30.2	60.2	97.8	213	62.8	72	67.6	72.4	30,660	2,346	10	202

Table 4-1 (Continued)
Summary of Analytical Data For Soil Samples Collected at SWMU 13
Modified from Dames and Moore RFI Investigation Report
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

SITE ID		13SB5	13SB5	13SB6	13SB6	13SB6	13SC1	13SC1	Adjusted	Adjusted	Draft	Facility-Wide
FIELD ID		RFIS*14	RFIS*15	RFIS*16	RFIS*17	RFIS*18	RFIS*21	RFIS*22	Soil	Soil	BTAG	Background
SAMPLE DATE		22-Aug-91	22-Aug-91	21-Aug-91	21-Aug-91	21-Aug-91	20-Aug-91	20-Aug-91	Industrial	Residential	Screening	Point
DEPTH (ft bgs)		5.0	10.0	0.5	5.0	10.0	0.5	5.0	RBC	RBC	Level	Estimates[(A)]
MATRIX	PQLs	CSO	CSO	CSO	CSO	CSO	CSO	CSO	mg/kg	mg/kg	mg/kg	mg/kg
UNITS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg				
Explosives												
1,3,5-Trinitrobenzene	0.488	<0.488	<0.488	<0.488	<0.488	<0.488	<0.488	<0.488	3,066	235	--	--
1,3-Dinitrobenzene	0.496	<0.496	<0.496	<0.496	<0.496	<0.496	<0.496	<0.496	10.2	0.782	--	--
2,4,6-Trinitrotoluene	0.456	<0.456	<0.456	29C	<0.456	<0.456	<0.456	<0.456	95	21.3	--	--
2,4-Dinitrotoluene	0.424	<0.424	<0.424	0.761C	<0.424	<0.424	<0.424	<0.424	204	16	--	--
2,6-Dinitrotoluene	0.524	<0.524	<0.524	<0.524	<0.524	<0.524	<0.524	<0.525	102	7.82	--	--
HMX	0.666	<0.666	0.945C	<0.666	<0.666	<0.666	0.744C	<0.666	5,110	391	--	--
Volatiles												
1,1,1-Trichloroethane	0.005	<0.004	<0.004	<0.004	<0.004B	0.005	<0.004	<0.004	28,616	2,190	0.3	--
Acetone	0.1	<0.017	<0.017	<0.017	<0.017B	<0.017	<0.017	<0.017	91,980	7039	--	--
Toluene	0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	20,440	1,564	0.1	--
Trichloroethylene	0.005	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	7.15	1.60	0.3	--
Trichlorofluoromethane	0.005	<0.006B	<0.006B	<0.006	<0.006B	<0.006	<0.006B	<0.006	30,660	2,346	--	--
Semi-Volatiles												
2,4-Dinitrotoluene	0.3	<0.14	<0.14	0.943	<0.14	<0.14	<0.14	<0.14	204	16	--	--
2,6-Dinitrotoluene	0.3	<0.085	<0.085	0.747	<0.085	<0.085	<0.085	<0.085	102	7.82	--	--
Bis(2-ethylhexyl)Phthalate	0.3	<0.62	<0.62	<0.62	<0.62	7.45	<0.62	<0.62	410	46	--	--
Di-N-Butyl Phthalate	0.3	<0.061	<0.061	0.194	<0.061	<0.061	<0.061	<0.061	10,220	782	--	--
Diethyl Phthalate	0.3	<0.24	<0.24	<0.24	<0.24	<0.24	<0.24	<0.24	81,760	6,257	--	--
N-Nitrosodiphenylamine	0.3	<0.19	<0.19	0.64	<0.19	<0.19	<0.19	<0.19	0.5	0.01	--	--

Table 4-1 (Continued)
Summary of Analytical Data For Soil Samples Collected at SWMU 13
Modified from Dames and Moore RFI Investigation Report
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

SITE ID		13SC1	13SC2	13SC2	13SC2	13SC3	13SC3	13SC3	Adjusted Soil Industrial RBC mg/kg	Adjusted Soil Residential RBC mg/kg	Draft BTAG Screening Level mg/kg	Facility-Wide Background Point Estimates[A] mg/kg
FIELD ID		RFIS*23	RFIS*24	RFIS*25	RFIS*26	RFIS*27	RFIS*28	RFIS*29				
SAMPLE DATE		20-Aug-91	21-Aug-91	21-Aug-91	21-Aug-91	21-Aug-91	21-Aug-91	21-Aug-91				
DEPTH (ft bgs)		10.0	0.5	5.0	10.0	0.5	5.0	10.0				
MATRIX		CSO	CSO	CSO	CSO	CSO	CSO	CSO				
UNITS	PQLs mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg				
TAL Metals												
Aluminum	14.1	10,400	8,960	10,300	11,000	4,110B	9,610	8,750	102,200	7,821	1	40,041
Arsenic	30	0.403B	0.623B	0.569B	0.826B	0.612B	0.736B	0.534B	1.91	0.43	328	15.8
Barium	1	128	132	135	175	76	143	131	7,154	548	440	209
Beryllium	0.2	1.61	1.49	1.34	1.88	0.945	1.37	1.28	204	15.6	0.02	1.02
Cadmium	2	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	102	7.8	3	0.69
Calcium	100	2050	1900	2040	2180	4580	1860	1610	--	--	--	--
Chromium[1]	4	23.7	20.5	22.0	27.2	12.2	21.4	20.0	307	23.5	0.0075	65.3
Cobalt	3	10.4	9.27	10.2	12.4	4.85	10.30	10.5	2,044	156	100	72.3
Copper	7	8.28	9.22	12.7	12.9	23.7	10.1	9.38	4,088	313	15	53.5
Iron	1000	16,200	15,400	16,300	19,600	9,720B	16,000	15,900	30,660	2,346	12	50,962
Lead[2]	2	<10.5	55.6	<10.5	<10.5	320	<10.5	<10.5	750	400	0.01	26.8
Magnesium	50	3,290	3,000	3,420	3,680	2,970	3,180	3,110	--	--	4,400	--
Manganese[3]	0.275	511	518	513	672	319	306	500	2,044	156	330	2,543
Mercury[4]	0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	31	2.3	0.058	0.13
Nickel	3	14.1	12.7	14.9	16.6	6.46	13.7	12.3	2,044	156	2	62.8
Potassium	37.5	1,070B	1,610	1,170B	946B	897B	1,970	1,090B	--	--	--	--
Silver	150	0.829	0.858	0.842	<0.589	<0.589	0.81	0.755	511	39.1	0.000098	--
Sodium	4	470B	287B	374B	384B	245B	306B	457B	--	--	--	--
Thallium	20	<6.62	<6.62	<6.62	**9.82**	<6.62	**12**	<6.62	7.15	0.548	0.001	2.11
Vanadium	0.775	27	24.7	27.2	32.5	14	26	26.5	31	2.3	0.5	108
Zinc	30.2	73.5	94.7	73.5	80.6	156	77.2	70.8	30,660	2,346	10	202

Table 4-1 (Continued)
Summary of Analytical Data For Soil Samples Collected at SWMU 13
Modified from Dames and Moore RFI Investigation Report
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

SITE ID FIELD ID SAMPLE DATE DEPTH (ft bgs) MATRIX UNITS	PQLs mg/kg	13SC1 RFIS*23 20-Aug-91 10.0 CSO mg/kg	13SC2 RFIS*24 21-Aug-91 0.5 CSO mg/kg	13SC2 RFIS*25 21-Aug-91 5.0 CSO mg/kg	13SC2 RFIS*26 21-Aug-91 10.0 CSO mg/kg	13SC3 RFIS*27 21-Aug-91 0.5 CSO mg/kg	13SC3 RFIS*28 21-Aug-91 5.0 CSO mg/kg	13SC3 RFIS*29 21-Aug-91 10.0 CSO mg/kg	Adjusted Soil Industrial RBC mg/kg	Adjusted Soil Residential RBC mg/kg	Draft BTAG Screening Level mg/kg	Facility-Wide Background Point Estimates[A] mg/kg
Explosives												
1,3,5-Trinitrobenzene	0.488	<0.488	<0.488	<0.488	<0.488	2.9C	<0.488	<0.488	3,066	235	--	--
1,3-Dinitrobenzene	0.496	<0.496	<0.496	<0.496	<0.496	<0.496	<0.496	<0.496	10.2	0.782	--	--
2,4,6-Trinitrotoluene	0.456	<0.456	<0.456	<0.456	<0.456	0.515C	<0.456	<0.456	95	21.3	--	--
2,4-Dinitrotoluene	0.424	<0.424	<0.424	<0.424	<0.424	<0.424	<0.424	<0.424	204	16	--	--
2,6-Dinitrotoluene	0.524	<0.524	<0.524	<0.524	<0.524	1.33C	<0.524	<0.524	102	7.82	--	--
HMX	0.666	<0.666	0.945	<0.666	<0.666	<0.666	<0.666	<0.666	5,110	391	--	--
Volatiles												
1,1,1-Trichloroethane	0.005	0.005	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	28,616	2,190	0.3	--
Acetone	0.1	0.025	<0.017	<0.017	<0.017	<0.017	<0.017	<0.017	91,980	7039	--	--
Toluene	0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	20,440	1,564	0.1	--
Trichloroethylene	0.005	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	7.15	1.60	0.3	--
Trichlorofluoromethane	0.005	<0.006	<0.006	<0.006	<0.006	<0.006B	<0.006B	<0.006B	30,660	2,346	--	--
Semi-Volatiles												
2,4-Dinitrotoluene	0.3	<0.14	<0.14	<0.14	<0.14	1.76	<0.14	<0.14	204	16	--	--
2,6-Dinitrotoluene	0.3	<0.085	<0.085	<0.085	<0.085	2.42	<0.085	<0.085	102	7.82	--	--
Bis(2-ethylhexyl)Phthalate	0.3	<0.62	<0.62	<0.62	<0.62	<0.62	<0.62	<0.62	410	46	--	--
Di-N-Butyl Phthalate	0.3	<0.061	<0.061	<0.061	<0.061	0.329	<0.061	<0.061	10,220	782	--	--
Diethyl Phthalate	0.3	<0.24	<0.24	<0.24	<0.24	<0.24	<0.24	<0.24	81,760	6,257	--	--
N-Nitrosodiphenylamine	0.3	<0.19	<0.19	<0.19	<0.19	<0.19	<0.19	<0.19	0.5	0.01	--	--

Table 4-1 (Continued)
Summary of Analytical Data For Soil Samples Collected at SWMU 13
Modified from Dames and Moore RFI Investigation Report
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

SITE ID FIELD ID SAMPLE DATE DEPTH (ft bgs) MATRIX UNITS	PQLs mg/kg	13SC4 RFIS*30 22-Aug-91 0.5 CSO mg/kg	13SC4 RFIS*31 22-Aug-91 5.0 CSO mg/kg	13SC4 RFIS*32 22-Aug-91 10.0 CSO mg/kg	13SC5 RFIS*33 26-Aug-91 0.5 CSO mg/kg	13SC5 RFIS*34 26-Aug-91 5.0 CSO mg/kg	13SC5 RFIS*35 26-Aug-91 10.0 CSO mg/kg	13SC6 RFIS*36 27-Aug-91 0.5 CSO mg/kg	Adjusted Soil Industrial RBC mg/kg	Adjusted Soil Residential RBC mg/kg	Draft BTAG Screening Level mg/kg	Facility-Wide Background Point Estimates[A] mg/kg
TAL Metals												
Aluminum	14.1	4,600	6,890	7,670	9,030	12,800	11,500	2,870B	102,200	7,821	1	40,041
Arsenic	30	1.59B	0.392B	0.463B	0.568B	0.979B	0.669B	0.423B	1.91	0.43	328	15.8
Barium	1	77.1	117	127	136	187	172	36.8B	7,154	548	440	209
Beryllium	0.2	0.886	1.40	1.50	1.16	1.95	1.90	<0.5	204	15.6	0.02	1.02
Cadmium	2	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	102	7.8	3	0.69
Calcium	100	23300	1530	1490	1730	2920	2290	5280	--	--	--	--
Chromium[1]	4	12.0	17.3	18.2	22.3	28.2	25.5	8.68	307	23.5	0.0075	65.3
Cobalt	3	4.92	8.94	9.35	9.71	12.3	12.6	2.64	2,044	156	100	72.3
Copper	7	66.9	8.43B	8.66B	12	12.5	10.9	71.3	4,088	313	15	53.5
Iron	1000	9,980B	14,000	14,500	15,800	21,400	18,700	6,080B	30,660	2,346	12	50,962
Lead[2]	2	406	<10.5	<10.5	76.7	17.4	14.9	293	750	400	0.01	26.8
Magnesium	50	11,600	2,770	2,890	2,970	4,060	3,580	2,750	--	--	4,400	--
Manganese[3]	0.275	352	423	424	535	571	477	126B	2,044	156	330	2,543
Mercury[4]	0.1	<0.05	<0.05	<0.05	<0.05	<0.05	0.098	<0.05	31	2.3	0.058	0.13
Nickel	3	5.79	11.1	11.4	13.3	18.3	15.8	3.5	2,044	156	2	62.8
Potassium	37.5	1,150B	931B	1,000B	1,380	1,110B	1,080B	693B	--	--	--	--
Silver	150	<0.589	<0.589	0.731	0.77	0.871	0.885	<0.589	511	39.1	0.000098	--
Sodium	4	293B	388B	335B	237B	263B	313B	228B	--	--	--	--
Thallium	20	**12.8**	**9.82**	<6.62	**9.7**	**13.9**	**15.8**	<6.62	7.15	0.548	0.001	2.11
Vanadium	0.775	16.4	22.4	24.1	26.8	35.8	31.3	11.6	31	2.3	0.5	108
Zinc	30.2	153	63.2	61	167	93.1	82.3	61.9	30,660	2,346	10	202

Table 4-1 (Continued)
Summary of Analytical Data For Soil Samples Collected at SWMU 13
Modified from Dames and Moore RFI Investigation Report
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

SITE ID		13SC4	13SC4	13SC4	13SC5	13SC5	13SC5	13SC6	Adjusted	Adjusted	Draft	Facility-Wide
FIELD ID		RFIS*30	RFIS*31	RFIS*32	RFIS*33	RFIS*34	RFIS*35	RFIS*36	Soil	Soil	BTAG	Background
SAMPLE DATE		22-Aug-91	22-Aug-91	22-Aug-91	26-Aug-91	26-Aug-91	26-Aug-91	27-Aug-91	Industrial	Residential	Screening	Point
DEPTH (ft bgs)		0.5	5.0	10.0	0.5	5.0	10.0	0.5	RBC	RBC	Level	Estimates[A]
MATRIX	PQLs	CSO	CSO	CSO	CSO	CSO	CSO	CSO	mg/kg	mg/kg	mg/kg	mg/kg
UNITS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg				
Explosives												
1,3,5-Trinitrobenzene	0.488	<0.488	<0.488	<0.488	<0.488	<0.488	<0.488	<0.488	3,066	235	--	--
1,3-Dinitrobenzene	0.496	<0.496	<0.496	<0.496	<0.496	<0.496	<0.496	<0.496	10.2	0.782	--	--
2,4,6-Trinitrotoluene	0.456	<0.456	<0.456	<0.456	<0.456	<0.456	<0.456	0.918C	95	21.3	--	--
2,4-Dinitrotoluene	0.424	<0.424	<0.424	<0.424	<0.424	<0.424	<0.424	<0.424	204	16	--	--
2,6-Dinitrotoluene	0.524	<0.524	<0.524	<0.524	<0.524	<0.524	<0.524	<0.524	102	7.82	--	--
HMX	0.666	<0.666	0.945	<0.666	<0.666	<0.666	<0.666	<0.666	5,110	391	--	--
Volatiles												
1,1,1-Trichloroethane	0.005	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	28,616	2,190	0.3	--
Acetone	0.1	<0.017	0.025	<0.017	<0.017	<0.017	<0.017	<0.017	91,980	7039	--	--
Toluene	0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	20,440	1,564	0.1	--
Trichloroethylene	0.005	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	7.15	1.60	0.3	--
Trichlorofluoromethane	0.005	<0.006B	<0.006B	<0.006	<0.006	0.007	<0.006	<0.006	30,660	2,346	--	--
Semi-Volatiles												
2,4-Dinitrotoluene	0.3	0.385	<0.14	<0.14	<0.14	<0.14	<0.14	4.6	204	16	--	--
2,6-Dinitrotoluene	0.3	3.3	<0.085	<0.085	<0.085	<0.085	<0.085	<0.425	102	7.82	--	--
Bis(2-ethylhexyl)Phthalate	0.3	<0.62	<0.62	<0.62	<0.62	<0.62	<0.62	<3.1	410	46	--	--
Di-N-Butyl Phthalate	0.3	0.974	<0.061	<0.061	<0.061	<0.061	<0.061	5.18	10,220	782	--	--
Diethyl Phthalate	0.3	1.94	<0.24	<0.24	<0.24	<0.24	<0.24	2.9	81,760	6,257	--	--
N-Nitrosodiphenylamine	0.3	<0.19	<0.19	<0.19	<0.19	<0.19	<0.19	<0.95	0.5	0.01	--	--

Table 4-1 (Continued)
Summary of Analytical Data For Soil Samples Collected at SWMU 13
Modified from Dames and Moore RFI Investigation Report
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

SITE ID		13SC6	13SC6	13SC7	13SC7	13SC7	13SC8	13SC8	Adjusted Soil Industrial RBC mg/kg	Adjusted Soil Residential RBC mg/kg	Draft BTAG Screening Level mg/kg	Facility-Wide Background Point Estimates[A] mg/kg
FIELD ID		RFIS*37	RFIS*38	RFIS*39	RFIS*40	RFIS*41	RFIS*42	RFIS*43				
SAMPLE DATE		27-Aug-91	27-Aug-91	28-Aug-91	28-Aug-91	28-Aug-91	29-Aug-91	29-Aug-91				
DEPTH (ft bgs)		5.0	10.0	0.5	5.0	10.0	0.5	5.0				
MATRIX		CSO	CSO	CSO	CSO	CSO	CSO	CSO				
UNITS	PQLs mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg				
TAL Metals												
Aluminum	14.1	8,440	7,480	5,630	6,060	5,750	9,830	4,860	102,200	7,821	1	40,041
Arsenic	30	0.579B	0.643B	0.695B	0.415B	0.506B	2.4B	0.388B	1.91	0.43	328	15.8
Barium	1	127	107	74.4	103	88.6	214	69.1	7,154	548	440	209
Beryllium	0.2	1.29	1.16	1.26	1.50	1.26	2.82	1.21	204	15.6	0.02	1.02
Cadmium	2	<0.7	<0.7	<0.7	<0.7	<0.7	0.904	<0.7	102	7.8	3	0.69
Calcium	100	1,670	1,410	11,700	1,630	1,160	18,700	905	--	--	--	--
Chromium[1]	4	23.2	18.0	13.8	16.2	14.9	22.6	13.20	307	23.5	0.0075	65.3
Cobalt	3	8.78	9.77	5.42	8.0	7.7	12.0	6.62	2,044	156	100	72.3
Copper	7	11.1	7.72B	38.3	16.8	7.38B	43.9	4.62B	4,088	313	15	53.5
Iron	1000	14,300	14,900	12,300B	12,700B	12,200B	**34,100**	10,200B	30,660	2,346	12	50,962
Lead[2]	2	<10.5	<10.5	210	<10.5	<10.5	575	<10.5	750	400	0.01	26.8
Magnesium	50	2,980	2,900	4,950	2,490	2,330	8,360	2,050	--	--	4,400	--
Manganese[3]	0.275	423	428	339	395	349	1,490	267	2,044	156	330	2,543
Mercury[4]	0.1	<0.05	<0.05	<0.05	0.161	<0.05	0.106	0.081	31	2.3	0.058	0.13
Nickel	3	15.1	11.5	8.22	9.66	9.06	13	7.77	2,044	156	2	62.8
Potassium	37.5	1,180B	863B	1,130B	800B	761B	1,830	1,310	--	--	--	--
Silver	150	0.68	<0.589	<0.589	<0.589	<0.589	0.889	<0.589	511	39.1	0.000098	--
Sodium	4	266B	254B	245B	253B	239B	301B	223B	--	--	--	--
Thallium	20	**11.7**	**16.9**	**9.63**	**9.47**	**10.8**	**25.8**	<6.62	7.15	0.548	0.001	2.11
Vanadium	0.775	24.5	23.9	18.3	20.8	19.5	37	15.7	102	7.8	0.5	108
Zinc	30.2	62.5	59	88.4	52.8	48.5	723	43.1	30,660	2,346	10	202

Table 4-1 (Continued)
Summary of Analytical Data For Soil Samples Collected at SWMU 13
Modified from Dames and Moore RFI Investigation Report
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

SITE ID		13SC6	13SC6	13SC7	13SC7	13SC7	13SC8	13SC8	Adjusted	Adjusted	Draft	Facility-Wide
FIELD ID		RFIS*37	RFIS*38	RFIS*39	RFIS*40	RFIS*41	RFIS*42	RFIS*43	Soil	Soil	BTAG	Background
SAMPLE DATE		27-Aug-91	27-Aug-91	28-Aug-91	28-Aug-91	28-Aug-91	29-Aug-91	29-Aug-91	Industrial	Residential	Screening	Point
DEPTH (ft bgs)		5.0	10.0	0.5	5.0	10.0	0.5	5.0	RBC	RBC	Level	Estimates[(A)]
MATRIX	PQLs	CSO	CSO	CSO	CSO	CSO	CSO	CSO	mg/kg	mg/kg	mg/kg	mg/kg
UNITS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg				
Explosives												
1,3,5-Trinitrobenzene	0.488	<0.488	<0.488	<0.488	<0.488	<0.488	<0.488	<0.488	3,066	235	--	--
1,3-Dinitrobenzene	0.496	<0.496	<0.496	<0.496	<0.496	<0.496	<0.496	<0.496	10.2	0.782	--	--
2,4,6-Trinitrotoluene	0.456	<0.456	<0.456	<0.456	<0.456	<0.456	<0.456	<0.456	95	21.3	--	--
2,4-Dinitrotoluene	0.424	<0.424	<0.424	<0.424	<0.424	<0.424	<0.424	<0.424	204	16	--	--
2,6-Dinitrotoluene	0.524	<0.524	<0.524	<0.524	<0.524	<0.524	<0.524	<0.524	102	7.82	--	--
HMX	0.666	<0.666	<0.666	<0.666	<0.666	<0.666	<0.666	<0.666	5,110	391	--	--
Volatiles												
1,1,1-Trichloroethane	0.005	<0.004	0.004	<0.004B	<0.004B	<0.004B	<0.004B	<0.004B	28,616	2,190	0.3	--
Acetone	0.1	<0.017	0.017	<0.017B	<0.017B	<0.017B	<0.017B	<0.017B	91,980	7039	--	--
Toluene	0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	20,440	1,564	0.1	--
Trichloroethylene	0.005	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	7.15	1.60	0.3	--
Trichlorofluoromethane	0.005	<0.006	<0.006	<0.006B	<0.006B	<0.006B	<0.006	<0.006	30,660	2,346	--	--
Semi-Volatiles												
2,4-Dinitrotoluene	0.3	<0.14	<0.14	<0.07	<0.14	<0.14	<0.14	<0.14	204	16	--	--
2,6-Dinitrotoluene	0.3	<0.085	<0.085	<0.425	<0.085	<0.085	<0.085	<0.085	102	7.82	--	--
Bis(2-ethylhexyl)Phthalate	0.3	<0.62	<0.62	<3.1	<0.62	<0.62	<0.62	<0.62	410	46	--	--
Di-N-Butyl Phthalate	0.3	<0.061	<0.061	0.581	<0.061	<0.061	<0.061	<0.061	10,220	782	--	--
Diethyl Phthalate	0.3	<0.24	<0.24	1.23	<0.24	<0.24	<0.24	<0.24	81,760	6,257	--	--
N-Nitrosodiphenylamine	0.3	<0.19	<0.19	<0.95	<0.19	<0.19	<0.19	<0.19	0.5	0.01	--	--

Table 4-1 (Continued)
Summary of Analytical Data For Soil Samples Collected at SWMU 13
Modified from Dames and Moore RFI Investigation Report
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

SITE ID		13SC8	13SE1	13SE2	13SS1	13SS1D	13SS2	13SS3	13SS4	Adjusted Soil Industrial RBC mg/kg	Adjusted Soil Residential RBC mg/kg	Draft BTAG Screening Level (Soil/Sediment) mg/kg	Facility-Wide Background Point Estimates[A] mg/kg
FIELD ID		RFIS*44	RFIS*52	RFIS*53	RFIS*47	RFIS*51	RFIS*48	RFIS*49	RFIS*50				
SAMPLE DATE		29-Aug-91	9-Oct-91	9-Oct-91	9-Oct-91	9-Oct-91	9-Oct-91	29-Aug-91	27-Aug-91				
DEPTH (ft bgs)		10.0	1.0	1.0	0.5	0.5	0.5	0.5	0.5				
MATRIX		CSO	CSE	CSE	CSO	CSO	CSO	CSO	CSO				
UNITS	PQLs mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg				
TAL Metals													
Aluminum	14.1	5,800	9,230B	29,100	7,890B	8,160B	5,840B	6,460	13,000	102,200	7,821	1/--	40,041
Arsenic	30	0.549B	1.91B	**4.2**	2.06B	1.78B	1.25B	1.1B	2.71B	1.91	0.43	328/0.057	15.8
Barium	1	79.4	131	351	128	132	110	102	225	7,154	548	440/--	209
Beryllium	0.2	0.878	<0.5	1.36	<0.5	<0.5	<0.5	1.27	2.52	204	15.6	0.02/--	1.02
Cadmium	2	<0.7	<0.7	1.45	<0.7	1.23	<0.7	<0.7	<0.7	102	7.8	2.5/1.2	0.69
Calcium	100	987	17,500B	9,300B	4,050B	5,730B	6,700B	3700	8580	--	--	--	--
Chromium[1]	4	14.4	21.9B	53.4	24.4B	30.5B	14.4B	21.60	25.4	307	23.5	0.0075/0.005	65.3
Cobalt	3	7.02	8.36	24.40	7.56	7.26	4.81	7.39	17.3	2,044	156	100/--	72.3
Copper	7	6.07B	64.60	99.4	59.60	69.9	26.3	108	55.4	4,088	313	15/34	53.5
Iron	1000	11600B	16,200	**39,700**	16,100	15,200	11,000	12,600B	28,000	30,660	2,346	12/--	50,962
Lead[2]	2	<10.5	475	731	986	**1,050**	478	762	376	750	400	0.01/46.7	26.8
Magnesium	50	2,310	8,540	9,310	2,270B	2,780B	4,030B	2,730	6,870	--	--	4,400/--	--
Manganese[3]	0.275	289	531	1,320	729	474	314	379	1,570	2,044	156	330/--	2,543
Mercury[4]	0.1	<0.05	<0.05	0.124	<0.05	0.064	<0.05	0.064	<0.05	31	2.3	0.058/0.15	0.13
Nickel	3	8.6	12	33.3	11.2	14.7	7.36B	12.6	14.7	2,044	156	2/20.9	62.8
Potassium	37.5	1390	1,850	4,880	1,340B	1,410B	1,010B	1,490	2,210	--	--	--	--
Silver	150	<0.589	<0.589	1.03	<0.589	<0.589	<0.589	<0.589	0.793	511	39.1	0.000098/1	--
Sodium	4	266B	342B	428B	326B	335B	452B	284B	261B	--	--	--	--
Thallium	20	**9.82**	<6.62	**14.1**	<6.62	<6.62	<6.62	**16.0**	**26.9**	7.15	0.548	0.001/--	2.11
Vanadium	0.775	18.8	24.2B	64.8	19.1B	19.4B	16.2B	19.5	45.9	102	7.8	0.5/--	108
Zinc	30.2	50.4	390	646	525	507	196	264	375	30,660	2,346	10/150	202

Table 4-1 (Continued)
Summary of Analytical Data For Soil Samples Collected at SWMU 13
Modified from Dames and Moore RFI Investigation Report
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

SITE ID		13SC8	13SE1	13SE2	13SS1	13SS1D	13SS2	13SS3	13SS4	Adjusted Soil Industrial RBC mg/kg	Adjusted Soil Residential RBC mg/kg	Draft BTAG Screening Level (Soil/Sediment) mg/kg	Facility-Wide Background Point Estimates[A] mg/kg
FIELD ID		RFIS*44	RFIS*52	RFIS*53	RFIS*47	RFIS*51	RFIS*48	RFIS*49	RFIS*50				
SAMPLE DATE		29-Aug-91	9-Oct-91	9-Oct-91	9-Oct-91	9-Oct-91	9-Oct-91	29-Aug-91	27-Aug-91				
DEPTH (ft bgs)		10.0	1.0	1.0	0.5	0.5	0.5	0.5	0.5				
MATRIX	PQLs	CSO	CSE	CSE	CSO	CSO	CSO	CSO	CSO				
UNITS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Explosives													
1,3,5-Trinitrobenzene	0.488	<0.488	1.87C	<0.488	<0.488	<0.488	6.86C	<0.488	<0.488	3,066	235	--	--
1,3-Dinitrobenzene	0.496	<0.496	<0.496	<0.496	<0.496	0.858C	<0.496	<0.496	<0.496	10.2	0.782	--	--
2,4,6-Trinitrotoluene	0.456	<0.456	2.35C	3.94C	4.03C	2.13C	**130C**	<0.456	<0.456	95	21.3	--	--
2,4-Dinitrotoluene	0.424	<0.424	1.26C	1.45C	1.84C	2.15C	10.4C	<0.424	<0.424	204	16	--	--
2,6-Dinitrotoluene	0.524	<0.524	1.26C	<0.524	1.28C	1.33C	4.65C	<0.524	<0.524	102	7.82	--	--
HMX	0.666	<0.666	<0.666	<0.666	<0.666	<0.666U	<0.666	<0.666	<0.666	5,110	391	--	--
Volatiles													
1,1,1-Trichloroethane	0.005	<0.004B	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	0.005	28,616	2,190	0.3/0.031	--
Acetone	0.1	<0.017B	<0.017B	<0.017B	<0.017	<0.017	<0.017	<0.017	0.025	91,980	7039	--	--
Toluene	0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	20,440	1,564	0.1/--	--
Trichloroethylene	0.005	<0.003	<0.003	<0.003	0.019	0.009	<0.003	<0.003	<0.003	7.15	1.60	0.3/--	--
Trichlorofluoromethane	0.005	<0.006	<0.006B	<0.006B	<0.006	<0.006	<0.006	<0.006	<0.006	30,660	2,346	--	--
Semi-Volatiles													
2,4-Dinitrotoluene	0.3	<0.14	6.14	<1.4	3.44	2.03	11.5	1.17	37.5	204	16	--	--
2,6-Dinitrotoluene	0.3	<0.085	3.61	<0.85	2.02	1.99	5.64	<0.425	1.84	102	7.82	--	--
Bis(2-ethylhexyl)Phthalate	0.3	<0.62	<6.2B	<6.2B	<3.1B	<3.1B	<3.1B	<3.1	<3.1	410	46	--/1.3	--
Di-N-Butyl Phthalate	0.3	<0.061	6.15	1.59	6.88	6.78	27.6	5.86	31.3	10,220	782	--/1.4	--
Diethyl Phthalate	0.3	<0.24	3.72	1.2	13.9	27.3	11.6	17.7	1.89	81,760	6,257	--/0.2	--
N-Nitrosodiphenylamine	0.3	<0.19	4.07	<1.9	2.28	3.74	1.27	1.16	6.21	0.5	0.01	--/0.028	--

Table 4-1 (Continued)
Summary of Analytical Data For Soil Samples Collected at SWMU 13
Modified from Dames and Moore RFI Investigation Report
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Notes:

B = Analyte was detected in corresponding method blank; values are flagged if the sample concentration is less than 10 times the method blank concentration for common laboratory constituents and 5 times for all other constituents

BTAG = USEPA Region III Draft, Biological Technical Assistance Group Screening Level

C = Indicates that analysis was confirmed using a second column.

CSE = Chemical sediment

CSO = Chemical soil

ft bgs = Feet below ground surface

mg/kg = milligrams per kilograms

PQL = Practical quantitation limit; the lowest concentration that can be reliably detected at a defined level of precision for a given analytical method

RBC = Risk-Based Concentration

USEPA = United States Environmental Protection Agency

USEPA Region III Risk-Based Concentration (RBC) values from the April 14, 2004, RBC Table

Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens

TAL = Target Analyte List

< = Concentration is reported as less than the certified reporting limit

(A) = Facility-Wide Background Point Estimate as Reported in the Facility-Wide Background Study Report (IT 2001a)

(1) = Chromium VI RBC value used

(2) = Lead criteria are Action Levels; see USEPA Region III guidance

(3) = Manganese-nonfood RBC value used

(4) = Mercuric chloride RBC value used

bold = Concentration exceeds Industrial RBC

= Concentration exceeds Residential RBC

= Concentration exceeds Draft BTAG Screening Level

underline = Concentration exceeds Facility-Wide Background Point Estimate

Table 4-2
Summary of Analytical Surface Water Data Collected at SWMU 13
Modified from Dames and Moore SWMU 13 RFI Investigation Report
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

SITE ID FIELD ID SAMPLE DATE DEPTH (ft bgs) MATRIX UNITS	PQLs µg/L	13SW1 RDWA*11 15-Jan-92 0.0 CSW µg/L	Adjusted Tap Water RBC µg/L	MCL µg/L	Draft BTAG Screening Level µg/L
TAL Metals					
Aluminum	141	47,500	3,650	--	25
Arsenic	10	2.99	0.045	10	48
Barium	20	495	256	2,000	10,000
Calcium	500	22,200	--	--	--
Chromium[(1)]	10	78.8	11.0	100	2
Cobalt	70	30.6	73.0	--	35,000
Copper	60	143	146	1,300 [(AL)]	6.5
Iron	38.1	59,700	1,100	--	320
Lead	10	500	--	15 [(AL)]	3.2
Magnesium	500	12,400	--	--	--
Manganese[(2)]	2.75	1,940	73	--	14,500
Nickel	50	43.8	73	--	160
Potassium	375	13,600	--	--	--
Sodium	500	1,830	--	--	--
Vanadium	40	89.9	3.7	--	10,000
Zinc	50	893	1,095	--	30
Explosives					
1,3,5-Trinitrobenzene	0.449	1.18	110	--	--
2,4,6-Trinitrotoluene	0.635	32.9	1.83	--	--
2,4-Dinitrotoluene	0.064	15.8	7.3	--	230
2,6-Dinitrotoluene	0.074	3.71	3.65	--	--
Cyclotetramethylene-tetranitramine	1.21	12.8	183	--	--
Volatiles					
Carbon Disulfide	5	1.25	104	--	2
Semi-Volatiles					
2,4-Dinitrotoluene	10	13.6	7.3	--	230
2,6-Dinitrotoluene	10	2.39	3.65	--	230

Notes:

BTAG = USEPA Region III, Biological Technical Assistance Group Screening Level

CSW = Chemical Surface Water

ft bgs = Feet below ground surface

MCL = Maximum Contaminant Level

PQL = Practical quanitation limit; the lowest concentration that can be reliably detected at a defined level of precision for a given analytical method

RBC = Risk-Based Concentration

USEPA = United States Environmental Protection Agency

USEPA Region III Risk-Based Concentration (RBC) values from the April 14, 2004, RBC Table

Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens

TAL = Target Analyte List

µg/L = Microgram Per Liter

[(AL)] = Action Level

[(1)] = Chromium VI RBC value used

[(2)] = Manganese-nonfood RBC value used

= Concentration exceeds Tap Water RBC

= Concentration exceeds lead action level

= Concentration exceeds Draft BTAG Screening Level

Table 4-3
Detected Analytes for SWMU 13 (Soil)
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	SSL DAF 20	Draft BTAG Screening Level	13SB7A 10/9/2003 0-1		MDL	RL	13SB7B 10/9/2003 5-6		MDL	RL	13SB7C 10/9/2003 10-12		MDL	RL	13SB8A 10/9/2003 0-1		MDL	RL	13SB8B 10/9/2003 3.5-3.7		MDL	RL	13SB9A 10/9/2003 0-1		MDL	RL
								Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
TAL Metals (mg/kg)																															
Aluminum	7429-90-5	--	40,041	--	--	--	1	14,000		1.83	50	13,900		1.83	50	21,400		1.83	50	12,600		1.83	50	7,650		1.83	50	20,400		1.83	50
Antimony	7440-36-0	N	--	3.13	40.9	13.2	0.48	<0.5	U	0.0518	0.5	0.12	J,B,p	0.0518	0.5	0.085	J,B,p	0.0518	0.5	0.069	J,B,p	0.0518	0.5	<0.5	U	0.0518	0.5	0.095	J,B,p	0.0518	0.5
Arsenic	7440-38-2	C	15.8	0.43	1.9	0.026	328	***2.5***		0.0232	0.4	***3.5***		0.0232	0.4	***2.4***		0.0232	0.4	***2.4***		0.0232	0.4	***0.65***		0.0232	0.4	***2.7***		0.0232	0.4
Barium	7440-39-3	N	209	1,564	20,440	6,015	440	170		0.106	5	199		0.106	5	208		0.106	5	124		0.106	5	66		0.106	5	175		0.106	5
Beryllium	7440-41-7	N	1.02	15.64	204.4	1,154	0.02	1		0.167	1	0.98	J	0.167	1	1.3		0.167	1	0.66	J	0.0333	1	<1	U	0.0391	1	1.2		0.167	1
Cadmium	7440-43-9	N	0.69	3.91	51.1	27.4	2.5	1.3		0.182	1	1.5		0.182	1	1.3		0.182	1	0.91	J	0.182	1	0.72	J	0.182	1	2.2		0.182	1
Calcium	7440-70-2	--	--	--	--	--	--	2,290	,J,m	16.6	250	2,650	,J,m	16.6	250	2,310	,J,m	16.6	250	3,290	,J,m	16.6	250	1,750	,J,m	16.6	250	1,890	,J,m	16.6	250
Chromium[1]	7440-47-3	N	65.3	23.46	306.6	42.05	0.0075	28	,J,m	0.912	5	30	,J,m	0.912	5	37	,J,m	0.912	5	28	,J,m	0.912	5	19	,J,m	0.912	5	36	,J,m	0.912	5
Cobalt	7440-48-4	--	72.3	--	--	--	100	9	,J,s	0.208	1	13	,J,s	0.208	1	13	,J,s	0.208	1	10	,J,s	0.208	1	6	,J,s	0.208	1	13	,J,s	0.208	1
Copper	7440-50-8	N	53.5	312.86	4,088	10,518	15	13	,J,s	0.368	2	16	,J,s	0.368	2	19	,J,s	0.368	2	18	,J,s	0.368	2	8.3	,J,s	0.368	2	25	,J,s	0.368	2
Iron	7439-89-6	N	50,962	2,346	30,660	--	12	31,000		42.4	200	41,600		42.4	200	41,900		42.4	200	29,200		42.4	200	12,400		21.2	100	36,500		42.4	200
Lead[2]	7439-92-1	--	26.8	400	750	--	0.01	141		0.545	25	235		1.09	50	239		1.09	50	8,620		21.8	1000	46		0.0218	1	434		1.09	50
Magnesium	7439-95-4	--	--	--	--	--	4,400	3,370	,J,m	3.21	250	3,140	,J,m	3.21	250	3,940	,J,m	3.21	250	3,240	,J,m	3.21	250	2,160	,J,m	3.21	250	3,690	,J,m	3.21	250
Manganese	7439-96-5	N	2,543	156.43	2,044	951.9	330	1,040		1.32	25	***1,650***		1.32	25	***1,380***		1.32	25	***1,160***		1.32	25	270		0.264	5	***1,240***		1.32	25
Mercury[3]	7439-97-6	--	0.13	2.35	30.66	--	0.058	0.027	J	0.0077	0.1	0.038	J	0.0077	0.1	0.034	J	0.0077	0.1	0.033	J	0.0077	0.1	0.0087	J	0.0077	0.1	0.043	J	0.0077	0.1
Nickel	7440-02-0	N	62.8	156.43	2,044	--	2	14		0.0356	0.5	13		0.0356	0.5	19		0.0356	0.5	14		0.0356	0.5	7.8		0.0356	0.5	19		0.0356	0.5
Potassium	7440-09-7	--	--	--	--	--	--	1,670		5	100	1,320		5	100	1,890		5	100	1,480		5	100	939		5	100	1,980		5	100
Selenium	7782-49-2	N	--	39.11	511	18.98	1.8	0.57	J	0.0502	1	0.7	J	0.0502	1	0.84	J	0.0502	1	0.66	J	0.0502	1	0.35	J	0.0502	1	0.93	J	0.0502	1
Silver	7440-22-4	N	--	39.11	511	31.03	0.0000098	0.084	J	0.0044	3	0.096	J	0.0044	3	0.11	J	0.0044	3	0.14	J	0.0044	3	0.45	J	0.0044	3	0.12	J	0.0044	3
Sodium	7440-23-5	--	--	--	--	--	--	58	J	18.1	100	46	J	18.1	100	53	J	18.1	100	40	J	18.1	100	63	J	18.1	100	44	J	18.1	100
Thallium	7440-28-0	N	2.11	0.55	7.2	3.6	0.001	0.52	,B,x	0.027	0.5	0.69	,B,x	0.027	0.5	0.86	,B,x	0.027	0.5	0.36	J,B,x	0.027	0.5	0.14	J,B,x	0.027	0.5	0.78	,B,x	0.027	0.5
Vanadium	7440-62-2	N	108	7.82	102.2	730.1	0.5	24		0.207	1	24		0.207	1	36		0.207	1	23		0.207	1	15		0.207	1	37		0.207	1
Zinc	7440-66-6	N	202	2,346	30,660	13,622	10	471		5.17	40	688		5.17	40	847		5.17	40	363		2.59	20	154		2.59	20	1,010		12.9	100
TCL VOCs (µg/kg)																															
1,2,4-Trichlorobenzene	120-82-1	N	--	7.8E+04	1.0E+06	2.4E+03	100	<6.1	U	0.492	6.1	<6.2	U	0.492	6.2	<6.3	U,UJ,m	0.517	6.3	<6.5	U	0.533	6.5	<6.5	U	0.533	6.5	<6.4	U	0.533	6.4
2-Butanone	78-93-3	N	--	4.7E+06	6.1E+07	2.9E+04	--	38		6	24	37		6	25	29	,J,d	6.3	25	30		6.5	26	25	J	6.5	26	41		6.5	26
Acetone	67-64-1	N	--	7.0E+06	9.2E+07	2.2E+04	--	140	,B,z	6	24	130	,B,z	6	25	110	B,B,z	6.3	25	120		6.5	26	77	,B,z	6.5	26	140		6.5	26
Benzene	71-43-2	C	--	1.2E+04	5.2E+04	1.9E+00	100	<6.1	U	0.632	6.1	<6.2	U	0.632	6.2	<6.3	U,UJ,m	0.664	6.3	<6.5	U	0.685	6.5	<6.5	U	0.685	6.5	<6.4	U	0.685	6.4
cis-1,2-Dichloroethene	156-59-2	N	--	7.8E+04	1.0E+06	--	300	<6.1	U	0.852	6.1	<6.2	U	0.852	6.2	<6.3	U	0.895	6.3	<6.5	U	0.923	6.5	<6.5	U	0.923	6.5	<6.4	U	0.923	6.4
Methylene chloride	75-09-2	C	--	8.5E+04	3.8E+05	1.9E+01	300	6.4	J,B,z	3.37	24	6.8	J,B,z	3.37	25	7.2	J,B,z	3.54	25	4.1	J	3.65	26	5.6	J	3.65	26	5.7	J	3.65	26
Tetrachloroethene	127-18-4	C	--	1.2E+03	5.3E+03	4.7E+00	300	<6.1	U	0.736	6.1	<6.2	U	0.736	6.2	<6.3	U,UJ,m	0.772	6.3	<6.5	U	0.797	6.5	<6.5	U	0.797	6.5	<6.4	U	0.797	6.4
Toluene	108-88-3	N	--	6.3E+05	8.2E+06	2.7E+04	100	<6.1	U	0.557	6.1	<6.2	U	0.557	6.2	<6.3	U,UJ,m	0.585	6.3	0.66	J	0.603	6.5	<6.5	U	0.603	6.5	2.7	J	0.603	6.4
Trichloroethene	79-01-6	C	--	1.6E+03	7.2E+03	2.6E-01	300	<6.1	U	0.812	6.1	<6.2	U	0.812	6.2	<6.3	U	0.853	6.3	<6.5	U	0.88	6.5	<6.5	U	0.88	6.5	<6.4	U	0.88	6.4
VOC TICs (µg/kg)																															
Ethyl Ether	60-29-7	N	--	1.6E+06	2.0E+07	8.5E+03	--	NI				NI				NI				NI				NI				NI			
Hexanal	66-25-1	--	--	--	--	--	--	13	E,NJ,t	0	1	NI				NI				NI				NI				NI			
TCL SVOCs (µg/kg)																															
2-Methylnaphthalene	91-57-6	N	--	3.1E+04	4.1E+05	4.4E+03	--	<210	U	3.29	210	<210	U	3.29	210	<220	U	3.56	220	22	J	3.56	220	<220	U	3.56	220	<220	U	3.56	220
2,4-Dinitrotoluene	121-14-2	N	--	1.6E+04	2.0E+05	5.7E+02	--	<210	U	3.78	210	<210	U	3.78	210	<220	U	4.1	220	<220	U	4.1	220	<220	U	4.1	220	220	J	4.1	220
2,6-Dinitrotoluene	606-20-2	N	--	7.8E+03	1.0E+05	2.5E+02	--	<210	U	33.2	210	<210	U	33.2	210	<220	U	36	220	<220	U	36	220	<220	U	36	220	<220	U	36	220
Dinitrotoluene Mix	--	C	--	9.4E+02	4.2E+03	--	--	ND				ND				ND				ND				ND				220			
4-Chloro-3-Methylphenol	59-50-7	--	--	--	--	--	--	19	J	6.25	210	16	J	6.25	210	8	J	6.77	220	<220	U	6.77	220	24	J	6.77	220	25	J	6.77	220
Acenaphthene	83-32-9	N	--	4.7E+05	6.1E+06	1.0E+05	100	<210	U	2.06	210	<210	U	2.06	210	<220	U	2.24	220	19	J	2.24	220	<220	U	2.24	220	10	J	2.24	220
Acenaphthylene[4]	208-96-8	N	--	2.3E+05	3.1E+06	--	100	<210	U	1.8	210	<210	U	1.82	210	<220	U	1.95	220	2	J	1.95	220	<220	U	1.95	220	7	J	1.95	220
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	100	<210	U	5.54	210	<210	U	5.54	210	<220	U	6.01	220	37	J	6.01	220	<220	U	6.01	220	25	J	6.01	220
Benzo(a)anthracene	56-55-3	C	--	2.2E+02	3.9E+03	4.8E+02	100	<210	U	16	210	<210	U	16	210	<220	U	17.3	220	100	J	17.3	220	<220	U	17.3	220	200	J	17.3	220
Benzo(a)pyrene	50-32-8	C	--	2.2E+01	3.9E+02	1.2E+02	100	18	J	6.85	210	11	J	6.85	210	<220	U	7.42	220	120	J	7.42	220	21	J	7.42	220	***140***	J	7.42	220
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	100	25	J,J,l	11.7	210	17	J,J,l	11.7	210	<220	U	12.7	220	180	J	12.7	220	36	J	12.7	220	240		12.7	220
Benzo(g,h,i)perylene[4]	191-24-2	N	--	2.3E+05	3.1E+06	--	100	11	J,J,l	10.5	210	<210	U	10.5	210	<220	U	11.3	220	72	J	11.3	220	14	J	11.3	220	46	J	11.3	220
Benzo(k)fluoranthene	207-08-9	C	--	2.2E+03	3.9E+04	1.5E+04	100	<210	U	16.1	210	<210	U	16.1	210	<220	U	17.4	220	68	J	17.4	220	<220	U	17.4	220	93	J	17.4	220
Bis(2-ethylhexyl)phthalate	117-81-7	C	--	4.6E+04	2.0E+05	2.9E+06	--	19	J,B,z	2.48	210	18	J,B,z	2.48	210	17	J,B,z	2.69	220	35	J	2.69	220	190	J	2.69	220	43	J	2.69	220
Butylbenzylphthalate	85-68-7	N	--	1.6E+06	2.0E+07	1.7E+07	--	6	J	5.38	210	<210	U	5.38	210	<220	U	5.82	220	<220	U	5.82	220	6	J	5.82	220	<220	U	5.82	220
Carbazole	86-74-8	C	--	3.2E+04	1.4E+05	4.7E+02	--	<210	U	7.32	210	<210	U	7.32	210	<220	U	7.93	220	<220	U	7.93	220	<220	U	7.93	220	<220	U	7.93	220
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	100	24	J	12.2	210	16	J	12.2	210	<220	U	13.3	220	140	J	13.3	220	25	J	13.3	220	220		13.3	220
Dibenz(a,h)anthracene	53-70-3	C	--	2.2E+01	3.9E+02	4.6E+02	100	<210	U	7.08	210	<210	U	7.08	210	<220	U	7.67	220	18	J	7.67	220	<220	U	7.67	220	13	J	7.67	220
Dibenzofuran	132-64-9	--	--	--	--	--	--	<210	U	3.79	210	<210	U	3.79	210	<220	U	4.11	220	13	J	4.11	220	<220	U	4.11	220	<220	U	4.11	220
Diethylphthalate	84-66-2	N	--	6.3E+06	8.2E+07	4.5E+05	--	9	J,J,l	2.28	210	8	J,J,l	2.28	210	6	J,J,l	2.47	220	33	J	2.47	220	40	J	2.47	220	230		2.47	220
Dimethylphthalate	131-11-3	--	--	--	--	--	--	<210	U	3.97	210	<210	U	3.97	210	<220	U	4.3	220	<220	U	4.3	220	<220	U	4.3	220	18	J	4.3	220
Di-n-butylphthalate	84-74-2	N	--	7.8E+05	1.0E+07	5.0E+06	--	70	J,B,z	4.58	210	85	J,B,z	4.58	210	120	J,B,z	4.97	220	62	J	4.97	220	190	J	4.97	220	580		4.97	220
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	100	9	J	2.82	210	<210	U	2.82	210	<220	U	3.06	220	370		3.06	220	35	J	3.06	220	260		3.06	220
Fluorene	86-73-7	N	--	3.1E+05	4.1E+06	1.4E+05	100	<210	U	2.02	210	<210	U	2.02	210	<220	U	2.18	220	20	J	2.18	220	<220	U	2.18	220	6	J	2.18	220
Indeno(1,2,3-cd)pyrene	193-39-5	C	--	2.2E+02	3.9E+03	4.2E+03	100	10	J,J,l	4.7	210	<210	U	4.7	210	<220	U	5.1	220	73	J	5.1	220	12	J	5.1	220	43	J	5.1	220
Naphthalene	91-20-3	N	--	1.6E+05	2.0E+06	1.5E+02	100	<210	U	3.3	210	<210	U	3.3	210	<220	U	3.58	220	10	J	3.58	220	<220	U	3.58	220	<220	U	3.58	220
N-Nitrosodiphenylamine	86-30-6	C	--	1.3E+05	5.8E+05	7.6E+02	--	<210	U	5.7	210	<210	U	5.7	210	<220	U	6.18	220	21	J	6.18	220	<220	U	6.18	220	25	J	6.18	220
Phenanthrene[4]	85-01-8	N	--	2.3E+05	3.1E+06	--	100	4	J	2.76	210	<210	U	2.76	210	<220	U	2.9	220	130	J	2.99	220	10	J	2.99	220	79	J	2.99	220
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	100	6	J	1.78	210	<210	U	1.78	210	<220	U	1.92	220	260		1.92	220	32	J	1.92	220	230		1.92	220
SVOC TICs (µg/kg)																															
(Z)-9-Octadecenamide	301-02-0	--	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
1-Heneicosanol	15594-90-8	--	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
1,1'-Biphenyl, (1,1-dimethylethoxy)-	72101-19-0	--	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
1,1'-Biphenyl, bis(1-methylethyl)-	69009-90-1	--	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
1,2-Benzenedicarboxylicacid, bis(2-methy	84-69-5	--	--	--	--	--	--	NI				140	E,NJ,t	0	100	200	E,NJ,t	0	100	120	E,NJ,t	0	100	NI				670	E,NJ,t	0	100
1,2-Benzenedicarboxylic acid, butyl 2-me	17851-53-5	--	--	--	--	--	--	69	E,NJ,t	0	10	NI				NI				NI				320	E,NJ,t	0	10	NI			
1,2-Benzenedicarboxylic acid, butyl cycl	84-64-0	--	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
2-Ethyl-hexanoic Acid	149575	--	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	--	--	--	--	--	--	50	E,B,x	0	100	42	E,B,x	0	100	36	E,B,x	0	100	NI				NI				75	E,NJ,t	0	100
4,4,6a,6b,8a,11,11,14b-Octamethyl-1,4,4a	10001-946-24	--	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
7H-Dibenzo (a,g) carbazole	207841	--	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
9-Octadecenoic acid, (E)-	112-79-8	--	--	--	--	--	--	NI				NI				NI				NI				74	E,NJ,t	0	10	NI			

Table 4-3
Detected Analytes for SWMU 13 (Soil)
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	SSL DAF 20	Draft BTAG Screening Level	13SB7A 10/9/2003 0-1		MDL	RL	13SB7B 10/9/2003 5-6		MDL	RL	13SB7C 10/9/2003 10-12		MDL	RL	13SB8A 10/9/2003 0-1		MDL	RL	13SB8B 10/9/2003 3.5-3.7		MDL	RL	13SB9A 10/9/2003 0-1		MDL	RL
								Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
Benzene, 2-methyl-1,3,5-trinitro-	118-96-7	--	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Benzeneamine, 2-nitro-N-phenyl-	119-75-5	--	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Bis(2-ethylhexyl)maleate	142-16-5	--	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Butyl Ester Octadecanioc	123955	--	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Cholesterol	57-88-5	--	--	--	--	--	--	NI				NI				NI				120	E,NJ,t	0	10	NI				NI			
Erucylamide	112-84-5	--	--	--	--	--	--	300	E,B,x	0	10	NI				120	E,B,x	0	10	220	E,B,x	0	10	890	E,NJ,t	0	10	570	E,NJ,t	0	10
Ethanol, 2-(hexadecyloxy)-	2136-71-2	--	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Ether, bis(p-tert-butylphenyl)	24085-65-2	--	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
.Gamma.-sitosterol	83-47-6	--	--	--	--	--	--	NI				NI				NI				780	E,NJ,t	0	10	76	E,NJ,t	0	10	160	E,NJ,t	0	10
Octacosane	630-02-4	--	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Perylene	198-55-0	--	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Stigmast-4-en-3-one	1058-61-3	--	--	--	--	--	--	NI				NI				NI				240	E,NJ,t	0	10	NI				NI			
Stigmasterol, 22,23-dihydro-	10002-142-07	--	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Taraxerol	127220	--	--	--	--	--	--	NI				NI				NI				290	E,NJ,t	0	10	NI				NI			
Tetradecanamide	638-58-4	--	--	--	--	--	--	NI				NI				NI				NI				60	E,NJ,t	0	10	NI			
Triacetin	102761	--	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Triphenyl Phosphate	115-86-6	--	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Urea, N,N'-dimethyl-N,N'-diphenyl-	611927	--	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Vitamin E	10191-41-0	--	--	--	--	--	--	NI				NI				NI				160	E,NJ,t	0	10	NI				NI			
PAHs (µg/kg)																															
Acenaphthene	83-32-9	N	--	4.7E+05	6.1E+06	1.0E+05	100	<120	U	11.3	120	<130	U	12.2	130	<130	U	12.2	130	<130	U	12.2	130	<130	U	12.2	130	17	J	12.2	130
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	100	<26	U	0.84	26	1	J	0.91	26	<27	U	0.91	27	12	J	0.91	27	<27	U	0.91	27	38		0.91	27
Benzo(a)anthracene	56-55-3	C	--	2.2E+02	3.9E+03	4.8E+02	100	2.1	J	0.96	26	3.9	J	1.04	26	<27	U	1.04	27	49		1.04	27	3.1	J	1.04	27	130		1.04	27
Benzo(a)pyrene	50-32-8	C	--	2.2E+01	3.9E+02	1.2E+02	100	<26	U	1.2	26	<26	U	1.3	26	<27	U	1.3	27	71		1.3	27	<27	U	1.3	27	***170***		1.3	27
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	100	<26	U	1.56	26	<26	U	1.69	26	<27	U	1.69	27	54		1.69	27	<27	U	1.69	27	120		1.69	27
Benzo(g,h,i)perylene[4]	191-24-2	N	--	2.3E+05	3.1E+06	--	100	<26	U	15	26	<26	U	16.3	26	<27	U	16.3	27	120		16.3	27	<27	U	16.3	27	540	,J,f	16.3	27
Benzo(k)fluoranthene	207-08-9	C	--	2.2E+03	3.9E+04	1.5E+04	100	<26	U	1.2	26	<26	U	1.3	26	<27	U	1.3	27	32		1.3	27	<27	U	1.3	27	77		1.3	27
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	100	2.6	J	1.44	26	6.5	J	1.56	26	<27	U	1.56	27	57		1.56	27	3.5	J	1.56	27	150		1.56	27
Dibenz(a,h)anthracene	53-70-3	C	--	2.2E+01	3.9E+02	4.6E+02	100	<26	U	1.68	26	<26	U	1.82	26	<27	U	1.82	27	2.3	J	1.82	27	<27	U	1.82	27	<27	U	1.82	27
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	100	5	J	2.04	26	3.3	J	2.21	26	<27	U	2.21	27	120		2.21	27	7.9	J	2.21	27	290	,J,f	2.21	27
Fluorene	86-73-7	N	--	3.1E+05	4.1E+06	1.4E+05	100	<26	U	1.56	26	<26	U	1.69	26	<27	U	1.69	27	<27	U	1.69	27	<27	U	1.69	27	11	J	1.69	27
Indeno(1,2,3-cd)pyrene	193-39-5	C	--	2.2E+02	3.9E+03	4.2E+03	100	<26	U	0.84	26	<26	U	0.91	26	<27	U	0.91	27	53		0.91	27	<27	U	0.91	27	100		0.91	27
Phenanthrene[4]	85-01-8	N	--	2.3E+05	3.1E+06	--	100	2.1	J	0.72	26	1.8	J	0.78	26	<27	U	0.78	27	43		0.78	27	2.9	J	0.78	27	130		0.78	27
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	100	3.6	J	1.08	26	3	J	1.17	26	<27	U	1.17	27	97		1.17	27	8.8	J	1.17	27	240	,J,f	1.17	27
Explosives (mg/kg)																															
1,3-Dinitrobenzene	99-65-0	N	--	7.8E-01	1.0E+01	3.7E-02	--	<0.5	U	0.159	0.5	<0.5	U	0.159	0.5	<0.5	U	0.159	0.5	<0.5	U	0.159	0.5	<0.5	U	0.159	0.5	<0.5	U	0.159	0.5
2,4-Dinitrotoluene	121-14-2	N	--	1.6E+01	2.0E+02	5.7E-01	--	<0.5	U	0.142	0.5	<0.5	U	0.142	0.5	<0.5	U	0.142	0.5	<0.5	U	0.142	0.5	<0.5	U	0.142	0.5	<0.5	U	0.142	0.5
Dinitrotoluene Mix	--	C	--	9.4E-01	4.2E+00	--	--	ND				ND				ND				ND				ND				ND			
2,4,6-Trinitrotoluene	118-96-7	C	--	3.9E+00	5.1E+01	--	--	<0.5	U	0.167	0.5	<0.5	U	0.167	0.5	<0.5	U	0.167	0.5	<0.5	U	0.167	0.5	<0.5	U	0.167	0.5	<0.5	U	0.167	0.5
RDX (Hexahydro-1,3,5-trinitro-1,3,5-tria	121-82-4	C	--	5.8E+00	2.6E+01	--	--	<0.5	U,UJ,c	0.131	0.5	<0.5	U,UJ,c	0.131	0.5	<0.5	U,UJ,c	0.131	0.5	<0.5	U	0.131	0.5	<0.5	U	0.131	0.5	<0.5	U,UJ,c	0.131	0.5
Nitroglycerin/PETN (mg/kg)																															
Nitroglycerin	55-63-0	N	--	1.3E+02	1.7E+03	--	--	<0.602	U	0.195	0.602	<0.617	U	0.2	0.617	<0.656	U	0.213	0.656	<0.682	U	0.221	0.682	<0.643	U	0.208	0.643	<0.682	U	0.221	0.682
Cyanide (mg/kg)																															
Cyanide	57-12-5	N	--	1.6E+02	2.0E+03	1.5E+02	0.005	0.07	J	0.0356	0.5	0.18	J	0.0356	0.5	<0.5	U	0.0356	0.5	0.25	J	0.0356	0.5	<0.5	U	0.0356	0.5	0.35	J	0.0356	0.5
Dioxins/Furans (pg/g)																															
1,2,3,7,8-PeCDD	40321-76-4	--	--	--	--	--	--	NT				NT				NT				NT				NT				0.656	J	0.332	6.21
1,2,3,4,7,8-HxCDD	39227-28-6	--	--	--	--	--	--	NT				NT				NT				NT				NT				0.735	J	0.268	6.21
1,2,3,6,7,8-HxCDD	57653-85-7	--	--	--	--	--	--	NT				NT				NT				NT				NT				2.24	J,J,l	0.456	6.21
1,2,3,7,8,9-HxCDD	19408-74-3	C	--	1.0E-01	4.6E-01	--	--	NT				NT				NT				NT				NT				2.33	J,J,l	0.559	6.21
1,2,3,4,6,7,8-HpCDD	35822-46-9	--	--	--	--	--	--	NT				NT				NT				NT				NT				50		0.423	6.21
OCDD	3268-87-9	--	--	--	--	--	--	NT				NT				NT				NT				NT				1,520	,J,f	1.12	12.4
2,3,7,8-TCDF	51207-31-9	--	--	--	--	--	--	NT				NT				NT				NT				NT				0.784	J	0.153	1.24
1,2,3,7,8-PeCDF	57117-41-6	--	--	--	--	--	--	NT				NT				NT				NT				NT				0.45	J	0.193	6.21
2,3,4,7,8-PeCDF	57117-31-4	--	--	--	--	--	--	NT				NT				NT				NT				NT				0.574	J	0.232	6.21
1,2,3,4,7,8-HxCDF	70648-26-9	--	--	--	--	--	--	NT				NT				NT				NT				NT				0.681	J	0.229	6.21
1,2,3,6,7,8-HxCDF	57117-44-9	--	--	--	--	--	--	NT				NT				NT				NT				NT				0.534	J	0.116	6.21
2,3,4,6,7,8-HxCDF	60851-34-5	--	--	--	--	--	--	NT				NT				NT				NT				NT				0.494	J	0.451	6.21
1,2,3,4,6,7,8-HpCDF	67562-39-4	--	--	--	--	--	--	NT				NT				NT				NT				NT				5.11	J	0.489	6.21
1,2,3,4,7,8,9-HpCDF	55673-89-7	--	--	--	--	--	--	NT				NT				NT				NT				NT				0.46	J	0.436	6.21
OCDF	39001-02-0	--	--	--	--	--	--	NT				NT				NT				NT				NT				11.2	J	0.709	12.4
Total TCDDs	41903-57-5	--	--	--	--	--	--	NT				NT				NT				NT				NT				1.08	J	0.117	6.21
Total PeCDDs	36088-22-9	--	--	--	--	--	--	NT				NT				NT				NT				NT				3.82	J	0.332	6.21
Total HxCDDs	34465-46-8	--	--	--	--	--	--	NT				NT				NT				NT				NT				21.6		0.268	6.21
Total HpCDDs	37871-00-4	--	--	--	--	--	--	NT				NT				NT				NT				NT				96.8		0.423	6.21
Total TCDFs	55722-27-5	--	--	--	--	--	--	NT				NT				NT				NT				NT				7.11		0.153	6.21
Total PeCDFs	30402-15-4	--	--	--	--	--	--	NT				NT				NT				NT				NT				4.85	J	0.193	6.21
Total HxCDFs	55684-94-1	--	--	--	--	--	--	NT				NT				NT				NT				NT				8.31		0.116	6.21
Total HpCDFs	38998-75-3	--	--	--	--	--	--	NT				NT				NT				NT				NT				13		0.436	6.21
Percent Solids (%)																															
Percent Solids		--	--	--	--	--	--	82		0.1	0.1	80		0.1	0.1	79		0.1	0.1	77		0.1	0.1	78		0.1	0.1	78		0.1	0.1

Table 4-3
Detected Analytes for SWMU 13 (Soil)
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID								13SB9A-DUP(SBD9)				13SB9B				13SB9C				13SB10A				13SB10B				13SB10C			
Sample Date								10/9/2003				10/9/2003				10/9/2003				10/9/2003				10/9/2003				10/9/2003			
Sample Depth (ft bgs)								0-1				1.5-2				3.5-4				0-1				2.5-3				4.5-4.8			
	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	SSL DAF 20	Draft BTAG Screening Level	Result	LQ, VQ, r	MDL	RL	Result	LQ, VQ, r	MDL	RL	Result	LQ, VQ, r	MDL	RL	Result	LQ, VQ, r	MDL	RL	Result	LQ, VQ, r	MDL	RL	Result	LQ, VQ, r	MDL	RL
TAL Metals (mg/kg)																															
Aluminum	7429-90-5	--	40,041	--	--	--	1	18,600		1.83	50	16,200		1.83	50	4,250		1.83	50	10,900		1.83	50	14,100		1.83	50	17,500		1.83	50
Antimony	7440-36-0	N	--	3.13	40.9	13.2	0.48	0.1	J,B,p	0.0518	0.5	<0.5	U	0.0518	0.5	<0.5	U	0.0518	0.5	0.19	J,B,p	0.0518	0.5	3		0.0518	0.5	0.78		0.0518	0.5
Arsenic	7440-38-2	C	15.8	0.43	1.9	0.026	328	***2.4***		0.0232	0.4	***1.1***		0.0232	0.4	***0.12***	J	0.0232	0.4	***2.5***		0.0232	0.4	***3.9***		0.0232	0.4	***3.6***		0.0232	0.4
Barium	7440-39-3	N	209	1,564	20,440	6,015	440	178		0.106	5	121		0.106	5	29		0.106	5	111		0.106	5	160		0.106	5	142		0.106	5
Beryllium	7440-41-7	N	1.02	15.64	204.4	1,154	0.02	1.1		0.167	1	<1	U	0.0391	1	<1	U	0.0391	1	0.85	J	0.167	1	0.97	J	0.167	1	0.89	J	0.0333	1
Cadmium	7440-43-9	N	0.69	3.91	51.1	27.4	2.5	2.4		0.182	1	1.2		0.182	1	1.1		0.182	1	1.1		0.182	1	1.5		0.182	1	1		0.182	1
Calcium	7440-70-2	--	--	--	--	--	--	2,070	,J,m	16.6	250	1,490	,J,m	16.6	250	1,300	,J,m	16.6	250	4,570	,J,m	16.6	250	2,240	,J,m	16.6	250	1,820	,J,m	16.6	250
Chromium [1]	7440-47-3	N	65.3	23.46	306.6	42.05	0.0075	34	,J,m	0.912	5	31	,J,m	0.912	5	11	,B,x	0.912	5	27	,J,m	0.912	5	35	,J,m	0.912	5	35	,J,m	0.912	5
Cobalt	7440-48-4	--	72.3	--	--	--	100	13	,J,s	0.208	1	9.8	,J,s	0.208	1	3.9	,J,s	0.208	1	11	,J,s	0.208	1	12	,J,s	0.208	1	14	,J,s	0.208	1
Copper	7440-50-8	N	53.5	312.86	4,088	10,518	15	26	,J,s	0.368	2	13	,J,s	0.368	2	2.5	,J,s	0.368	2	16	,J,s	0.368	2	44	,J,s	0.368	2	34	,J,s	0.368	2
Iron	7439-89-6	N	50,962	2,346	30,660	--	12	35,900		42.4	200	20,400		42.4	200	5,330		4.24	20	25,700		42.4	200	37,500		42.4	200	39,600		42.4	200
Lead [2]	7439-92-1	--	26.8	400	750	--	0.01	396		1.09	50	113		0.545	25	12		0.0218	1	111		0.545	25	320		1.09	50	204		0.545	25
Magnesium	7439-95-4	--	--	--	--	--	4,400	3,690	,J,m	3.21	250	2,970	,J,m	3.21	250	1,210	,J,m	3.21	250	3,850	,J,m	3.21	250	2,890	,J,m	3.21	250	3,230	,J,m	3.21	250
Manganese	7439-96-5	N	2,543	156.43	2,044	951.9	330	***1,390***		1.32	25	689		0.264	5	59		0.264	5	853		0.264	5	***1,310***		1.32	25	***1,150***		1.32	25
Mercury [3]	7439-97-6	--	0.13	2.35	30.66	--	0.058	0.043	J	0.0077	0.1	0.027	J	0.0077	0.1	<0.1	U	0.0077	0.1	0.04	J	0.0077	0.1	0.089	J	0.0077	0.1	0.083	J	0.0077	0.1
Nickel	7440-02-0	N	62.8	156.43	2,044	--	2	17		0.0356	0.5	17		0.0356	0.5	3.8		0.0356	0.5	14		0.0356	0.5	16		0.0356	0.5	16		0.0356	0.5
Potassium	7440-09-7	--	--	--	--	--	--	1,910		5	100	1,490		5	100	548		5	100	1,540		5	100	1,200		5	100	1,410		5	100
Selenium	7782-49-2	N	--	39.11	511	18.98	1.8	0.84	J	0.0502	1	0.72	J	0.0502	1	0.23	J	0.0502	1	0.67	J	0.0502	1	0.77	J	0.0502	1	0.96	J	0.0502	1
Silver	7440-22-4	N	--	39.11	511	31.03	0.0000098	0.12	J	0.0044	3	0.06	J	0.0044	3	0.023	J,B,p	0.0044	3	0.085	J	0.0044	3	0.18	J	0.0044	3	0.11	J	0.0044	3
Sodium	7440-23-5	--	--	--	--	--	--	45	J	18.1	100	54	J	18.1	100	69	J	18.1	100	36	J	18.1	100	52	J	18.1	100	48	J	18.1	100
Thallium	7440-28-0	N	2.11	0.55	7.2	3.6	0.001	0.95	,B,x	0.027	0.5	0.25	J,B,x	0.027	0.5	0.047	J,B,x	0.027	0.5	0.32	J,B,x	0.027	0.5	0.45	J,B,x	0.027	0.5	0.5	,B,x	0.027	0.5
Vanadium	7440-62-2	N	108	7.82	102.2	730.1	0.5	35		0.207	1	30		0.207	1	11		0.207	1	22		0.207	1	25		0.207	1	30		0.207	1
Zinc	7440-66-6	N	202	2,346	30,660	13,622	10	969		12.9	100	194		2.59	20	46		0.517	4	287		2.59	20	578		5.17	40	540		5.17	40
TCL VOCs (µg/kg)																															
1,2,4-Trichlorobenzene	120-82-1	N	--	7.8E+04	1.0E+06	2.4E+03	100	<6.2	U	0.492	6.2	<6.8	U	0.574	6.8	<6.4	U	0.533	6.4	0.96	J	0.574	7	<6.5	U	0.533	6.5	<6.8	U	0.574	6.8
2-Butanone	78-93-3	N	--	4.7E+06	6.1E+07	2.9E+04	--	33		6	25	400		7	27	24	J	6.5	26	39		7	28	39		6.5	26	36		7	27
Acetone	67-64-1	N	--	7.0E+06	9.2E+07	2.2E+04	--	130		6	25	140		7	27	31	,B,z	6.5	26	320		7	28	180	,B,z	6.5	26	160	,B,z	7	27
Benzene	71-43-2	C	--	1.2E+04	5.2E+04	1.9E+00	100	<6.2	U	0.632	6.2	<6.8	U	0.738	6.8	<6.4	U	0.685	6.4	<7	U	0.738	7	<6.5	U	0.685	6.5	<6.8	U	0.738	6.8
cis-1,2-Dichloroethene	156-59-2	N	--	7.8E+04	1.0E+06	--	300	<6.2	U	0.852	6.2	<6.8	U	0.994	6.8	<6.4	U	0.923	6.4	<7	U	0.994	7	<6.5	U	0.923	6.5	<6.8	U	0.994	6.8
Methylene chloride	75-09-2	C	--	8.5E+04	3.8E+05	1.9E+01	300	5.7	J	3.37	25	5.5	J	3.93	27	5	J	3.65	26	11	J,B,z	3.93	28	6.6	J,B,z	3.65	26	7.4	J,B,z	3.93	27
Tetrachloroethene	127-18-4	C	--	1.2E+03	5.3E+03	4.7E+00	300	<6.2	U	0.736	6.2	<6.8	U	0.858	6.8	<6.4	U	0.797	6.4	<7	U	0.858	7	<6.5	U	0.797	6.5	<6.8	U	0.858	6.8
Toluene	108-88-3	N	--	6.3E+05	8.2E+06	2.7E+04	100	0.69	J	0.557	6.2	<6.8	U	0.65	6.8	<6.4	U	0.603	6.4	3.5	J	0.65	7	1	J	0.603	6.5	<6.8	U	0.65	6.8
Trichloroethene	79-01-6	C	--	1.6E+03	7.2E+03	2.6E-01	300	<6.2	U	0.812	6.2	<6.8	U	0.948	6.8	<6.4	U	0.88	6.4	<7	U	0.948	7	<6.5	U	0.88	6.5	<6.8	U	0.948	6.8
VOC TICs (µg/kg)																															
Ethyl Ether	60-29-7	N	--	1.6E+06	2.0E+07	8.5E+03	--	NI				NI				NI				NI				NI				NI			
Hexanal	66-25-1	--	--	--	--	--	--	NI				8.6	E,NJ,t	0	1	NI				350	E,NJ,t	0	1	9	E,NJ,t	0	1	NI			
TCL SVOCs (µg/kg)																															
2-Methylnaphthalene	91-57-6	N	--	3.1E+04	4.1E+05	4.4E+03	--	<210	U	3.29	210	<230	U	3.84	230	<220	U	3.56	220	4	J	3.84	240	4	J	3.56	220	<230	U	3.84	230
2,4-Dinitrotoluene	121-14-2	N	--	1.6E+04	2.0E+05	5.7E+02	--	23	J	3.78	210	<230	U	4.41	230	<220	U	4.1	220	<240	U	4.41	240	51	J	4.1	220	<230	U	4.41	230
2,6-Dinitrotoluene	606-20-2	N	--	7.8E+03	1.0E+05	2.5E+02	--	<210	U	33.2	210	<230	U	38.8	230	<220	U	36	220	<240	U	38.8	240	<220	U	36	220	<230	U	38.8	230
Dinitrotoluene Mix	--	C	--	9.4E+02	4.2E+03	--	--	23				ND				ND				ND				51				ND			
4-Chloro-3-Methylphenol	59-50-7	--	--	--	--	--	--	8	J	6.25	210	<230	U	7.29	230	<220	U	6.77	220	15	J	7.29	240	<220	U	6.77	220	<230	U	7.29	230
Acenaphthene	83-32-9	N	--	4.7E+05	6.1E+06	1.0E+05	100	7	J	2.06	210	<230	U	2.41	230	<220	U	2.24	220	9	J	2.41	240	4	J	2.24	220	<230	U	2.41	230
Acenaphthylene [4]	208-96-8	N	--	2.3E+05	3.1E+06	--	100	3	J	1.8	210	<230	U	2.1	230	<220	U	1.95	220	4	U	2.1	240	6	J	1.95	220	6	J	2.1	230
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	100	18	J	5.54	210	<230	U	6.47	230	<220	U	6.01	220	26	J	6.47	240	16	J	6.01	220	22	J	6.47	230
Benzo(a)anthracene	56-55-3	C	--	2.2E+02	3.9E+03	4.8E+02	100	140	J	16	210	22	J	18.6	230	<220	U	17.3	220	89	J	186	240	73	J	17.3	220	50	J	1.86	230
Benzo(a)pyrene	50-32-8	C	--	2.2E+01	3.9E+02	1.2E+02	100	120	J	6.85	210	22	J	7.99	230	<220	U	4.72	220	72	J	7.99	240	95	J	7.42	220	82	J	7.99	230
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	100	170	J	11.7	210	25	J	13.7	230	<220	U	12.7	220	120	J	13.7	240	150	J	12.7	220	140	J	13.7	230
Benzo(g,h,i)perylene [4]	191-24-2	N	--	2.3E+05	3.1E+06	--	100	58	J	10.5	210	15	J	12.2	230	<220	U	11.3	220	34	J	12.2	240	60	J	11.3	220	46	J	12.2	230
Benzo(k)fluoranthene	207-08-9	C	--	2.2E+03	3.9E+04	1.5E+04	100	85	J	16.1	210	<230	U	18.8	230	<220	U	17.4	220	49	J	18.8	240	64	J	17.4	220	48	J	18.8	230
Bis(2-ethylhexyl)phthalate	117-81-7	C	--	4.6E+04	2.0E+05	2.9E+06	--	33	J	2.48	210	24	J	2.9	230	15	J	2.69	220	450		2.9	240	200	J	2.69	220	31	J	2.9	230
Butylbenzylphthalate	85-68-7	N	--	1.6E+06	2.0E+07	1.7E+07	--	<210	U	5.38	210	<230	U	6.27	230	<220	U	5.82	220	38	J	6.27	240	<220	U	5.82	220	9	J	6.27	230
Carbazole	86-74-8	C	--	3.2E+04	1.4E+05	4.7E+02	--	37	J	7.32	210	<230	U	8.54	230	<220	U	7.93	220	<240	U	8.54	240	<220	U	7.93	220	<230	U	8.54	230
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	100	160	J	12.2	210	30	J	14.3	230	<220	U	13.3	220	120	J	14.3	240	100	J	13.3	220	83	J	14.3	230
Dibenz(a,h)anthracene	53-70-3	C	--	2.2E+01	3.9E+02	4.6E+02	100	18	J	7.08	210	<230	U	8.26	230	<220	U	7.67	220	<240	U	8.26	240	16	J	7.67	220	13	J	8.26	230
Dibenzofuran	132-64-9	--	--	--	--	--	--	<210	U	3.79	210	<230	U	4.42	230	<220	U	4.11	220	6	J	4.42	240	<220	U	4.11	220	<230	U	4.42	230
Diethylphthalate	84-66-2	N	--	6.3E+06	8.2E+07	4.5E+05	--	44	J	2.28	210	8	J	2.66	230	3	J	2.47	220	110	J	2.66	240	240		2.47	220	71	J	2.66	230
Dimethylphthalate	131-11-3	--	--	--	--	--	--	<210	U	3.97	210	<230	U	4.63	230	<220	U	4.3	220	140	J	4.63	240	<220	U	4.3	220	<230	U	4.63	230
Di-n-butylphthalate	84-74-2	N	--	7.8E+05	1.0E+07	5.0E+06	--	430		4.58	210	270		5.35	230	180	J	4.97	220	470		5.35	240	470		4.97	220	450		5.35	230
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	100	190	J	2.82	210	37	J	3.29	230	<220	U	3.06	220	350		3.29	240	90	J	3.06	220	29	J	3.29	230
Fluorene	86-73-7	N	--	3.1E+05	4.1E+06	1.4E+05	100	4	J	2.02	210	<230	U	2.35	230	<220	U	2.18	220	12	J	2.35	240	4	J	2.18	220	<230	U	2.35	230
Indeno(1,2,3-cd)pyrene	193-39-5	C	--	2.2E+02	3.9E+03	4.2E+03	100	52	J	4.7	210	10	J	5.49	230	<220	U	5.1	220	32	J	5.49	240	54	J	5.1	220	45	J	5.49	230
Naphthalene	91-20-3	N	--	1.6E+05	2.0E+06	1.5E+02	100	<210	U	3.3	210	<230	U	3.85	230	<220	U	3.58	220	<240	U	3.85	240	<220	U	3.58	220	<230	U	3.85	230
N-Nitrosodiphenylamine	86-30-6	C	--	1.3E+05	5.8E+05	7.6E+02	--	46	J	5.7	210	<230	U	6.65	230	<220	U	6.18	220	<240	U	6.65	240	120	J	6.18	220	<230	U	6.65	230
Phenanthrene[4]	85-01-8	N	--	2.3E+05	3.1E+06	--	100	60	J	2.76	210	17	J	3.22	230	<220	U	2.99	220	170	J	3.22	240	43	J	2.99	220	14	J	3.22	230
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	100	170	J	1.78	210	33	J	2.07	230	3	J	1.92	220	260		2.07	240	83	J	1.92	220	29	J	2.07	230
SVOC TICs (µg/kg)																															
(Z)-9-Octadecenamide	301-02-0	--	--	--	--	--	--	NI				83	E,NJ,t	0	100	NI				NI				NI				NI			
1-Heneicosanol	15594-90-8	--	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
1,1'-Biphenyl, (1,1-dimethylethoxy)-	72101-19-0	--	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
1,1'-Biphenyl, bis(1-methylethyl)-	69009-90-1	--	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
1,2-Benzenedicarboxylicacid, bis(2-methy	84-69-5	--	--	--	--	--	--	NI				420	E,NJ,t	0	100	NI				NI				NI				530	E,NJ,t	0	100
1,2-Benzenedicarboxylic acid, butyl 2-me	17851-53-5	--	--	--	--	--	--	NI				NI				350	E,NJ,t	0	10	530	E,NJ,t	0	10	47	E,NJ,t	0	10	NI			
1,2-Benzenedicarboxylic acid, butyl cycl	84-64-0	--	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
2-Ethyl-hexanoic Acid	149575	--	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	--	--	--	--	--	--	45	E,B,x	0	100	45	E,NJ,t	0	100	NI				NI				150	E,NJ,t	0	100	NI			
4,4,6a,6b,8a,11,11,14b-Octamethyl-1,4,4a	10001-946-24	--	--	--	--	--	--	NI				NI				NI				710	E,NJ,t	0	100	NI				NI			
7H-Dibenzo (a,g) carbazole	207841	--	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
9-Octadecenoic acid, (E)-	112-79-8	--	--	--	--	--	--	NI				NI				NI				NI				NI				NI			

Table 4-3
Detected Analytes for SWMU 13 (Soil)
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	SSL DAF 20	Draft BTAG Screening Level	13SB9A-DUP(SBD9) 10/9/2003 0-1		MDL	RL	13SB9B 10/9/2003 1.5-2		MDL	RL	13SB9C 10/9/2003 3.5-4		MDL	RL	13SB10A 10/9/2003 0-1		MDL	RL	13SB10B 10/9/2003 2.5-3		MDL	RL	13SB10C 10/9/2003 4.5-4.8		MDL	RL
								Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
Benzene, 2-methyl-1,3,5-trinitro-	118-96-7	--	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Benzeneamine, 2-nitro-N-phenyl-	119-75-5	--	--	--	--	--	--	NI				NI				NI				NI				71	E,NJ,t	0	10	NI			
Bis(2-ethylhexyl)maleate	142-16-5	--	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Butyl Ester Octadecanioc	123955	--	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Cholesterol	57-88-5	--	--	--	--	--	--	NI				NI				NI				470	E,NJ,t	0	10	NI				NI			
Erucylamide	112-84-5	--	--	--	--	--	--	NI				NI				NI				400	E,B,x	0	10	900	E,NJ,t	0	10	180	E,B,x	0	10
Ethanol, 2-(hexadecyloxy)-	2136-71-2	--	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Ether, bis(p-tert-butylphenyl)	24085-65-2	--	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
.Gamma.-sitosterol	83-47-6	--	--	--	--	--	--	NI				NI				NI				2,400	E,NJ,t	0	10	NI				NI			
Octacosane	630-02-4	--	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Perylene	198-55-0	--	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Stigmast-4-en-3-one	1058-61-3	--	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Stigmasterol, 22,23-dihydro-	10002-142-07	--	--	--	--	--	--	160	E,NJ,t	0	10	NI				NI				NI				NI				NI			
Taraxerol	127220	--	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Tetradecanamide	638-58-4	--	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Triacetin	102761	--	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Triphenyl Phosphate	115-86-6	--	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Urea, N,N'-dimethyl-N,N'-diphenyl-	611927	--	--	--	--	--	--	48	E,NJ,t	0	100	NI				NI				NI				NI				NI			
Vitamin E	10191-41-0	--	--	--	--	--	--	NI				NI				NI				600	E,NJ,t	0	10	NI				NI			
PAHs (µg/kg)																															
Acenaphthene	83-32-9	N	--	4.7E+05	6.1E+06	1.0E+05	100	<130	U	12.2	130	<140	U	13.2	140	<130	U	12.2	130	14	J	13.2	140	<130	U	12.2	130	<140	U	13.2	140
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	100	15	J	0.91	26	4.2	J	0.98	29	<27	U	0.91	27	38		0.98	30	14	J	0.91	27	6.1	J	0.98	29
Benzo(a)anthracene	56-55-3	C	--	2.2E+02	3.9E+03	4.8E+02	100	61		1.04	26	12	J	1.12	29	1.4	J	1.04	27	140		1.12	30	56		1.04	27	18	J	1.12	29
Benzo(a)pyrene	50-32-8	C	--	2.2E+01	3.9E+02	1.2E+02	100	73		1.3	26	15	J	1.4	29	<27	U	1.3	27	***190***		1.4	30	130		1.3	27	59		1.4	29
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	100	56		1.69	26	10	J	1.82	29	<27	U	1.69	27	140		1.82	30	91		1.69	27	47		1.82	29
Benzo(g,h,i)perylene[4]	191-24-2	N	--	2.3E+05	3.1E+06	--	100	240	,J,f	16.3	26	<29	U	17.5	29	<27	U	16.3	27	260		17.5	30	290		16.3	27	140		17.5	29
Benzo(k)fluoranthene	207-08-9	C	--	2.2E+03	3.9E+04	1.5E+04	100	36		1.3	26	6	J	1.4	29	<27	U	1.3	27	80		1.4	30	52		1.3	27	20	J	1.4	29
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	100	74		1.56	26	15	J	1.68	29	1.7	J	1.56	27	150		1.68	30	80		1.56	27	33		1.68	29
Dibenz(a,h)anthracene	53-70-3	C	--	2.2E+01	3.9E+02	4.6E+02	100	<26	U	1.82	26	<29	U	1.96	29	<27	U	1.82	27	5.2	J	1.96	30	8	J	1.82	27	5.3	J	1.96	29
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	100	120	,J,f	2.21	26	30		2.38	29	3.8	J	2.21	27	470		2.38	30	64		2.21	27	12	J	2.38	29
Fluorene	86-73-7	N	--	3.1E+05	4.1E+06	1.4E+05	100	<26	U	1.69	26	<29	U	1.82	29	<27	U	1.69	27	17	J	1.82	30	<27	U	1.69	27	<29	U	1.82	29
Indeno(1,2,3-cd)pyrene	193-39-5	C	--	2.2E+02	3.9E+03	4.2E+03	100	46		0.91	26	9.4	J	0.98	29	<27	U	0.91	27	130		0.98	30	110		0.91	27	58		0.98	29
Phenanthrene[4]	85-01-8	N	--	2.3E+05	3.1E+06	--	100	50		0.78	26	14	J	0.84	29	1.8	J	0.78	27	210		0.84	30	27		0.78	27	7	J	0.84	29
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	100	110	,J,f	1.17	26	27	J	1.26	29	5.1	J	1.17	27	320		1.26	30	50		1.17	27	9.5	J	1.26	29
Explosives (mg/kg)																															
1,3-Dinitrobenzene	99-65-0	N	--	7.8E-01	1.0E+01	3.7E-02	--	<0.5	U	0.159	0.5	<0.5	U	0.159	0.5	<0.5	U	0.159	0.5	<0.5	U	0.159	0.5	<0.5	U	0.159	0.5	<0.5	U	0.159	0.5
2,4-Dinitrotoluene	121-14-2	N	--	1.6E+01	2.0E+02	5.7E-01	--	<0.5	U	0.142	0.5	<0.5	U	0.142	0.5	<0.5	U	0.142	0.5	<0.5	U	0.142	0.5	<0.5	U	0.142	0.5	<0.5	U	0.142	0.5
Dinitrotoluene Mix	--	C	--	9.4E-01	4.2E+00	--	--	ND				ND				ND				ND				ND				ND			
2,4,6-Trinitrotoluene	118-96-7	C	--	3.9E+00	5.1E+01	--	--	<0.5	U	0.167	0.5	<0.5	U	0.167	0.5	<0.5	U	0.167	0.5	<0.5	U	0.167	0.5	<0.5	U	0.167	0.5	<0.5	U	0.167	0.5
RDX (Hexahydro-1,3,5-trinitro-1,3,5-tria	121-82-4	C	--	5.8E+00	2.6E+01	--	--	<0.5	U,UJ,c	0.131	0.5	<0.5	U,UJ,c	0.131	0.5	<0.5	U,UJ,c	0.131	0.5	<0.5	U,UJ,c	0.131	0.5	<0.5	U,UJ,c	0.131	0.5	<0.5	U,UJ,c	0.131	0.5
Nitroglycerin/PETN (mg/kg)																															
Nitroglycerin	55-63-0	N	--	1.3E+02	1.7E+03	--	--	0.793		0.238	0.733	0.954	,J,g	0.214	0.66	<0.665	U	0.215	0.665	<0.853	U	0.276	0.853	<0.666	U	0.216	0.666	2.46	,J,g	0.225	0.693
Cyanide (mg/kg)																															
Cyanide	57-12-5	N	--	1.6E+02	2.0E+03	1.5E+02	0.005	0.26	J	0.0356	0.5	0.12	J	0.0356	0.5	<0.5	U	0.0356	0.5	0.17	J	0.0356	0.5	0.22	J	0.0356	0.5	0.11	J	0.0356	0.5
Dioxins/Furans (pg/g)																															
1,2,3,7,8-PeCDD	40321-76-4	--	--	--	--	--	--	<6.97	U	0.373	6.97	NT				NT				NT				NT				NT			
1,2,3,4,7,8-HxCDD	39227-28-6	--	--	--	--	--	--	0.477	J	0.301	6.97	NT				NT				NT				NT				NT			
1,2,3,6,7,8-HxCDD	57653-85-7	--	--	--	--	--	--	1.04	J,J,I	0.512	6.97	NT				NT				NT				NT				NT			
1,2,3,7,8,9-HxCDD	19408-74-3	C	--	1.0E-01	4.6E-01	--	--	1.37	J,J,I	0.628	6.97	NT				NT				NT				NT				NT			
1,2,3,4,6,7,8-HpCDD	35822-46-9	--	--	--	--	--	--	40.6		0.474	6.97	NT				NT				NT				NT				NT			
OCDD	3268-87-9	--	--	--	--	--	--	2,900	E,J,q	1.26	13.9	NT				NT				NT				NT				NT			
2,3,7,8-TCDF	51207-31-9	--	--	--	--	--	--	0.194		0.132	1.39	NT				NT				NT				NT				NT			
1,2,3,7,8-PeCDF	57117-41-6	--	--	--	--	--	--	<6.97	U	0.217	6.97	NT				NT				NT				NT				NT			
2,3,4,7,8-PeCDF	57117-31-4	--	--	--	--	--	--	<6.97	U	0.261	6.97	NT				NT				NT				NT				NT			
1,2,3,4,7,8-HxCDF	70648-26-9	--	--	--	--	--	--	0.276	J	0.257	6.97	NT				NT				NT				NT				NT			
1,2,3,6,7,8-HxCDF	57117-44-9	--	--	--	--	--	--	0.243	J	0.13	6.97	NT				NT				NT				NT				NT			
2,3,4,6,7,8-HxCDF	60851-34-5	--	--	--	--	--	--	<6.97	U	0.507	6.97	NT				NT				NT				NT				NT			
1,2,3,4,6,7,8-HpCDF	67562-39-4	--	--	--	--	--	--	2.14	J	0.549	6.97	NT				NT				NT				NT				NT			
1,2,3,4,7,8,9-HpCDF	55673-89-7	--	--	--	--	--	--	<6.97	U	0.489	6.97	NT				NT				NT				NT				NT			
OCDF	39001-02-0	--	--	--	--	--	--	4.35	J	0.796	13.9	NT				NT				NT				NT				NT			
Total TCDDs	41903-57-5	--	--	--	--	--	--	0.132	J	0.132	6.97	NT				NT				NT				NT				NT			
Total PeCDDs	36088-22-9	--	--	--	--	--	--	2.57	J	0.373	6.97	NT				NT				NT				NT				NT			
Total HxCDDs	34465-46-8	--	--	--	--	--	--	10.5		0.301	6.97	NT				NT				NT				NT				NT			
Total HpCDDs	37871-00-4	--	--	--	--	--	--	93.9		0.474	6.97	NT				NT				NT				NT				NT			
Total TCDFs	55722-27-5	--	--	--	--	--	--	1.07	J,B,x	0.172	6.97	NT				NT				NT				NT				NT			
Total PeCDFs	30402-15-4	--	--	--	--	--	--	0.921	J	0.217	6.97	NT				NT				NT				NT				NT			
Total HxCDFs	55684-94-1	--	--	--	--	--	--	2.18	J	0.13	6.97	NT				NT				NT				NT				NT			
Total HpCDFs	38998-75-3	--	--	--	--	--	--	4.88	J	0.489	6.97	NT				NT				NT				NT				NT			
Percent Solids (%)																															
Percent Solids		--	--	--	--	--	--	80		0.1	0.1	73		0.1	0.1	78		0.1	0.1	71		0.1	0.1	77		0.1	0.1	73		0.1	0.1

Table 4-3
Detected Analytes for SWMU 13 (Soil)
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	SSL DAF 20	Draft BTAG Screening Level	13SB11A 10/9/2003 0-1		MDL	RL	13SB11B 10/9/2003 4.5-5		MDL	RL	13SB11C 10/9/2003 8-8.5		MDL	RL	13SB12A 10/9/2003 0-1		MDL	RL	13SB12B 10/9/2003 2-3		MDL	RL	13SB12B-DUP(SBD8) 10/9/2003 2-3		MDL	RL
								Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
TAL Metals (mg/kg)																															
Aluminum	7429-90-5	--	40,041	--	--	--	1	19,800		1.83	50	10,800		1.83	50	20,900		1.83	50	6,630		1.83	50	9,910		1.83	50	8,930		1.83	50
Antimony	7440-36-0	N	--	3.13	40.9	13.2	0.48	0.27	J,B,p	0.0518	0.5	4.7		0.0518	0.5	0.62		0.0518	0.5	1.1		0.0518	0.5	1.1		0.0518	0.5	1.3		0.0518	0.5
Arsenic	7440-38-2	C	15.8	0.43	1.9	0.026	328	***2.2***		0.0232	0.4	***2.8***		0.0232	0.4	***4.7***		0.0232	0.4	***1.6***		0.0232	0.4	***1.2***		0.0232	0.4	***1.2***		0.0232	0.4
Barium	7440-39-3	N	209	1,564	20,440	6,015	440	171		0.106	5	143		0.106	5	211		0.106	5	78		0.106	5	106		0.106	5	102		0.106	5
Beryllium	7440-41-7	N	1.02	15.64	204.4	1,154	0.02	1		0.167	1	0.65	J	0.0333	1	1.2		0.167	1	<1	U	0.0391	1	<1	U	0.0391	1	<1	U	0.0391	1
Cadmium	7440-43-9	N	0.69	3.91	51.1	27.4	2.5	1.2		0.182	1	1.2		0.182	1	2.7		0.182	1	1.1		0.182	1	1.4		0.182	1	1.6		0.182	1
Calcium	7440-70-2	--	--	--	--	--	--	4,020	,J,m	16.6	250	2,120	,J,m	16.6	250	2,970	,J,m	16.6	250	12,400	,J,m	16.6	250	4,820	,J,m	16.6	250	4,640	,J,m	16.6	250
Chromium [1]	7440-47-3	N	65.3	23.46	306.6	42.05	0.0075	38	,J,m	0.912	5	29	,J,m	0.912	5	39	,J,m	0.912	5	18	,J,m	0.912	5	27	,J,m	0.912	5	26	,J,m	0.912	5
Cobalt	7440-48-4	--	72.3	--	--	--	100	13	,J,s	0.208	1	9.4	,J,s	0.208	1	16	,J,s	0.208	1	5.1	,J,s	0.208	1	6.4	,J,s	0.208	1	6.3	,J,s	0.208	1
Copper	7440-50-8	N	53.5	312.86	4,088	10,518	15	26	,J,s	0.368	2	98	,J,s	1.84	5	33	,J,s	0.368	2	45	,J,s	0.368	2	37	,J,s	0.368	2	36	,J,s	0.368	2
Iron	7439-89-6	N	50,962	2,346	30,660	--	12	32,600		42.4	200	33,800		42.4	200	48,600		42.4	200	14,800		21.2	100	15,000		21.2	100	14,700		21.2	100
Lead [2]	7439-92-1	--	26.8	400	750	--	0.01	111		0.545	25	26,500		109	5000	295		1.09	50	176		0.545	25	325		1.09	50	318		1.09	50
Magnesium	7439-95-4	--	--	--	--	--	4,400	4,650	,J,m	3.21	250	2,520	,J,m	3.21	250	3,940	,J,m	3.21	250	5,330	,J,m	3.21	250	3,270	,J,m	3.21	250	3,050	,J,m	3.21	250
Manganese	7439-96-5	N	2,543	156.43	2,044	951.9	330	***1,140***		1.32	25	942		0.264	5	***1,700***		6.6	125	301		0.264	5	280		0.264	5	291		0.264	5
Mercury [3]	7439-97-6	--	0.13	2.35	30.66	--	0.058	0.052	J	0.0077	0.1	0.045	J	0.0077	0.1	0.071	J	0.0077	0.1	0.016	J	0.0077	0.1	0.041	J	0.0077	0.1	0.035	J	0.0077	0.1
Nickel	7440-02-0	N	62.8	156.43	2,044	--	2	17		0.0356	0.5	12		0.0356	0.5	21		0.0356	0.5	8.3		0.0356	0.5	11		0.0356	0.5	9.6		0.0356	0.5
Potassium	7440-09-7	--	--	--	--	--	--	2,680		5	100	1,280		5	100	1,720		5	100	1,050		5	100	1,420		5	100	1,290		5	100
Selenium	7782-49-2	N	--	39.11	511	18.98	1.8	0.86	J	0.0502	1	0.53	J	0.0502	1	1.5		0.0502	1	0.32	J	0.0502	1	0.39	J	0.0502	1	0.41	J	0.0502	1
Silver	7440-22-4	N	--	39.11	511	31.03	0.0000098	0.1	J	0.0044	3	0.26	J	0.0044	3	0.15	J	0.0044	3	0.059	J	0.0044	3	0.027	J,B,p	0.0044	3	0.03	J,B,p	0.0044	3
Sodium	7440-23-5	--	--	--	--	--	--	51	J	18.1	100	63	J	18.1	100	64	J	18.1	100	102		18.1	100	252		18.1	100	88	J	18.1	100
Thallium	7440-28-0	N	2.11	0.55	7.2	3.6	0.001	0.42	J,B,x	0.027	0.5	0.45	J,B,x	0.027	0.5	0.68	,B,x	0.027	0.5	0.13	J,B,x	0.027	0.5	0.23	J,B,x	0.027	0.5	0.15	J,B,x	0.027	0.5
Vanadium	7440-62-2	N	108	7.82	102.2	730.1	0.5	34		0.207	1	18		0.207	1	34		0.207	1	14		0.207	1	17		0.207	1	17		0.207	1
Zinc	7440-66-6	N	202	2,346	30,660	13,622	10	294		5.17	40	502		5.17	40	1,070		12.9	100	214		2.59	20	377		5.17	40	426		5.17	40
TCL VOCs (µg/kg)																															
1,2,4-Trichlorobenzene	120-82-1	N	--	7.8E+04	1.0E+06	2.4E+03	100	<6.5	U	0.533	6.5	<5.7	U	0.451	5.7	<6.5	U	0.533	6.5	<6.4	U	0.533	6.4	<7	U	0.574	7	<7.5	U	0.615	7.5
2-Butanone	78-93-3	N	--	4.7E+06	6.1E+07	2.9E+04	--	45		6.5	26	32		5.5	23	40		6.5	26	26		6.5	26	25	J	7	28	27	J	7.5	30
Acetone	67-64-1	N	--	7.0E+06	9.2E+07	2.2E+04	--	240		6.5	26	150	,B,z	5.5	23	200	,B,z	6.5	26	49	B,B,z	6.5	26	55	B,B,z	7	28	62	B,B,z	7.5	30
Benzene	71-43-2	C	--	1.2E+04	5.2E+04	1.9E+00	100	0.91	J	0.685	6.5	1.5	J	0.58	5.7	1.5	J	0.685	6.5	<6.4	U	0.685	6.4	<7	U	0.738	7	1	J	0.791	7.5
cis-1,2-Dichloroethene	156-59-2	N	--	7.8E+04	1.0E+06	--	300	<6.5	U	0.923	6.5	1.9	J	0.781	5.7	4.2	J	0.923	6.5	<6.4	U	0.923	6.4	<7	U	0.994	7	<7.5	U	1.07	7.5
Methylene chloride	75-09-2	C	--	8.5E+04	3.8E+05	1.9E+01	300	7.3	J,B,z	3.65	26	6.1	J,B,z	3.09	23	5.8	J,B,z	3.65	26	4.7	J,B,z	3.65	26	6.9	J,B,z	3.93	28	6.1	J,B,z	4.22	30
Tetrachloroethene	127-18-4	C	--	1.2E+03	5.3E+03	4.7E+00	300	<6.5	U	0.797	6.5	<5.7	U	0.674	5.7	<6.5	U	0.797	6.5	<6.4	U	0.797	6.4	<7	U	0.858	7	<7.5	U	0.92	7.5
Toluene	108-88-3	N	--	6.3E+05	8.2E+06	2.7E+04	100	1.9	J	0.603	6.5	1.4	J	0.51	5.7	1.1	J	0.603	6.5	1.2	J	0.603	6.4	<7	U	0.65	7	<7.5	U	0.696	7.5
Trichloroethene	79-01-6	C	--	1.6E+03	7.2E+03	2.6E-01	300	***9.6***		0.88	6.5	***31***		0.745	5.7	***57***		0.88	6.5	<6.4	U	0.88	6.4	<7	U	0.948	7	<7.5	U	1.02	7.5
VOC TICs (µg/kg)																															
Ethyl Ether	60-29-7	N	--	1.6E+06	2.0E+07	8.5E+03	--	NI				NI				NI				NI				NI				NI			
Hexanal	66-25-1	--	--	--	--	--	--	NI				8.9	E,NJ,t	0	1	4.7	E,NJ,t	0	1	NI				NI				NI			
TCL SVOCs (µg/kg)																															
2-Methylnaphthalene	91-57-6	N	--	3.1E+04	4.1E+05	4.4E+03	--	5	J	3.56	220	<190	U	3.01	190	<220	U	3.56	220	<220	U	3.56	220	<240	U	3.84	240	<250	U	4.11	250
2,4-Dinitrotoluene	121-14-2	N	--	1.6E+04	2.0E+05	5.7E+02	--	35	J	4.1	220	87	J	3.47	190	<220	U	4.1	220	***710***		4.1	220	***700***		4.41	240	***1,500***		9.45	510
2,6-Dinitrotoluene	606-20-2	N	--	7.8E+03	1.0E+05	2.5E+02	--	<220	U	36	220	32	J	30.5	190	<220	U	36	220	210	J	36	220	61	J	38.8	240	56	J	41.6	250
Dinitrotoluene Mix	--	C	--	9.4E+02	4.2E+03	--	--	35				119				ND				920				761				1,556			
4-Chloro-3-Methylphenol	59-50-7	--	--	--	--	--	--	9	J	6.77	220	13	J	5.73	190	<220	U	6.77	220	19	J	6.77	220	18	J	7.29	240	23	J	7.82	250
Acenaphthene	83-32-9	N	--	4.7E+05	6.1E+06	1.0E+05	100	8	J	2.24	220	<190	U	1.89	190	<220	U	2.24	220	<220	U	2.24	220	<240	U	2.41	240	<250	U	2.58	250
Acenaphthylene [4]	208-96-8	N	--	2.3E+05	3.1E+06	--	100	2	J	1.95	220	2	J	1.65	190	<220	U	1.95	220	<220	U	1.95	220	<240	U	2.1	240	<250	U	2.25	250
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	100	15	J	6.01	220	<190	U	5.08	190	<220	U	6.01	220	<220	U	6.01	220	<240	U	6.47	240	<250	U	6.93	250
Benzo(a)anthracene	56-55-3	C	--	2.2E+02	3.9E+03	4.8E+02	100	51	J	17.3	220	<190	U	14.6	190	<220	U	17.3	220	<220	U	17.3	220	<240	U	18.6	240	<250	U	20	250
Benzo(a)pyrene	50-32-8	C	--	2.2E+01	3.9E+02	1.2E+02	100	44	J	7.42	220	7	J	6.28	190	14	J	7.42	220	<220	U	7.42	220	<240	U	7.99	240	<250	U	8.57	250
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	100	78	J	12.7	220	13	J	10.7	190	24	J	12.7	220	13	J	12.7	220	<240	U	13.7	240	<250	U	14.6	250
Benzo(g,h,i)perylene [4]	191-24-2	N	--	2.3E+05	3.1E+06	--	100	25	J	11.3	220	<190	U	9.59	190	17	J	11.3	220	<220	U	11.3	220	<240	U	12.2	240	<250	U	13.1	250
Benzo(k)fluoranthene	207-08-9	C	--	2.2E+03	3.9E+04	1.5E+04	100	28	J	17.4	220	<190	U	14.7	190	<220	U	17.4	220	<220	U	17.4	220	<240	U	18.8	240	<250	U	20.1	250
Bis(2-ethylhexyl)phthalate	117-81-7	C	--	4.6E+04	2.0E+05	2.9E+06	--	59	J	2.69	220	380		2.28	190	540		2.69	220	71	J	2.69	220	360		2.9	240	300		3.11	250
Butylbenzylphthalate	85-68-7	N	--	1.6E+06	2.0E+07	1.7E+07	--	13	J	5.82	220	24	J	4.93	190	40	J	5.82	220	<220	U	5.82	220	<240	U	6.27	240	<250	U	6.72	250
Carbazole	86-74-8	C	--	3.2E+04	1.4E+05	4.7E+02	--	<220	U	7.93	220	<190	U	6.71	190	<220	U	7.93	220	<220	U	7.93	220	<240	U	8.54	240	<250	U	9.15	250
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	100	57	J	13.3	220	<190	U	11.2	190	16	J	13.3	220	<220	U	13.3	220	<240	U	14.3	240	<250	U	15.3	250
Dibenz(a,h)anthracene	53-70-3	C	--	2.2E+01	3.9E+02	4.6E+02	100	<220	U	7.67	220	<190	U	6.49	190	<220	U	7.67	220	<220	U	7.67	220	<240	U	8.26	240	<250	U	8.85	250
Dibenzofuran	132-64-9	--	--	--	--	--	--	<220	U	4.11	220	<190	U	3.48	190	<220	U	4.11	220	<220	U	4.11	220	<240	U	4.42	240	<250	U	4.74	250
Diethylphthalate	84-66-2	N	--	6.3E+06	8.2E+07	4.5E+05	--	93	J	2.47	220	39	J	2.09	190	6	J	2.47	220	950		2.47	220	2,200		5.32	480	2,400		5.7	510
Dimethylphthalate	131-11-3	--	--	--	--	--	--	<220	U	4.3	220	550		3.64	190	<220	U	4.3	220	<220	U	4.3	220	32	J	4.63	240	<250	U	4.97	250
Di-n-butylphthalate	84-74-2	N	--	7.8E+05	1.0E+07	5.0E+06	--	360		4.97	220	600		4.2	190	320		4.97	220	680		4.97	220	1,300	,J,f	10.7	480	1,900	,J,f	11.5	510
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	100	150	J	3.06	220	12	J	2.59	190	16	J	3.06	220	25	J	3.06	220	<240	U	3.29	240	21	J	3.53	250
Fluorene	86-73-7	N	--	3.1E+05	4.1E+06	1.4E+05	100	6	J	2.18	220	<190	U	1.85	190	<220	U	2.18	220	<220	U	2.18	220	<240	U	2.35	240	<250	U	2.52	250
Indeno(1,2,3-cd)pyrene	193-39-5	C	--	2.2E+02	3.9E+03	4.2E+03	100	22	J	5.1	220	5	J	4.31	190	16	J	5.1	220	<220	U	5.1	220	<240	U	5.49	240	<250	U	5.88	250
Naphthalene	91-20-3	N	--	1.6E+05	2.0E+06	1.5E+02	100	4	J	3.58	220	<190	U	3.03	190	<220	U	3.58	220	<220	U	3.58	220	<240	U	3.85	240	<250	U	4.13	250
N-Nitrosodiphenylamine	86-30-6	C	--	1.3E+05	5.8E+05	7.6E+02	--	200	J	6.18	220	***950***		5.23	190	<220	U	6.18	220	630		6.18	220	***900***		6.65	240	700		7.13	250
Phenanthrene[4]	85-01-8	N	--	2.3E+05	3.1E+06	--	100	63	J	2.99	220	9	J	2.53	190	7	J	2.99	220	15	J	2.99	220	<240	U	3.22	240	9	J	3.45	250
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	100	110	J	1.92	220	11	J	1.63	190	14	J	1.92	220	21	J	1.92	220	<240	U	2.07	240	16	J	2.22	250
SVOC TICs (µg/kg)																															
(Z)-9-Octadecenamide	301-02-0	--	--	--	--	--	--	NI				NI				NI				120	E,NJ,t	0	100	NI				NI			
1-Heneicosanol	15594-90-8	--	--	--	--	--	--	220	E,NJ,t	0	100	NI				NI				NI				NI				NI			
1,1'-Biphenyl, (1,1-dimethylethoxy)-	72101-19-0	--	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
1,1'-Biphenyl, bis(1-methylethyl)-	69009-90-1	--	--	--	--	--	--	NI				NI				NI				NI				NI				66	E,NJ,t	0	10
1,2-Benzenedicarboxylicacid, bis(2-methy	84-69-5	--	--	--	--	--	--	360	E,NJ,t	0	100	430	E,NJ,t	0	100	NI				290	E,NJ,t	0	100	270	E,NJ,t	0	100	400	E,NJ,t	0	100
1,2-Benzenedicarboxylic acid, butyl 2-me	17851-53-5	--	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
1,2-Benzenedicarboxylic acid, butyl cycl	84-64-0	--	--	--	--	--	--	NI				NI				310	E,NJ,t	0	1	NI				NI				NI			
2-Ethyl-hexanoic Acid	149575	--	--	--	--	--	--	NI				NI				NI				NI				180	E,NJ,t	0	1,000	140	E,NJ,t	0	1,000
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	--	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
4,4,6a,6b,8a,11,11,14b-Octamethyl-1,4,4a	10001-946-24	--	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
7H-Dibenzo (a,g) carbazole	207841	--	--	--	--	--	--	NI				NI				NI				NI				280	E,NJ,t	0	100	NI			
9-Octadecenoic acid, (E)-	112-79-8	--	--	--	--	--	--	NI				NI				NI				NI				NI				NI			

Table 4-3
Detected Analytes for SWMU 13 (Soil)
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	SSL DAF 20	Draft BTAG Screening Level	13SB11A 10/9/2003 0-1		MDL	RL	13SB11B 10/9/2003 4.5-5		MDL	RL	13SB11C 10/9/2003 8-8.5		MDL	RL	13SB12A 10/9/2003 0-1		MDL	RL	13SB12B 10/9/2003 2-3		MDL	RL	13SB12B-DUP(SBD8) 10/9/2003 2-3		MDL	RL
								Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
Benzene, 2-methyl-1,3,5-trinitro-	118-96-7	--	--	--	--	--	--	280	E,NJ,t	0	10	NI				NI				350	E,NJ,t	0	10	260	E,NJ,t	0	10	160	E,NJ,t	0	10
Benzeneamine, 2-nitro-N-phenyl-	119-75-5	--	--	--	--	--	--	NI				150	E,NJ,t	0	10	NI				280	E,NJ,t	0	10	900	E,NJ,t	0	10	600	E,NJ,t	0	10
Bis(2-ethylhexyl)maleate	142-16-5	--	--	--	--	--	--	NI				120	E,NJ,t	0	100	140	E,NJ,t	0	100	NI				NI				NI			
Butyl Ester Octadecanioc	123955	--	--	--	--	--	--	130	E,NJ,t	0	10	NI				NI				NI				NI				NI			
Cholesterol	57-88-5	--	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Erucylamide	112-84-5	--	--	--	--	--	--	140	E,B,x	0	10	510	E,NJ,t	0	10	180	E,B,x	0	10	330	E,B,x	0	10	NI				440	E,B,x	0	10
Ethanol, 2-(hexadecyloxy)-	2136-71-2	--	--	--	--	--	--	390	E,NJ,t	0	10	NI				NI				NI				NI				NI			
Ether, bis(p-tert-butylphenyl)	24085-65-2	--	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
.Gamma.-sitosterol	83-47-6	--	--	--	--	--	--	500	E,NJ,t	0	10	NI				NI				NI				NI				NI			
Octacosane	630-02-4	--	--	--	--	--	--	NI				NI				NI				NI				180	E,NJ,t	0	10	NI			
Perylene	198-55-0	--	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Stigmast-4-en-3-one	1058-61-3	--	--	--	--	--	--	140	E,NJ,t	0	10	NI				NI				NI				NI				NI			
Stigmasterol, 22,23-dihydro-	10002-142-07	--	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Taraxerol	127220	--	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Tetradecanamide	638-58-4	--	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Triacetin	102761	--	--	--	--	--	--	NI				NI				NI				140	E,NJ,t	0	10	1,300	E,NJ,t	0	10	1,000	E,NJ,t	0	10
Triphenyl Phosphate	115-86-6	--	--	--	--	--	--	NI				110	E,NJ,t	0	3,300	NI				NI				NI				200	E,NJ,t	0	3,300
Urea, N,N'-dimethyl-N,N'-diphenyl-	611927	--	--	--	--	--	--	NI				NI				NI				910	E,NJ,t	0	100	NI				100	E,NJ,t	0	100
Vitamin E	10191-41-0	--	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
PAHs (µg/kg)																															
Acenaphthene	83-32-9	N	--	4.7E+05	6.1E+06	1.0E+05	100	<130	U	12.2	130	<110	U,UL,s	10.3	110	<130	U	12.2	130	<130	U	12.2	130	<140	U	13.2	140	<150	U	14.1	150
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	100	6.6	J	0.91	27	8.7	J,L,s	0.77	24	1.1	J	0.91	27	<27	U	0.91	27	<30	U	0.98	30	<31	U	1.05	31
Benzo(a)anthracene	56-55-3	C	--	2.2E+02	3.9E+03	4.8E+02	100	31		1.04	27	24	,L,s	0.88	24	4.1	J	1.04	27	3.8	J	1.04	27	1.7	J	1.12	30	6.4	J	1.2	31
Benzo(a)pyrene	50-32-8	C	--	2.2E+01	3.9E+02	1.2E+02	100	45		1.3	27	33	,L,s	1.1	24	13	J	1.3	27	6.5	J	1.3	27	<30	U	1.4	30	8	J	1.5	31
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	100	32		1.69	27	21	J,L,s	1.43	24	8.8	J	1.69	27	4.9	J	1.69	27	<30	U	1.82	30	6.7	J	1.95	31
Benzo(g,h,i)perylene[4]	191-24-2	N	--	2.3E+05	3.1E+06	--	100	82		16.3	27	77	,L,s	13.8	24	46		16.3	27	<27	U	16.3	27	<30	U	17.5	30	21	J	18.8	31
Benzo(k)fluoranthene	207-08-9	C	--	2.2E+03	3.9E+04	1.5E+04	100	20	J	1.3	27	15	J,L,s	1.1	24	4.5	J	1.3	27	<27	U	1.3	27	<30	U	1.4	30	<31	U	1.5	31
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	100	37		1.56	27	40	,L,s	1.32	24	7.6	J	1.56	27	2.4	J	1.56	27	<30	U	1.68	30	6.7	J	1.8	31
Dibenz(a,h)anthracene	53-70-3	C	--	2.2E+01	3.9E+02	4.6E+02	100	<27	U	1.82	27	<24	U,UL,s	1.54	24	<27	U	1.82	27	<27	U	1.82	27	<30	U	1.96	30	<31	U	2.1	31
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	100	73		2.21	27	<24	U,UL,s	1.87	24	6.5	J	2.21	27	9.2	J	2.21	27	7.4	J	2.38	30	16	J	2.55	31
Fluorene	86-73-7	N	--	3.1E+05	4.1E+06	1.4E+05	100	<27	U	1.69	27	12	J,L,s	1.43	24	<27	U	1.69	27	<27	U	1.69	27	<30	U	1.82	30	<31	U	1.95	31
Indeno(1,2,3-cd)pyrene	193-39-5	C	--	2.2E+02	3.9E+03	4.2E+03	100	37		0.91	27	21	J,L,s	0.77	24	16	J	0.91	27	5.9	J	0.91	27	<30	U	0.98	30	6.8	J	1.05	31
Phenanthrene[4]	85-01-8	N	--	2.3E+05	3.1E+06	--	100	26	J	0.78	27	110	,L,s	0.66	24	3.4	J	0.78	27	2.5	J	0.78	27	2.2	J	0.84	30	2.7	J	0.9	31
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	100	59		1.17	27	79	,L,s	0.99	24	5.6	J	1.17	27	6.4	J	1.17	27	3.9	J	1.26	30	10	J	1.35	31
Explosives (mg/kg)																															
1,3-Dinitrobenzene	99-65-0	N	--	7.8E-01	1.0E+01	3.7E-02	--	<0.5	U	0.159	0.5	<0.5	U	0.159	0.5	<0.5	U	0.159	0.5	<0.5	U	0.159	0.5	<0.5	U	0.159	0.5	0.32	J	0.159	0.5
2,4-Dinitrotoluene	121-14-2	N	--	1.6E+01	2.0E+02	5.7E-01	--	<0.5	U	0.142	0.5	<0.5	U	0.142	0.5	<0.5	U	0.142	0.5	0.39	J	0.142	0.5	0.19	J	0.142	0.5	<0.5	U	0.142	0.5
Dinitrotoluene Mix	--	C	--	9.4E-01	4.2E+00	--	--	ND				ND				ND				0.39				0.19				ND			
2,4,6-Trinitrotoluene	118-96-7	C	--	3.9E+00	5.1E+01	--	--	0.43	J	0.167	0.5	<0.5	U	0.167	0.5	<0.5	U	0.167	0.5	0.27	J	0.167	0.5	0.55		0.167	0.5	0.56		0.167	0.5
RDX (Hexahydro-1,3,5-trinitro-1,3,5-tria	121-82-4	C	--	5.8E+00	2.6E+01	--	--	<0.5	U,UJ,c	0.131	0.5	<0.5	U,UJ,c	0.131	0.5	<0.5	U,UJ,c	0.131	0.5	<0.5	U,UJ,c	0.131	0.5	0.29	J,J,c	0.131	0.5	<0.5	U,UJ,c	0.131	0.5
Nitroglycerin/PETN (mg/kg)																															
Nitroglycerin	55-63-0	N	--	1.3E+02	1.7E+03	--	--	2.11	,J,g	0.223	0.688	2.55	,J,g	0.212	0.654	<0.695	U	0.225	0.695	8.48		0.216	0.666	4.05		0.256	0.79	67.4		0.462	1.43
Cyanide (mg/kg)																															
Cyanide	57-12-5	N	--	1.6E+02	2.0E+03	1.5E+02	0.005	0.22	J	0.0356	0.5	0.35	J	0.0356	0.5	0.25	J	0.0356	0.5	0.18	J	0.0356	0.5	0.39	J	0.0356	0.5	0.23	J	0.0356	0.5
Dioxins/Furans (pg/g)																															
1,2,3,7,8-PeCDD	40321-76-4	--	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1,2,3,4,7,8-HxCDD	39227-28-6	--	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1,2,3,6,7,8-HxCDD	57653-85-7	--	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1,2,3,7,8,9-HxCDD	19408-74-3	C	--	1.0E-01	4.6E-01	--	--	NT				NT				NT				NT				NT				NT			
1,2,3,4,6,7,8-HpCDD	35822-46-9	--	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
OCDD	3268-87-9	--	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
2,3,7,8-TCDF	51207-31-9	--	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1,2,3,7,8-PeCDF	57117-41-6	--	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
2,3,4,7,8-PeCDF	57117-31-4	--	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1,2,3,4,7,8-HxCDF	70648-26-9	--	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1,2,3,6,7,8-HxCDF	57117-44-9	--	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
2,3,4,6,7,8-HxCDF	60851-34-5	--	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1,2,3,4,6,7,8-HpCDF	67562-39-4	--	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1,2,3,4,7,8,9-HpCDF	55673-89-7	--	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
OCDF	39001-02-0	--	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Total TCDDs	41903-57-5	--	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Total PeCDDs	36088-22-9	--	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Total HxCDDs	34465-46-8	--	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Total HpCDDs	37871-00-4	--	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Total TCDFs	55722-27-5	--	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Total PeCDFs	30402-15-4	--	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Total HxCDFs	55684-94-1	--	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Total HpCDFs	38998-75-3	--	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Percent Solids (%)																															
Percent Solids		--	--	--	--	--	--	77		0.1	0.1	88		0.1	0.1	77		0.1	0.1	78		0.1	0.1	71		0.1	0.1	67		0.1	0.1

Table 4-3
Detected Analytes for SWMU 13 (Soil)
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	SSL DAF 20	Draft BTAG Screening Level	13SB12C 10/9/2003 3.5-4 Result	LQ, VQ, r	MDL	RL
TAL Metals (mg/kg)											
Aluminum	7429-90-5	--	40,041	--	--	--	1	15,000		1.83	50
Antimony	7440-36-0	N	--	3.13	40.9	13.2	0.48	1.5		0.0518	0.5
Arsenic	7440-38-2	C	15.8	0.43	1.9	0.026	328	***2.2***		0.0232	0.4
Barium	7440-39-3	N	209	1,564	20,440	6,015	440	161		0.106	5
Beryllium	7440-41-7	N	1.02	15.64	204.4	1,154	0.02	<1	U	0.0391	1
Cadmium	7440-43-9	N	0.69	3.91	51.1	27.4	2.5	2.3		0.182	1
Calcium	7440-70-2	--	--	--	--	--	--	3,840	,J,m	16.6	250
Chromium [1]	7440-47-3	N	65.3	23.46	306.6	42.05	0.0075	34	,J,m	0.912	5
Cobalt	7440-48-4	--	72.3	--	--	--	100	9.9	,J,s	0.208	1
Copper	7440-50-8	N	53.5	312.86	4,088	10,518	15	94	,J,s	0.368	2
Iron	7439-89-6	N	50,962	2,346	30,660	--	12	18,700		21.2	100
Lead [2]	7439-92-1	--	26.8	400	750	--	0.01	1,140		4.36	200
Magnesium	7439-95-4	--	--	--	--	--	4,400	3,980	,J,m	3.21	250
Manganese	7439-96-5	N	2,543	156.43	2,044	951.9	330	272		0.264	5
Mercury [3]	7439-97-6	--	0.13	2.35	30.66	--	0.058	0.13		0.0077	0.1
Nickel	7440-02-0	N	62.8	156.43	2,044	--	2	17		0.0356	0.5
Potassium	7440-09-7	--	--	--	--	--	--	2,150		5	100
Selenium	7782-49-2	N	--	39.11	511	18.98	1.8	0.67	J	0.0502	1
Silver	7440-22-4	N	--	39.11	511	31.03	0.0000098	0.063	J	0.0044	3
Sodium	7440-23-5	--	--	--	--	--	--	95	J	18.1	100
Thallium	7440-28-0	N	2.11	0.55	7.2	3.6	0.001	0.29	J,B,x	0.027	0.5
Vanadium	7440-62-2	N	108	7.82	102.2	730.1	0.5	26		0.207	1
Zinc	7440-66-6	N	202	2,346	30,660	13,622	10	476		5.17	40
TCL VOCs (µg/kg)											
1,2,4-Trichlorobenzene	120-82-1	N	--	7.8E+04	1.0E+06	2.4E+03	100	<8.1	U,UJ,i	0.656	8.1
2-Butanone	78-93-3	N	--	4.7E+06	6.1E+07	2.9E+04	--	<32	U	8	32
Acetone	67-64-1	N	--	7.0E+06	9.2E+07	2.2E+04	--	63	B,B,z	8	32
Benzene	71-43-2	C	--	1.2E+04	5.2E+04	1.9E+00	100	<8.1	U	0.843	8.1
cis-1,2-Dichloroethene	156-59-2	N	--	7.8E+04	1.0E+06	--	300	<8.1	U	1.14	8.1
Methylene chloride	75-09-2	C	--	8.5E+04	3.8E+05	1.9E+01	300	<32	U	4.5	32
Tetrachloroethene	127-18-4	C	--	1.2E+03	5.3E+03	4.7E+00	300	<8.1	U	0.981	8.1
Toluene	108-88-3	N	--	6.3E+05	8.2E+06	2.7E+04	100	<8.1	U	0.742	8.1
Trichloroethene	79-01-6	C	--	1.6E+03	7.2E+03	2.6E-01	300	<8.1	U	1.08	8.1
VOC TICs (µg/kg)											
Ethyl Ether	60-29-7	N	--	1.6E+06	2.0E+07	8.5E+03	--	28	Q,NJ,t	0	100
Hexanal	66-25-1	--	--	--	--	--	--	NI			
TCL SVOCs (µg/kg)											
2-Methylnaphthalene	91-57-6	N	--	3.1E+04	4.1E+05	4.4E+03	--	<270	U	4.38	270
2,4-Dinitrotoluene	121-14-2	N	--	1.6E+04	2.0E+05	5.7E+02	--	65	J	5.04	270
2,6-Dinitrotoluene	606-20-2	N	--	7.8E+03	1.0E+05	2.5E+02	--	<270	U	44.3	270
Dinitrotoluene Mix	--	C	--	9.4E+02	4.2E+03	--	--	65			
4-Chloro-3-Methylphenol	59-50-7	--	--	--	--	--	--	24	J	8.34	270
Acenaphthene	83-32-9	N	--	4.7E+05	6.1E+06	1.0E+05	100	3	J	2.75	270
Acenaphthylene [4]	208-96-8	N	--	2.3E+05	3.1E+06	--	100	<270	U	2.4	270
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	100	<270	J	7.39	270
Benzo(a)anthracene	56-55-3	C	--	2.2E+02	3.9E+03	4.8E+02	100	25	J	21.3	270
Benzo(a)pyrene	50-32-8	C	--	2.2E+01	3.9E+02	1.2E+02	100	21	J	9.14	270
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	100	40	J	15.6	270
Benzo(g,h,i)perylene [4]	191-24-2	N	--	2.3E+05	3.1E+06	--	100	<270	U	14	270
Benzo(k)fluoranthene	207-08-9	C	--	2.2E+03	3.9E+04	1.5E+04	100	22	J	21.4	270
Bis(2-ethylhexyl)phthalate	117-81-7	C	--	4.6E+04	2.0E+05	2.9E+06	--	1,000		3.31	270
Butylbenzylphthalate	85-68-7	N	--	1.6E+06	2.0E+07	1.7E+07	--	<270	U	7.17	270
Carbazole	86-74-8	C	--	3.2E+04	1.4E+05	4.7E+02	--	<270	U	9.76	270
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	100	24	J	16.3	270
Dibenz(a,h)anthracene	53-70-3	C	--	2.2E+01	3.9E+02	4.6E+02	100	<270	U	9.44	270
Dibenzofuran	132-64-9	--	--	--	--	--	--	<270	U	5.06	270
Diethylphthalate	84-66-2	N	--	6.3E+06	8.2E+07	4.5E+05	--	940		3.04	270
Dimethylphthalate	131-11-3	--	--	--	--	--	--	<270	U	5.3	270
Di-n-butylphthalate	84-74-2	N	--	7.8E+05	1.0E+07	5.0E+06	--	650		6.11	270
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	100	59	J	3.76	270
Fluorene	86-73-7	N	--	3.1E+05	4.1E+06	1.4E+05	100	4	J	2.69	270
Indeno(1,2,3-cd)pyrene	193-39-5	C	--	2.2E+02	3.9E+03	4.2E+03	100	10	J	6.27	270
Naphthalene	91-20-3	N	--	1.6E+05	2.0E+06	1.5E+02	100	15	J	4.4	270
N-Nitrosodiphenylamine	86-30-6	C	--	1.3E+05	5.8E+05	7.6E+02	--	480		7.6	270
Phenanthrene[4]	85-01-8	N	--	2.3E+05	3.1E+06	--	100	52	J	3.68	270
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	100	54	J	2.37	270
SVOC TICs (µg/kg)											
(Z)-9-Octadecenamide	301-02-0	--	--	--	--	--	--	NI			
1-Heneicosanol	15594-90-8	--	--	--	--	--	--	NI			
1,1'-Biphenyl, (1,1-dimethylethoxy)-	72101-19-0	--	--	--	--	--	--	360	E,NJ,t	0	1,000
1,1'-Biphenyl, bis(1-methylethyl)-	69009-90-1	--	--	--	--	--	--	NI			
1,2-Benzenedicarboxylicacid, bis(2-methy	84-69-5	--	--	--	--	--	--	460	E,NJ,t	0	100
1,2-Benzenedicarboxylic acid, butyl 2-me	17851-53-5	--	--	--	--	--	--	NI			
1,2-Benzenedicarboxylic acid, butyl cycl	84-64-0	--	--	--	--	--	--	NI			
2-Ethyl-hexanoic Acid	149575	--	--	--	--	--	--	NI			
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	--	--	--	--	--	--	NI			
4,4,6a,6b,8a,11,11,14b-Octamethyl-1,4,4a	10001-946-24	--	--	--	--	--	--	NI			
7H-Dibenzo (a,g) carbazole	207841	--	--	--	--	--	--	NI			
9-Octadecenoic acid, (E)-	112-79-8	--	--	--	--	--	--	NI			

Table 4-3
Detected Analytes for SWMU 13 (Soil)
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	SSL DAF 20	Draft BTAG Screening Level	13SB12C 10/9/2003 3.5-4 Result	LQ, VQ, r	MDL	RL
Benzene, 2-methyl-1,3,5-trinitro-	118-96-7	--	--	--	--	--	--	NI			
Benzeneamine, 2-nitro-N-phenyl-	119-75-5	--	--	--	--	--	--	250	E,NJ,t	0	10
Bis(2-ethylhexyl)maleate	142-16-5	--	--	--	--	--	--	NI			
Butyl Ester Octadecanioc	123955	--	--	--	--	--	--	NI			
Cholesterol	57-88-5	--	--	--	--	--	--	NI			
Erucylamide	112-84-5	--	--	--	--	--	--	NI			
Ethanol, 2-(hexadecyloxy)-	2136-71-2	--	--	--	--	--	--	NI			
Ether, bis(p-tert-butylphenyl)	24085-65-2	--	--	--	--	--	--	830	E,NJ,t	0	100
.Gamma.-sitosterol	83-47-6	--	--	--	--	--	--	NI			
Octacosane	630-02-4	--	--	--	--	--	--	NI			
Perylene	198-55-0	--	--	--	--	--	--	NI			
Stigmast-4-en-3-one	1058-61-3	--	--	--	--	--	--	NI			
Stigmasterol, 22,23-dihydro-	10002-142-07	--	--	--	--	--	--	NI			
Taraxerol	127220	--	--	--	--	--	--	NI			
Tetradecanamide	638-58-4	--	--	--	--	--	--	NI			
Triacetin	102761	--	--	--	--	--	--	240	E,NJ,t	0	10
Triphenyl Phosphate	115-86-6	--	--	--	--	--	--	NI			
Urea, N,N'-dimethyl-N,N'-diphenyl-	611927	--	--	--	--	--	--	NI			
Vitamin E	10191-41-0	--	--	--	--	--	--	NI			
PAHs (µg/kg)											
Acenaphthene	83-32-9	N	--	4.7E+05	6.1E+06	1.0E+05	100	<160	U	15	160
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	100	11	J	1.12	34
Benzo(a)anthracene	56-55-3	C	--	2.2E+02	3.9E+03	4.8E+02	100	32	J	1.28	34
Benzo(a)pyrene	50-32-8	C	--	2.2E+01	3.9E+02	1.2E+02	100	<34	U	1.6	34
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	100	<34	U	2.08	34
Benzo(g,h,i)perylene[4]	191-24-2	N	--	2.3E+05	3.1E+06	--	100	37		20	34
Benzo(k)fluoranthene	207-08-9	C	--	2.2E+03	3.9E+04	1.5E+04	100	<34	U	1.6	34
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	100	<34	U	1.92	34
Dibenz(a,h)anthracene	53-70-3	C	--	2.2E+01	3.9E+02	4.6E+02	100	<34	U	2.24	34
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	100	130		2.72	34
Fluorene	86-73-7	N	--	3.1E+05	4.1E+06	1.4E+05	100	<34	U	2.08	34
Indeno(1,2,3-cd)pyrene	193-39-5	C	--	2.2E+02	3.9E+03	4.2E+03	100	17	J	1.12	34
Phenanthrene[4]	85-01-8	N	--	2.3E+05	3.1E+06	--	100	80		0.96	34
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	100	99		1.44	34
Explosives (mg/kg)											
1,3-Dinitrobenzene	99-65-0	N	--	7.8E-01	1.0E+01	3.7E-02	--	<0.5	U	0.159	0.5
2,4-Dinitrotoluene	121-14-2	N	--	1.6E+01	2.0E+02	5.7E-01	--	<0.5	U	0.142	0.5
Dinitrotoluene Mix	--	C	--	9.4E-01	4.2E+00	--	--	ND			
2,4,6-Trinitrotoluene	118-96-7	C	--	3.9E+00	5.1E+01	--	--	0.54		0.167	0.5
RDX (Hexahydro-1,3,5-trinitro-1,3,5-tria	121-82-4	C	--	5.8E+00	2.6E+01	--	--	<0.5	U,UJ,c	0.131	0.5
Nitroglycerin/PETN (mg/kg)											
Nitroglycerin	55-63-0	N	--	1.3E+02	1.7E+03	--	--	2.54		0.265	0.818
Cyanide (mg/kg)											
Cyanide	57-12-5	N	--	1.6E+02	2.0E+03	1.5E+02	0.005	0.11	J	0.0356	0.5
Dioxins/Furans (pg/g)											
1,2,3,7,8-PeCDD	40321-76-4	--	--	--	--	--	--	NT			
1,2,3,4,7,8-HxCDD	39227-28-6	--	--	--	--	--	--	NT			
1,2,3,6,7,8-HxCDD	57653-85-7	--	--	--	--	--	--	NT			
1,2,3,7,8,9-HxCDD	19408-74-3	C	--	1.0E-01	4.6E-01	--	--	NT			
1,2,3,4,6,7,8-HpCDD	35822-46-9	--	--	--	--	--	--	NT			
OCDD	3268-87-9	--	--	--	--	--	--	NT			
2,3,7,8-TCDF	51207-31-9	--	--	--	--	--	--	NT			
1,2,3,7,8-PeCDF	57117-41-6	--	--	--	--	--	--	NT			
2,3,4,7,8-PeCDF	57117-31-4	--	--	--	--	--	--	NT			
1,2,3,4,7,8-HxCDF	70648-26-9	--	--	--	--	--	--	NT			
1,2,3,6,7,8-HxCDF	57117-44-9	--	--	--	--	--	--	NT			
2,3,4,6,7,8-HxCDF	60851-34-5	--	--	--	--	--	--	NT			
1,2,3,4,6,7,8-HpCDF	67562-39-4	--	--	--	--	--	--	NT			
1,2,3,4,7,8,9-HpCDF	55673-89-7	--	--	--	--	--	--	NT			
OCDF	39001-02-0	--	--	--	--	--	--	NT			
Total TCDDs	41903-57-5	--	--	--	--	--	--	NT			
Total PeCDDs	36088-22-9	--	--	--	--	--	--	NT			
Total HxCDDs	34465-46-8	--	--	--	--	--	--	NT			
Total HpCDDs	37871-00-4	--	--	--	--	--	--	NT			
Total TCDFs	55722-27-5	--	--	--	--	--	--	NT			
Total PeCDFs	30402-15-4	--	--	--	--	--	--	NT			
Total HxCDFs	55684-94-1	--	--	--	--	--	--	NT			
Total HpCDFs	38998-75-3	--	--	--	--	--	--	NT			
Percent Solids (%)											
Percent Solids		--	--	--	--	--	--	62		0.1	0.1

Notes:

CAS = Chemical Abstracts Service
ft bgs = Feet Below Ground Surface
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
pg/g = Picogram Per Gram
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon
TIC = Tentatively Identified Compound
NA = Not Applicable
MDL = Method Detection Limit
RL = Reporting Limit
NT = Not Tested
NI = Not Identified
LQ = Laboratory Qualifier
VQ = Validation Qualifier
r = Reason Code
(1) = Chromium VI RBC value was used
(2) = Lead criteria are Action Levels; see USEPA Region III guidance
(3) = Mercuric chloride soil RBC value used
(4) = RBC value for pyrene was used for these compounds

[A] = Facility-Wide Background Point Estimate as Reported in the Facility-Wide Background Study Report (IT 2001a)
RBC = USEPA Region III Risk-Based Concentration (RBC) values from the October 31, 2006, RBC Table and October 10, 2006, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
C = Carcinogenic per EPA RBC Table (October 2006)
N = Noncarcinogenic per EPA RBC Table (October 2006)
SSL DAF20 = Soil Screening Levels at a Dilution Attenuation Factor of 20
BTAG = Biological Technical Assistance Group Screening Level, Draft 1995

= Concentration Exceeds Adjusted Soil Residential RBC
= Concentration Exceeds Adjusted Soil Industrial RBC
underline = Concentration Exceeds Site Background Values
bold italic = Concentration Exceeds SSL DAF20
= Concentration Exceeds BTAG Screening Level

Laboratory Qualifiers

U	The compound was analyzed for but not detected.
J	Estimated value.
B	Analyte found in associated blank as well as in the sample.
E	Concentration exceeded the upper level of the calibration range of the instrument for that specific analysis. For TICs, compound not present in calibration standard, calculated using total peak areas ion chromatographs and response factor of 1.
Q	Not estimated. TIC detected in sample, quantified using a response factor from the initial calibration.

Validation Qualifiers

B	Not detected substantially above the level reported in laboratory or field blanks.
N	Tentative Identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.
J	Analyte present. Reported value may not be accurate or precise.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.

Reason Codes

GC/MS Organics

c	Calibration failure; poor (RRF) or unstable (%D) response
d	MS/MSD or LCS/LCSD RPD imprecision
f	Field duplicate imprecision
i	Tuning Failure or poor mass spectrometer performance
l	MS/MSD recovery failure
m	Internal standard failure
s	Surrogate failure
t	Tentatively identified Compound
x	Field and/or equipment blank contamination
z	Method blank and/or storage blank contamination

Inorganics and Conventionals

c	Calibration failure
m	MS/MSD recovery failure
p	Preparation blank contamination
s	Serial dilution failure
x	CRDL standard recovery failure

GC and HPLC Organics

c	Calibration failure; poor or unstable (%D) response
d	MS/MSD or LCS/LCSD RPD imprecision
f	Field duplicate imprecision
g	Dual column confirmation imprecision
i	LCS recovery failure
l	MS/MSD recovery failure
p	Concentration exceeded the linear range
s	No confirmation column
x	Trip blank contamination
z	Method blank and/or storage blank contamination

Table 4-4
Detected Analytes for SWMU 13 (Sediment)
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	SSL DAF 20	Draft BTAG Screening Level	13SD2 10/10/2003		MDL	RL	13SD3 10/10/2003		MDL	RL	13SD3-DUP(SDD1) 10/10/2003		MDL	RL
								Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
TAL Metals (mg/kg)																			
Aluminum	7429-90-5	--	40,041	--	--	--	--	9,870		1.83	50	23,400		5.1	500	19,600		1.83	50
Antimony	7440-36-0	N	--	3.13	40.9	13.2	2	0.18	J	0.0518	0.5	3.5		0.0518	0.5	1.9		0.0518	0.5
Arsenic	7440-38-2	C	15.8	0.43	1.91	0.026	9.8	***3.3***		0.0232	0.4	***3.4***		0.0232	0.4	3.7		0.0232	0.4
Barium	7440-39-3	N	209	1,564	20,440	6,015	--	101		0.106	5	169		0.106	5	131		0.106	5
Beryllium	7440-41-7	N	1.02	15.64	204.4	1,154	--	0.83	J	0.167	1	1.3		0.167	1	1.3		0.167	1
Cadmium	7440-43-9	N	0.69	3.91	51.1	27.4	0.99	0.57	J	0.182	1	1		0.182	1	0.94	J	0.182	1
Calcium	7440-70-2	--	--	--	--	--	--	1,270	,K,m	16.6	250	2,080	,K,m	16.6	250	1,620	,K,m	16.6	250
Chromium [1]	7440-47-3	N	65.3	23.46	306.6	42.05	43.4	27		0.912	5	40		0.912	5	31		0.912	5
Cobalt	7440-48-4	--	72.3	--	--	--	50	9.9		0.208	1	13		0.208	1	12		0.208	1
Copper	7440-50-8	N	53.5	312.86	4,088	10,518	31.6	14		0.368	2	36		0.368	2	31		0.368	2
Iron	7439-89-6	N	50,962	2,346	30,660	--	20,000	34,600		71.6	1,000	37,100		71.6	1,000	32,000		71.6	1,000
Lead [2]	7439-92-1	--	26.8	400	750	--	35.8	132		0.545	25	247		1.09	50	271		1.09	50
Magnesium	7439-95-4	--	--	--	--	--	--	2,130	,K,m	3.21	250	3,870	,K,m	3.21	250	3,030	,K,m	3.21	250
Manganese	7439-96-5	N	2,543	156.43	2,044	951.9	460	720		0.264	5	544		0.264	5	644		0.264	5
Mercury [3]	7439-97-6	--	0.13	2.35	30.66	--	0.18	0.033	J	0.0077	0.1	0.13		0.0077	0.1	0.11		0.0077	0.1
Nickel	7440-02-0	N	62.8	156.43	2,044	--	23	12		0.0356	0.5	19		0.0356	0.5	18		0.0356	0.5
Potassium	7440-09-7	--	--	--	--	--	--	1,020		5	100	1,950		5	100	1,520		5	100
Selenium	7782-49-2	N	--	39.11	511	18.98	2	0.85	J	0.0502	1	1.2		0.0502	1	1.2		0.0502	1
Silver	7440-22-4	N	--	39.11	511	31.03	1	0.12	J	0.0044	3	0.12	J	0.0044	3	0.14	J	0.0044	3
Sodium	7440-23-5	--	--	--	--	--	--	53	J	8.92	100	52	J	8.92	100	38	J	8.92	100
Thallium	7440-28-0	N	2.11	0.55	7.2	3.6	--	0.46	J	0.027	0.5	0.52		0.027	0.5	0.49	J	0.027	0.5
Vanadium	7440-62-2	N	108	7.82	102.2	730.1	--	19		0.207	1	44		0.207	1	32		0.207	1
Zinc	7440-66-6	N	202	2,346	30,660	13,622	121	442		3.35	40	541		3.35	40	541		3.35	40
TCL VOCs (µg/kg)																			
2-Butanone	78-93-3	N	--	4.7E+06	6.1E+07	2.9E+04	--	42		7.5	31	31		7.5	29	30	J	8	32
Acetone	67-64-1	N	--	7.0E+06	9.2E+07	2.2E+04	--	180	,J,m	7.5	31	80	,B,z	7.5	29	59	,B,z	8	32
cis-1,2-Dichloroethene	156-59-2	N	--	7.8E+04	1.0E+06	--	--	<7.7	U,UJ,m	1.07	7.7	11		1.07	7.4	8		1.14	7.9
Methylene chloride	75-09-2	C	--	8.5E+04	3.8E+05	1.9E+01	--	<31	U,UJ,m	4.22	31	<29	U	4.22	29	6.6	J	4.5	32
Tetrachloroethene	127-18-4	C	--	1.2E+03	5.3E+03	4.7E+00	468	<7.7	U,UJ,m	0.92	7.7	***5***	J	0.92	7.4	2.1	J	0.981	7.9
Toluene	108-88-3	N	--	6.3E+05	8.2E+06	2.7E+04	--	1.1	J,J,m	0.696	7.7	1.8	J	0.696	7.4	1	J	0.742	7.9
Trichloroethene	79-01-6	C	--	1.6E+03	7.2E+03	2.6E-01	96.9	<7.7	U,UJ,m	1.02	7.7	***64***		1.02	7.4	***38***		1.08	7.9
TCL SVOCs (µg/kg)																			
2-Methylnaphthalene	91-57-6	N	--	3.1E+04	4.1E+05	4.4E+03	20.2	12	J	4.11	260	7	J	4.11	250	<270	U	4.38	270
Acenaphthene	83-32-9	N	--	4.7E+05	6.1E+06	1.0E+05	6.7	5	J	2.58	260	<250	U	2.58	250	<270	U	2.75	270
Acenaphthylene [4]	208-96-8	N	--	2.3E+05	3.1E+06	--	5.9	<260	U	2.25	260	9	J	2.25	250	3	J	2.4	270
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	57.2	<260	U,UJ,m	6.93	260	44	J	6.93	250	12	J	7.39	270
Benzo(a)anthracene	56-55-3	C	--	2.2E+02	3.9E+03	4.8E+02	108	33	J	20	260	86	J	20	250	30	J	21.3	270
Benzo(a)pyrene	50-32-8	C	--	2.2E+01	3.9E+02	1.2E+02	150	42	J	8.57	260	140	J	8.57	250	53	J	9.14	270
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	--	64	J	14.6	260	190	J	14.6	250	86	J	15.6	270
Benzo(g,h,i)perylene [4]	191-24-2	N	--	2.3E+05	3.1E+06	--	170	35	J	13.1	260	110	J	13.1	250	27	J	14	270
Benzo(k)fluoranthene	207-08-9	C	--	2.2E+03	3.9E+04	1.5E+04	240	27	J	20.1	260	92	J	20.1	250	36	U	21.4	270
Bis(2-ethylhexyl)phthalate	117-81-7	C	--	4.6E+04	2.0E+05	2.9E+06	180	28	J,J,m	3.11	260	41	J	3.11	250	35	J	3.31	270
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	166	37	J	15.3	260	220	J	15.3	250	64	J	16.3	270
Dibenz(a,h)anthracene	53-70-3	C	--	2.2E+01	3.9E+02	4.6E+02	33	15	J	8.85	260	42	J	8.85	250	<270	U	9.44	270
Diethylphthalate	84-66-2	N	--	6.3E+06	8.2E+07	4.5E+05	603	14	J,J,d	2.85	260	18	J	2.85	250	22	J	3.04	270
Dimethylphthalate	131-11-3	--	--	--	--	--	--	<260	U	4.97	260	1,400	,J,f	4.97	250	<270	U,UJ,f	5.3	270
Di-n-butylphthalate	84-74-2	N	--	7.8E+05	1.0E+07	5.0E+06	6,470	69	J	5.73	260	130	J	5.73	250	110	J	6.11	270
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	423	56	J,J,m	3.53	260	34	J	3.53	250	26	J	3.76	270
Fluorene	86-73-7	N	--	3.1E+05	4.1E+06	1.4E+05	77.4	5	J	2.52	260	4	J	2.52	250	<270	U	2.69	270
Indeno(1,2,3-cd)pyrene	193-39-5	C	--	2.2E+02	3.9E+03	4.2E+03	17	31	J	5.88	260	100	J	5.88	250	30	J	6.27	270
Naphthalene	91-20-3	N	--	1.6E+05	2.0E+06	1.5E+02	176	<260	U	4.13	260	5	J	4.13	250	<270	U	4.4	270
Phenanthrene [4]	85-01-8	N	--	2.3E+05	3.1E+06	--	204	34	J	3.45	260	29	J	3.45	250	14	J	3.68	270
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	195	51	J	2.22	260	37	J	2.22	250	23	J	2.37	270
SVOC TICs (µg/kg)																			
(Z)-9-Octadecenamide	301-02-0	--	--	--	--	--	--	66	E,NJ,t	0	100	NI				NI			
1,2-Benzenedicarboxylicacid, bis(2-methy	84-69-5	--	--	--	--	--	--	NI				300	E,NJ,t	0	100	170	E,NJ,t	0	100
1,2-Benzenedicarboxylic acid, butyl 2-me	17851-53-5	--	--	--	--	--	--	91	E,NJ,t	0	10	NI				NI			
Benzeneamine, 2-nitro-N-phenyl-	119-75-5	--	--	--	--	--	--	NI				350	E,NJ,t	0	10	60	E,NJ,t	0	10
Erucylamide	112-84-5	--	--	--	--	--	--	NI				400	E,NJ,t	0	10	NI			
Perylene	198-55-0	--	--	--	--	--	--	NI				170	E,NJ,t	0	100	57	E,NJ,t	0	100

Table 4-4
Detected Analytes for SWMU 13 (Sediment)
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	SSL DAF 20	Draft BTAG Screening Level	13SD2 10/10/2003		MDL	RL	13SD3 10/10/2003		MDL	RL	13SD3-DUP(SDD1) 10/10/2003		MDL	RL
								Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
PAHs (µg/kg)																			
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	57	3.8	J	1.05	32	9.4	J	1.05	31	<33	U	1.12	33
Benzo(a)anthracene	56-55-3	C	--	2.2E+02	3.9E+03	4.8E+02	108	21	J	1.2	32	30	J	1.2	31	<33	U	1.28	33
Benzo(a)pyrene	50-32-8	C	--	2.2E+01	3.9E+02	1.2E+02	150	26	J	1.5	32	49		1.5	31	<33	U	1.6	33
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	--	23	J	1.95	32	36		1.95	31	<33	U	2.08	33
Benzo(g,h,i)perylene[(4)]	191-24-2	N	--	2.3E+05	3.1E+06	--	170	40		18.8	32	88		18.8	31	<33	U	20	33
Benzo(k)fluoranthene	207-08-9	C	--	2.2E+03	3.9E+04	1.5E+04	240	12	J	1.5	32	24	J	1.5	31	<33	U	1.6	33
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	166	19	J	1.8	32	84		1.8	31	2.6	J	1.92	33
Dibenz(a,h)anthracene	53-70-3	C	--	2.2E+01	3.9E+02	4.6E+02	33	<32	U	2.1	32	6.2	J	2.1	31	<33	U	2.24	33
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	423	48		2.55	32	19	J	2.55	31	<33	U	2.72	33
Indeno(1,2,3-cd)pyrene	193-39-5	C	--	2.2E+02	3.9E+03	4.2E+03	17	18	J	1.05	32	45		1.05	31	<33	U	1.12	33
Phenanthrene[(4)]	85-01-8	N	--	2.3E+05	3.1E+06	--	204	16	J	0.9	32	5.2	J	0.9	31	<33	U	0.96	33
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	195	45		1.35	32	14	J	1.35	31	<33	U	1.44	33
Cyanide (mg/kg)																			
Cyanide	57-12-5	N	--	1.6E+02	2.0E+03	1.5E+02	0.1	0.07	J	0.0356	0.5	0.2	J	0.0356	0.5	0.39	J	0.0356	0.5
Percent Solids (%)																			
Percent Solids	--	--	--	--	--	--	--	65		0.1	0.1	68		0.1	0.1	63		0.1	0.1

Notes:

CAS = Chemical Abstracts Service
ft bgs = Feet Below Ground Surface
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon
TIC = Tentatively Identified Compound
C = Carcinogenic per EPA RBC Table (April 2004)
N = Noncarcinogenic per EPA RBC Table (April 2004)
NA = Not Applicable
MDL = Method Detection Limit
RL = Reporting Limit
NI = Not Identified
LQ = Laboratory Qualifier
VQ = Validation Qualifier
r = Reason Code
(1) = Chromium VI RBC value was used
(2) = Lead criteria are Action Levels; see USEPA Region III guidance
(3) = Mercuric chloride soil RBC value used
(4) = RBC value for pyrene was used for these compounds

[A] = Facility-Wide Background Point Estimate as Reported in the Facility-Wide Background Study Report (IT 2001a)
RBC = USEPA Region III Risk-Based Concentration (RBC) values from the October 31, 2006, RBC Table and October 10, 2006, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
C = Carcinogenic per EPA RBC Table (October 2006)
N = Noncarcinogenic per EPA RBC Table (October 2006)
SSL DAF20 = Soil Screening Level at a Dilution Attenuation Factor of 20
BTAG = Biological Technical Assistance Group Screening Level, 2004

= Concentration Exceeds Adjusted Soil Residential RBC

= Concentration Exceeds Adjusted Soil Industrial RBC

underline = Concentration Exceeds Site Background Values

bold italic = Concentration Exceeds SSL DAF20

= Concentration Exceeds BTAG Screening Level

Laboratory Qualifiers

U	The compound was analyzed for but not detected. The reporting limit will be adjusted to reflect any dilution, and for soil, the percent moisture.
J	Estimated value.
E	Concentration exceeded the upper level of the calibration range of the instrument for that specific analysis. For TICs, compound not present in calibration standard, calculated using total peak areas ion chromatographs and response factor of 1.

Validation Qualifiers

U	Not detected. The associated number indicates the approximate sample concentration necessary to be detected.
B	Not detected substantially above the level reported in laboratory or field blanks.
N	Tentative Identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.
J	Analyte present. Reported value may not be accurate or precise.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.

Reason Codes

GC/MS Organics

d	MS/MSD or LCS/LCSD RPD imprecision
f	Field duplicate imprecision
m	Internal standard failure
z	Method blank and/or storage blank contamination

GC and HPLC Organics

d	MS/MSD or LCS/LCSD RPD imprecision
f	Field duplicate imprecision
m	Air bubble (> 6 mm or ¼ inch) in VOC vials
z	Method blank and/or storage blank contamination

Inorganics and Conventionals

m	MS/MSD recovery failure

Table 4-5
Detected Analytes for SWMU 13 (Surface Water)
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date	CAS	C/N	Adjusted Tap Water RBC	MCL	BTAG Screening Values	Units	13SW2 10/10/2003 Result	13SW2 LQ, VQ, r	MDL	RL	13SW3 10/10/2003 Result	13SW3 LQ, VQ, r	MDL	RL	SWD1 10/10/2003 Result	SWD1 LQ, VQ, r	MDL	RL
TAL Metals (µg/L)																		
Aluminum	7429-90-5	N	--	--	87	µg/L	74	J	18.7	100	66	J	18.7	100	53	J	18.7	100
Antimony	7440-36-0	N	1.46	6	30	µg/L	<1	U	0.552	1	0.7	J	0.552	1	<1	U	0.552	1
Antimony, Dissolved	7440-36-0		1.46		30	µg/L	<2	U	0.552	2	0.8	J	0.552	2	<2	U	0.552	2
Barium	7440-39-3	N	730	2,000	4	µg/L	22		1.82	10	21		1.82	10	21		1.82	10
Barium, Dissolved	7440-39-3		730		4	µg/L	18		1.82	10	18		1.82	10	17		1.82	10
Calcium	7440-70-2	--	--		116,000	µg/L	13,000		170	2,500	13,000		170	2,500	13,000		170	2,500
Calcium, Dissolved	7440-70-2		--	--	116,000	µg/L	13,000		170	2,500	13,000		170	2,500	13,000		170	2,500
Chromium	7440-47-3	N	10.95	100	85	µg/L	0.8	J,B,p	0.554	1	0.8	J,B,p	0.554	1	0.6	J,B,p	0.554	1
Chromium, Dissolved	7440-47-3		10.95		85	µg/L	<2	U	0.554	2	0.6	J	0.554	2	0.8	J	0.554	2
Iron	7439-89-6	N	1,095	--	300	µg/L	190		2.95	100	180		2.95	100	170		2.95	100
Iron, Dissolved	7439-89-6		1,095		300	µg/L	37	J	2.95	100	38	J	2.95	100	36	J	2.95	100
Lead	7439-92-1	--	--	15	2.5	µg/L	0.6	J,B,p	0.281	1	0.9	J,B,p	0.281	1	0.9	J,B,p	0.281	1
Magnesium	7439-95-4	--	--	--	82,000	µg/L	5,700		57.4	500	5,400		57.4	500	5,300		57.4	500
Magnesium, Dissolved	7439-95-4	--	--		82,000	µg/L	5,600		57.4	500	5,500		57.4	500	5,400		57.4	500
Manganese	7439-96-5	N	73	--	120	µg/L	27		3.16	10	30		3.16	10	24		3.16	10
Manganese, Dissolved	7439-96-5		73		120	µg/L	10		3.16	10	7.9	J	3.16	10	4.3	J	3.16	10
Nickel	7440-02-0	N	73	--	52	µg/L	0.96	J	0.41	1	0.8	J	0.41	1	0.8	J	0.41	1
Nickel, Dissolved	7440-02-0		73		52	µg/L	1.1	J	0.41	2	1	J	0.41	2	0.8	J	0.41	2
Potassium	7440-09-7	--	--	--	53,000	µg/L	1,800		59.7	200	1,900		59.7	200	1,800		59.7	200
Potassium, Dissolved	7440-09-7		--		53,000	µg/L	1,600		59.7	200	1,600		59.7	200	1,700		59.7	200
Sodium	7440-23-5	--	--	--	680,000	µg/L	5,100	,J,s	76.9	500	5,100	,J,s	76.9	500	5,000	,J,s	76.9	500
Sodium, Dissolved	7440-23-5		--		680,000	µg/L	5,100		76.9	500	5,100		76.9	500	5,000		76.9	500
Thallium	7440-28-0	N	0.256	2	0.8	µg/L	<1	U	0.208	1	0.3	J	0.208	1	0.24	J	0.208	1
Zinc	7440-66-6	N	1,095	--	120	µg/L	5.5	J	4.55	20	<20	U	4.55	20	<20	U	4.55	20
TCL SVOCs (µg/L)						µg/L												
Bis(2-ethylhexyl)phthalate	117-81-7	C	4.78	--	16	µg/L	0.34	J,B,z	0.149	5	0.31	J,B,z	0.149	5	0.33	J,B,z	0.149	5
Butylbenzylphthalate	85-68-7	N	730	--	19	µg/L	0.11	J,B,z	0.015	5	0.11	J,B,z	0.015	5	0.11	J,B,z	0.015	5
Diethylphthalate	84-66-2	N	2,920	--	210	µg/L	0.11	J,B,z	0.074	5	<5	U	0.074	5	<5	U	0.074	5
SVOC TICs (µg/L)						µg/L												
(M) 1-Eicosanol	629969	--	--	--	--	µg/L	0.91	E,NJ,t	0	1	0.89	E,NJ,t	0	1	0.78	E,NJ,t	0	1
(Z)-9-Octadecenamide	301-02-0	--	--	--	--	µg/L	NI				NI				10.37	E,NJ,t	0	0.1
1-HEXACOSANOL	506-52-5	--	--	--	--	µg/L	NI				NI				NI			
1-Hexadecanol	36653-82-4	--	--	--	--	µg/L	0.51	E,NJ,t	0	0.01	NI				NI			
1,2-Benzenedicarboxylicacid, bis(2-methy	84-69-5	--	--	--	--	µg/L	0.84	E,NJ,t	0	0.01	NI				0.52	E,NJ,t	0	0.01
1,2-Benzenedicarboxylic acid, butyl 2-me	17851-53-5	--	--	--	--	µg/L	NI				0.51	E,NJ,t	0	0.01	NI			
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	--	--	--	--	µg/L	1.63	E,NJ,t	0	0.1	1.2	E,NJ,t	0	0.1	NI			
Docosane, 11-butyl-	629-97-0	--	--	--	--	µg/L	NI				0.49	E,NJ,t	0	0.01	NI			
Eicosane	112-95-8	--	--	--	--	µg/L	0.54	E,NJ,t	0	1000	NI				NI			
Erucylamide	112-84-5	--	--	--	--	µg/L	20.79	E,NJ,t	0	0.1	9.63	E,NJ,t	0	0.1	NI			

Notes:

CAS = Chemical Abstracts Service
µg/L = Microgram Per Liter
TAL = Target Analyte List
TCL = Target Compound List
MDL = Method Detection Limit
RL = Reporting Limit
NI = Not Identified
LQ = Laboratory Qualifier
VQ = Validation Qualifier
r = Reason Code
SVOC = Semivolatile Organic Compound
TIC = Tentatively Identified Compound
RBC = USEPA Region III Risk-Based Concentration
(RBC) values from the October 31, 2006,
RBC Table and October 10, 2006, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
C = Carcinogenic per EPA RBC Table (October 2006)
N = Noncarcinogenic per EPA RBC Table (October 2006)
MCL = Maximum Contaminant Level
BTAG = Biological Technical Assistance Group Screening Level, 2004

= Exceeded Adjusted T-RBC

= Exceeds MCL

= Concentration Exceeds BTAG Screening Level

Laboratory Qualifiers

U The compound was analyzed for but not detected. The reporting limit will be adjusted to reflect any dilution, and for soil, the percent moisture.

J Estimated value.

E Concentration exceeded the upper level of the calibration range of the instrument for that specific analysis. For TICs, compound not present in calibration standard, calculated using total peak areas ion chromatographs and response factor of 1.

Validation Qualifiers

B Not detected substantially above the level reported in laboratory or field blanks.

N Tentative Identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.

J Analyte present. Reported value may not be accurate or precise.

Reason Codes

GC/MS Organics
t Tentatively identified Compound
z Method blank and/or storage blank contamination
GC and HPLC Organics
z Method blank and/or storage blank contamination
Inorganics and Conventionals
p Preparation blank contamination
s Serial dilution failure

Table 4-6
HHRS COPC Selection (Surface Soil) for SWMU 13
SSP Report
Radford Army Ammunition Plant, Radford, VA

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	C/N	Adjusted RBC Residential	Adjusted RBC Industrial	COPC Flag (Y/N)	Rationale for Selection or Deletion
	TAL Metals (mg/kg)												
7429905	Aluminum	6,630	19,800	mg/kg	13SB11A	6/6	1.83 - 1.83	19,800	--	--	--	Y	NSV
7440360	Antimony	0.07	1.1	mg/kg	13SB12A	5/6	0.0518 - 0.0518	1.1	N	3	40.9	N	BSL
7440382	Arsenic	1.6	2.6	mg/kg	13SB9A	6/6	0.0232 - 0.0232	3	C	0.43	1.91	Y	***ARES/IND***
7440393	Barium	78	177	mg/kg	13SB9A	6/6	0.106 - 0.106	177	N	1,564	20,440	N	BSL
7440417	Beryllium	0.66	1.15	mg/kg	13SB9A	5/6	0.0333 - 0.167	1.15	N	16	204	N	BSL
7440439	Cadmium	0.91	2.3	mg/kg	13SB9A	6/6	0.182 - 0.182	2.3	N	3.91	51	N	BSL
7440702	Calcium	1,980	12,400	mg/kg	13SB12A	6/6	16.6 - 16.6	12,400	--	Nutrient	Nutrient	N	Nutrient
7440473	Chromium[1]	18	38	mg/kg	13SB11A	6/6	0.912 - 0.912	38	N	23.5	307	Y	**ARES**
7440484	Cobalt	5.1	13	mg/kg	13SB11A	6/6	0.208 - 0.208	13	--	--	--	Y	NSV
7440508	Copper	13	45	mg/kg	13SB12A	6/6	0.368 - 0.368	45	N	313	4,088	N	BSL
7439896	Iron	14,800	36,200	mg/kg	13SB9A	6/6	21.2 - 42.4	36,200	N	2,346	30,660	Y	***ARES/IND***
7439921	Lead[2]	111	8,620	mg/kg	13SB8A	6/6	0.545 - 21.8	8,620	--	400	750	Y	***ARES/IND***
7439954	Magnesium	3,240	5,330	mg/kg	13SB12A	6/6	3.21 - 3.21	5,330	--	Nutrient	Nutrient	N	Nutrient
7439965	Manganese	301	1,315	mg/kg	13SB9A	6/6	0.264 - 1.32	1,315	N	156	2,044	Y	**ARES**
7439976	Mercury[3]	0.02	0.05	mg/kg	13SB11A	6/6	0.0077 - 0.0077	0.05	--	0.8	10	N	BSL
7440020	Nickel	8.3	18.00	mg/kg	13SB9A	6/6	0.0356 - 0.0356	18	N	156.43	2,044	N	BSL
7440097	Potassium	1,050	2,680	mg/kg	13SB11A	6/6	5 - 5	2,680	--	Nutrient	Nutrient	N	Nutrient
7782492	Selenium	0.32	0.89	mg/kg	13SB9A	6/6	0.0502 - 0.0502	0.89	N	39	511	N	BSL
7440224	Silver	0.06	0.14	mg/kg	13SB8A	6/6	0.0044 - 0.0044	0.14	N	39	511	N	BSL
7440235	Sodium	36	102	mg/kg	13SB12A	6/6	18.1 - 18.1	102	--	Nutrient	Nutrient	N	Nutrient
7440280	Thallium	0.13	0.87	mg/kg	13SB9A	6/6	0.027 - 0.027	0.87	N	0.55	7.15	Y	**ARES**
7440622	Vanadium	14	36	mg/kg	13SB9A	6/6	0.207 - 0.207	36	N	7.82	102	Y	**ARES**
7440666	Zinc	214	990	mg/kg	13SB9A	6/6	2.59 - 12.9	990	N	2,346	30,660	N	BSL
	TCL VOCs (µg/kg)												
120821	1,2,4-Trichlorobenzene	9.6E-01	9.6E-01	µg/kg	13SB10A	1/6	0.492 - 0.574	9.6E-01	N	7.8E+04	1.0E+06	N	BSL
78933	2-Butanone	2.6E+01	4.5E+01	µg/kg	13SB11A	6/6	6 - 7	4.5E+01	N	4.7E+06	6.1E+07	N	BSL
67641	Acetone	4.9E+01	3.2E+02	µg/kg	13SB10A	6/6	6 - 7	3.2E+02	N	7.0E+06	9.2E+07	N	BSL
71432	Benzene	9.1E-01	9.1E-01	µg/kg	13SB11A	1/6	0.632 - 0.738	9.1E-01	C	1.2E+04	5.2E+04	N	BSL
108883	Toluene	6.6E-01	3.5E+00	µg/kg	13SB10A	5/6	0.557 - 0.65	3.5E+00	N	6.3E+05	8.2E+06	N	BSL
79016	Trichloroethene	9.6E+00	9.6E+00	µg/kg	13SB11A	1/6	0.812 - 0.948	9.6E+00	C	1.6E+03	7.2E+03	N	BSL
	VOC TICs (µg/kg)												
66251	Hexanal	1.3E+01	3.5E+02	µg/kg	13SB10A	2/6	0 - 0	3.5E+02	--	--	--	Y	NSV
	TCL SVOCs (µg/kg)												
91576	2-Methylnaphthalene	4.0E+00	2.2E+01	µg/kg	13SB8A	3/6	3.29 - 3.84	2.2E+01	N	3.1E+04	4.1E+05	N	BSL
121142	2,4-Dinitrotoluene	3.5E+01	7.1E+02	µg/kg	13SB12A	3/6	3.78 - 4.41	7.1E+02	N	1.6E+04	2.0E+05	N	BSL
606202	2,6-Dinitrotoluene	2.1E+02	2.1E+02	µg/kg	13SB12A	1/6	33.2 - 38.8	2.1E+02	N	7.8E+03	1.0E+05	N	BSL
--	Dinitrotoluene Mix	3.5E+01	9.2E+02	µg/kg	13SB12A	2/6	0 - 0	9.2E+02	C	9.4E+02	4.2E+03	N	BSL
59507	4-Chloro-3-Methylphenol	9.0E+00	1.9E+01	µg/kg	13SB7A	5/6	6.25 - 7.29	1.9E+01	--	--	--	Y	NSV
83329	Acenaphthene	8.0E+00	1.9E+01	µg/kg	13SB8A	4/6	2.06 - 2.41	1.9E+01	N	4.7E+05	6.1E+06	N	BSL
208968	Acenaphthylene[4]	2.0E+00	5.0E+00	µg/kg	13SB9A	4/6	1.8 - 2.1	5.0E+00	N	2.3E+05	3.1E+06	N	BSL
120127	Anthracene	1.5E+01	3.7E+01	µg/kg	13SB8A	4/6	5.54 - 6.47	3.7E+01	N	2.3E+06	3.1E+07	N	BSL
56553	Benzo(a)anthracene	5.1E+01	1.7E+02	µg/kg	13SB9A	4/6	16 - 186	1.7E+02	C	2.2E+02	3.9E+03	N	BSL
50328	Benzo(a)pyrene	1.8E+01	1.3E+02	µg/kg	13SB9A	5/6	6.85 - 7.99	1.3E+02	C	2.2E+01	3.9E+02	Y	**ARES**
205992	Benzo(b)fluoranthene	1.3E+01	2.1E+02	µg/kg	13SB9A	6/6	11.7 - 13.7	2.1E+02	C	2.2E+02	3.9E+03	N	BSL
191242	Benzo(g,h,i)perylene[4]	1.1E+01	7.2E+01	µg/kg	13SB8A	5/6	10.5 - 12.2	7.2E+01	N	2.3E+05	3.1E+06	N	BSL
207089	Benzo(k)fluoranthene	2.8E+01	8.9E+01	µg/kg	13SB9A	4/6	16.1 - 18.8	8.9E+01	C	2.2E+03	3.9E+04	N	BSL
117817	Bis(2-ethylhexyl)phthalate	1.9E+01	4.5E+02	µg/kg	13SB10A	6/6	2.48 - 2.9	4.5E+02	C	4.6E+04	2.0E+05	N	BSL
85687	Butylbenzylphthalate	6.0E+00	3.8E+01	µg/kg	13SB10A	3/6	5.38 - 6.27	3.8E+01	N	1.6E+06	2.0E+07	N	BSL
86748	Carbazole	2.1E+01	2.1E+01	µg/kg	13SB9A	1/6	7.32 - 8.54	2.1E+01	C	3.2E+04	1.4E+05	N	BSL
218019	Chrysene	2.4E+01	1.9E+02	µg/kg	13SB9A	5/6	12.2 - 14.3	1.9E+02	C	2.2E+04	3.9E+05	N	BSL
53703	Dibenz(a,h)anthracene	1.6E+01	1.8E+01	µg/kg	13SB8A	2/6	7.08 - 8.26	1.8E+01	C	2.2E+01	3.9E+02	N	BSL
132649	Dibenzofuran	6.0E+00	1.3E+01	µg/kg	13SB8A	2/6	3.79 - 4.42	1.3E+01	--	--	--	Y	NSV
84662	Diethylphthalate	9.0E+00	9.5E+02	µg/kg	13SB12A	6/6	2.28 - 2.66	9.5E+02	N	6.3E+06	8.2E+07	N	BSL
131113	Dimethylphthalate	1.0E+01	1.4E+02	µg/kg	13SB10A	2/6	3.97 - 4.63	1.4E+02	--	--	--	Y	NSV
84742	Di-n-butylphthalate	6.2E+01	6.8E+02		13SB12A	6/6	4.58 - 5.35	6.8E+02	N	7.8E+05	1.0E+07	N	BSL
206440	Fluoranthene	9.0E+00	3.7E+02	µg/kg	13SB8A	6/6	2.82 - 3.29	3.7E+02	N	3.1E+05	4.1E+06	N	BSL
91203	Naphthalene	4.0E+00	1.0E+01	µg/kg	13SB8A	2/6	3.3 - 3.85	1.0E+01	N	1.6E+05	2.0E+06	N	BSL
85018	Phenanthrene[4]	4.0E+00	1.7E+02	µg/kg	13SB10A	6/6	2.76 - 3.22	1.7E+02	N	2.3E+05	3.1E+06	N	BSL
129000	Pyrene	6.0E+00	2.6E+02	µg/kg	13SB8A	6/6	1.78 - 2.07	2.6E+02	N	2.3E+05	3.1E+06	N	BSL

Table 4-6
HHRS COPC Selection (Surface Soil) for SWMU 13
SSP Report
Radford Army Ammunition Plant, Radford, VA

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	C/N	Adjusted RBC Residential	Adjusted RBC Industrial	COPC Flag (Y/N)	Rationale for Selection or Deletion
	SVOC TICs (µg/kg)												
15594908	1-Heneicosanol	2.2E+02	2.2E+02	µg/kg	13SB11A	1/6	0 - 0	2.2E+02	--	--	--	Y	NSV
101371	2,4,6-Triallyloxy-1,3,5-triazine	5.0E+01	6.0E+01	µg/kg	13SB9A	2/6	0 - 0	6.0E+01	--	--	--	Y	NSV
1000194624	4,4,6a,6b,8a,11,11,14b-Octamethyl-1,4,4a	7.1E+02	7.1E+02	µg/kg	13SB10A	1/6	0 - 0	7.1E+02	--	--	--	Y	NSV
0118967	Benzene, 2-methyl-1,3,5-trinitro-	2.8E+02	3.5E+02	µg/kg	13SB12A	2/6	0 - 0	3.5E+02	--	--	--	Y	NSV
119755	Benzeneamine, 2-nitro-N-phenyl-	2.8E+02	2.8E+02	µg/kg	13SB12A	1/6	0 - 0	2.8E+02	--	--	--	Y	NSV
123955	Butyl Ester Octadecanioc	1.3E+02	1.3E+02	µg/kg	13SB11A	1/6	0 - 0	1.3E+02	--	--	--	Y	NSV
57885	Cholesterol	1.2E+02	4.7E+02	µg/kg	13SB10A	2/6	0 - 0	4.7E+02	--	--	--	Y	NSV
112845	Erucylamide	1.4E+02	5.7E+02	µg/kg	13SB9A	6/6	0 - 0	5.7E+02	--	--	--	Y	NSV
2136712	Ethanol, 2-(hexadecyloxy)-	3.9E+02	3.9E+02	µg/kg	13SB11A	1/6	0 - 0	3.9E+02	--	--	--	Y	NSV
83476	.Gamma.-sitosterol	1.6E+02	2.4E+03	µg/kg	13SB10A	4/6	0 - 0	2.4E+03	--	--	--	Y	NSV
1058613	Stigmast-4-en-3-one	1.4E+02	2.4E+02	µg/kg	13SB8A	2/6	0 - 0	2.4E+02	--	--	--	Y	NSV
1000214207	Stigmasterol, 22,23-dihydro-	1.6E+02	1.6E+02	µg/kg	13SB9A	1/6	0 - 0	1.6E+02	--	--	--	Y	NSV
127220	Taraxerol	2.9E+02	2.9E+02	µg/kg	13SB8A	1/6	0 - 0	2.9E+02	--	--	--	Y	NSV
102761	Triacetin	1.4E+02	1.4E+02	µg/kg	13SB12A	1/6	0 - 0	1.4E+02	--	--	--	Y	NSV
611927	Urea, N,N'-dimethyl-N,N'-diphenyl-	4.8E+01	9.1E+02	µg/kg	13SB12A	2/6	0 - 0	9.1E+02	--	--	--	Y	NSV
10191410	Vitamin E	1.6E+02	6.0E+02	µg/kg	13SB10A	2/6	0 - 0	6.0E+02	--	--	--	Y	NSV
	PAHs (µg/kg)												
83329	Acenaphthene	1.4E+01	1.7E+01	µg/kg	13SB9A	2/6	11.3 - 13.2	1.7E+01	N	4.7E+05	6.1E+06	N	BSL
120127	Anthracene	6.6E+00	3.8E+01	µg/kg	13SB10A	4/6	0.84 - 0.98	3.8E+01	N	2.3E+06	3.1E+07	N	BSL
56553	Benzo(a)anthracene	2.1E+00	1.4E+02	µg/kg	13SB10A	6/6	0.96 - 1.12	1.4E+02	C	2.2E+02	3.9E+03	N	BSL
50328	Benzo(a)pyrene	6.5E+00	1.9E+02	µg/kg	13SB10A	5/6	1.2 - 1.4	1.9E+02	C	2.2E+01	3.9E+02	Y	**ARES**
205992	Benzo(b)fluoranthene	4.9E+00	1.4E+02	µg/kg	13SB10A	5/6	1.56 - 1.82	1.4E+02	C	2.2E+02	3.9E+03	N	BSL
191242	Benzo(g,h,i)perylene[4]	8.2E+01	3.9E+02	µg/kg	13SB9A	4/6	15 - 17.5	3.9E+02	N	2.3E+05	3.1E+06	N	BSL
207089	Benzo(k)fluoranthene	2.0E+01	8.0E+01	µg/kg	13SB10A	4/6	1.2 - 1.4	8.0E+01	C	2.2E+03	3.9E+04	N	BSL
218019	Chrysene	2.4E+00	1.5E+02	µg/kg	13SB10A	6/6	1.44 - 1.68	1.5E+02	C	2.2E+04	3.9E+05	N	BSL
53703	Dibenz(a,h)anthracene	2.3E+00	5.2E+00	µg/kg	13SB10A	2/6	1.68 - 1.96	5.2E+00	C	2.2E+01	3.9E+02	N	BSL
206440	Fluoranthene	5.0E+00	4.7E+02	µg/kg	13SB10A	6/6	2.04 - 2.38	4.7E+02	N	3.1E+05	4.1E+06	N	BSL
86737	Fluorene	5.9E+00	1.7E+01	µg/kg	13SB10A	2/6	1.56 - 1.82	1.7E+01	N	3.1E+05	4.1E+06	N	BSL
193395	Indeno(1,2,3-cd)pyrene	5.9E+00	1.3E+02	µg/kg	13SB10A	5/6	0.84 - 0.98	1.3E+02	C	2.2E+02	3.9E+03	N	BSL
85018	Phenanthrene[4]	2.1E+00	2.1E+02	µg/kg	13SB10A	6/6	0.72 - 0.84	2.1E+02	N	2.3E+05	3.1E+06	N	BSL
129000	Pyrene	3.6E+00	3.2E+02	µg/kg	13SB10A	6/6	1.08 - 1.26	3.2E+02	N	2.3E+05	3.1E+06	N	BSL
	Explosives (mg/kg)												
121142	2,4-Dinitrotoluene	3.9E-01	3.9E-01	mg/kg	13SB12A	1/6	0.142 - 0.142	3.9E-01	N	1.6E+01	2.0E+02	N	BSL
--	Dinitrotoluene Mix	3.9E-01	3.9E-01	mg/kg	13SB12A	1/6	0 - 0	3.9E-01	C	9.4E-01	4.2E+00	N	BSL
118967	2,4,6-Trinitrotoluene	2.7E-01	4.3E-01	mg/kg	13SB11A	2/6	0.167 - 0.167	4.3E-01	C	3.9E+00	5.1E+01	N	BSL
	Nitroglycerin/PETN (mg/kg)												
55630	Nitroglycerin	4.5E-01	8.5E+00	mg/kg	13SB12A	3/6	0.195 - 0.276	8.5E+00	N	1.3E+02	1.7E+03	N	BSL
	Cyanide (mg/kg)												
57125	Cyanide	7.0E-02	3.1E-01	mg/kg	13SB9A	6/6	0.0356 - 0.0356	3.1E-01	N	1.6E+02	2.0E+03	N	BSL
	Dioxins/Furans (mg/g)												
1746016	Total 2,3,7,8-TCDD Equivalents	--	--	mg/kg	13SB9A	1/1	--	2.1E-06	C	4.6E-06	1.9E-05	N	BSL

Notes:

CAS = Chemical Abstracts Service
COPC = Chemical of Potential Concern
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon
TIC = Tentatively Identified Compound

[1] = Chromium VI RBC value was used
[2] = Lead criteria are Action Levels; see USEPA Region III guidance
[3] = Mercuric chloride soil RBC value used
[4] = RBC value for pyrene was used for these compounds

RBC = USEPA Region III Risk-Based Concentration (RBC) values from the October 31, 2006, RBC Table and October 10, 2006, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
C = Carcinogenic per EPA RBC Table (October 2006)
N = Noncarcinogenic per EPA RBC Table (October 2006)

ARES = Above Residential RBC
ARES/IND = Above Residential RBC/Industrial RBC
BSL = Below Residential/Industrial RBC Screening Levels
NSV = No Screening Value Available

Table 4-7
HHRS COPC Selection (Total Soil) for SWMU 13
SSP Report
Radford Army Ammunition Plant, Radford, VA

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	C/N	Adjusted RBC Residential	Adjusted RBC Industrial	COPC Flag (Y/N)	Rationale for Selection or Deletion
	TAL Metals (mg/kg)												
7429905	Aluminum	4,250	21,400	mg/kg	13SB7C	17/17	1.83 - 1.83	21,400	--	--	--	Y	NSV
7440360	Antimony	0.07	4.7	mg/kg	13SB11B	13/17	0.0518 - 0.0518	4.7	N	3	40.9	Y	**ARES**
7440382	Arsenic	0.12	4.7	mg/kg	13SB11C	17/17	0.0232 - 0.0232	5	C	0.43	1.91	Y	***ARES/IND***
7440393	Barium	29	211	mg/kg	13SB11C	17/17	0.106 - 0.106	211	N	1,564	20,440	N	BSL
7440417	Beryllium	0.65	1.30	mg/kg	13SB7C	11/17	0.0333 - 0.167	1.30	N	16	204	N	BSL
7440439	Cadmium	0.72	2.7	mg/kg	13SB11C	17/17	0.182 - 0.182	2.7	N	3.91	51	N	BSL
7440702	Calcium	1,300	12,400	mg/kg	13SB12A	17/17	16.6 - 16.6	12,400	--	Nutrient	Nutrient	N	Nutrient
7440473	Chromium[1]	11	39	mg/kg	13SB11C	17/17	0.912 - 0.912	39	N	23.5	307	Y	**ARES**
7440484	Cobalt	3.90	16	mg/kg	13SB11C	17/17	0.208 - 0.208	16	--	--	--	Y	NSV
7440508	Copper	2.50	98	mg/kg	13SB11B	17/17	0.368 - 1.84	98	N	313	4,088	N	BSL
7439896	Iron	5,330	48,600	mg/kg	13SB11C	17/17	4.24 - 42.4	48,600	N	2,346	30,660	Y	***ARES/IND***
7439921	Lead[2]	12.00	26,500	mg/kg	13SB11B	17/17	0.0218 - 109	26,500	--	400	750	Y	***ARES/IND***
7439954	Magnesium	1,210	5,330	mg/kg	13SB12A	17/17	3.21 - 3.21	5,330	--	Nutrient	Nutrient	N	Nutrient
7439965	Manganese	59	1,700	mg/kg	13SB11C	17/17	0.264 - 6.6	1,700	N	156	2,044	Y	**ARES**
7439976	Mercury[3]	0.01	0.13	mg/kg	13SB12C	16/17	0.0077 - 0.0077	0.13	--	0.8	10	N	BSL
7440020	Nickel	3.80	21.00	mg/kg	13SB11C	17/17	0.0356 - 0.0356	21	N	156	2,044	N	BSL
7440097	Potassium	548	2,680	mg/kg	13SB11A	17/17	5 - 5	2,680	--	Nutrient	Nutrient	N	Nutrient
7782492	Selenium	0.23	1.5	mg/kg	13SB11C	17/17	0.0502 - 0.0502	1.5	N	39.11	511	N	BSL
7440224	Silver	0.02	0.45	mg/kg	13SB8B	17/17	0.0044 - 0.0044	0.45	N	39.11	511	N	BSL
7440235	Sodium	36	170	mg/kg	13SB12B - DUP AVG	17/17	18.1 - 18.1	170	--	Nutrient	Nutrient	N	Nutrient
7440280	Thallium	0.05	0.87	mg/kg	13SB9A	17/17	0.027 - 0.027	0.87	N	0.55	7.15	Y	**ARES**
7440622	Vanadium	11	36	mg/kg	13SB7C	17/17	0.207 - 0.207	36	N	7.82	102	Y	**ARES**
7440666	Zinc	46	1,070	mg/kg	13SB11C	17/17	0.517 - 12.9	1,070	N	2,346	30,660	N	BSL
	TCL VOCs (µg/kg)												
120821	1,2,4-Trichlorobenzene	9.6E-01	9.6E-01	µg/kg	13SB10A	1/17	0.451 - 0.656	9.6E-01	N	7.8E+04	1.0E+06	N	BSL
78933	2-Butanone	2.4E+01	4.0E+02	µg/kg	13SB9B	16/17	5.5 - 8	4.0E+02	N	4.7E+06	6.1E+07	N	BSL
67641	Acetone	3.1E+01	3.2E+02	µg/kg	13SB10A	17/17	5.5 - 8	3.2E+02	N	7.0E+06	9.2E+07	N	BSL
71432	Benzene	6.9E-01	1.5E+00	µg/kg	13SB11B	4/17	0.58 - 0.843	1.5E+00	C	1.2E+04	5.2E+04	N	BSL
156592	cis-1,2-Dichloroethene	1.9E+00	4.2E+00	µg/kg	13SB11C	2/17	0.781 - 1.14	4.2E+00	N	7.8E+04	1.0E+06	N	BSL
75092	Methylene chloride	4.1E+00	1.1E+01	µg/kg	13SB10A	16/17	3.09 - 4.5	1.1E+01	C	8.5E+04	3.8E+05	N	BSL
108883	Toluene	6.6E-01	3.5E+00	µg/kg	13SB10A	8/17	0.51 - 0.742	3.5E+00	N	6.3E+05	8.2E+06	N	BSL
79016	Trichloroethene	9.6E+00	5.7E+01	µg/kg	13SB11C	3/17	0.745 - 1.08	5.7E+01	C	1.6E+03	7.2E+03	N	BSL
	VOC TICs (µg/kg)												
60297	Ethyl Ether	2.8E+01	2.8E+01	µg/kg	13SB12C	1/17	0 - 0	2.8E+01	N	1.6E+06	2.0E+07	N	BSL
66251	Hexanal	4.7E+00	3.5E+02	µg/kg	13SB10A	6/17	0 - 0	3.5E+02	--	--	--	Y	NSV
	TCL SVOCs (µg/kg)												
91576	2-Methylnaphthalene	4.0E+00	2.2E+01	µg/kg	13SB8A	4/17	3.01 - 4.38	2.2E+01	N	3.1E+04	4.1E+05	N	BSL
121142	2,4-Dinitrotoluene	3.5E+01	1.1E+03	µg/kg	13SB12B - DUP AVG	7/17	3.47 - 5.04	1.1E+03	N	1.6E+04	2.0E+05	N	BSL
606202	2,6-Dinitrotoluene	3.2E+01	2.1E+02	µg/kg	13SB12A	3/17	30.5 - 44.3	2.1E+02	N	7.8E+03	1.0E+05	N	BSL
--	Dinitrotoluene Mix	3.5E+01	1.2E+03	µg/kg	13SB12B - DUP AVG	5/17	0 - 0	1.2E+03	C	9.4E+02	4.2E+03	Y	**ARES**
59507	4-Chloro-3-Methylphenol	8.0E+00	2.4E+01	µg/kg	13SB8B	11/17	5.73 - 8.34	2.4E+01	--	--	--	Y	NSV
83329	Acenaphthene	3.0E+00	1.9E+01	µg/kg	13SB8A	6/17	1.89 - 2.75	1.9E+01	N	4.7E+05	6.1E+06	N	BSL
208968	Acenaphthylene[4]	2.0E+00	6.0E+00	µg/kg	13SB10B	7/17	1.65 - 2.4	6.0E+00	N	2.3E+05	3.1E+06	N	BSL
120127	Anthracene	1.5E+01	3.7E+01	µg/kg	13SB8A	6/17	5.08 - 7.39	3.7E+01	N	2.3E+06	3.1E+07	N	BSL
56553	Benzo(a)anthracene	2.2E+01	1.7E+02	µg/kg	13SB9A	8/17	1.86 - 186	1.7E+02	C	2.2E+02	3.9E+03	N	BSL
50328	Benzo(a)pyrene	7.0E+00	1.3E+02	µg/kg	13SB9A	13/17	4.72 - 9.14	1.3E+02	C	2.2E+01	3.9E+02	Y	**ARES**
205992	Benzo(b)fluoranthene	1.3E+01	2.1E+02	µg/kg	13SB9A	14/17	10.7 - 15.6	2.1E+02	C	2.2E+02	3.9E+03	N	BSL
191242	Benzo(g,h,i)perylene[4]	1.1E+01	7.2E+01	µg/kg	13SB8A	10/17	9.59 - 14	7.2E+01	N	2.3E+05	3.1E+06	N	BSL
207089	Benzo(k)fluoranthene	2.2E+01	8.9E+01	µg/kg	13SB9A	7/17	14.7 - 21.4	8.9E+01	C	2.2E+03	3.9E+04	N	BSL
117817	Bis(2-ethylhexyl)phthalate	1.5E+01	1.0E+03	µg/kg	13SB12C	17/17	2.28 - 3.31	1.0E+03	C	4.6E+04	2.0E+05	N	BSL
85687	Butylbenzylphthalate	6.0E+00	4.0E+01	µg/kg	13SB11C	7/17	4.93 - 7.17	4.0E+01	N	1.6E+06	2.0E+07	N	BSL
86748	Carbazole	2.1E+01	2.1E+01	µg/kg	13SB9A	1/17	6.71 - 9.76	2.1E+01	C	3.2E+04	1.4E+05	N	BSL
218019	Chrysene	1.6E+01	1.9E+02	µg/kg	13SB9A	12/17	11.2 - 16.3	1.9E+02	C	2.2E+04	3.9E+05	N	BSL
53703	Dibenz(a,h)anthracene	1.3E+01	1.8E+01	µg/kg	13SB8A	4/17	6.49 - 9.44	1.8E+01	C	2.2E+01	3.9E+02	N	BSL
132649	Dibenzofuran	6.0E+00	1.3E+01	µg/kg	13SB8A	2/17	3.48 - 5.06	1.3E+01	--	--	--	Y	NSV
84662	Diethylphthalate	3.0E+00	2.3E+03	µg/kg	13SB12B - DUP AVG	17/17	2.09 - 5.32	2.3E+03	N	6.3E+06	8.2E+07	N	BSL
131113	Dimethylphthalate	1.0E+01	5.5E+02	µg/kg	13SB11B	4/17	3.64 - 5.3	5.5E+02	--	--	--	Y	NSV
84742	Di-n-butylphthalate	6.2E+01	1.6E+03	µg/kg	13SB12B - DUP AVG	17/17	4.2 - 10.7	1.6E+03	N	7.8E+05	1.0E+07	N	BSL
206440	Fluoranthene	9.0E+00	3.7E+02	µg/kg	13SB8A	14/17	2.59 - 3.76	3.7E+02	N	3.1E+05	4.1E+06	N	BSL
86737	Fluorene	4.0E+00	2.0E+01	µg/kg	13SB8A	6/17	1.85 - 2.69	2.0E+01	N	3.1E+05	4.1E+06	N	BSL

Table 4-7
HHRS COPC Selection (Total Soil) for SWMU 13
SSP Report
Radford Army Ammunition Plant, Radford, VA

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	C/N	Adjusted RBC Residential	Adjusted RBC Industrial	COPC Flag (Y/N)	Rationale for Selection or Deletion
193395	Indeno(1,2,3-cd)pyrene	5.0E+00	7.3E+01	µg/kg	13SB8A	12/17	4.31 - 6.27	7.3E+01	C	2.2E+02	3.9E+03	N	BSL
91203	Naphthalene	4.0E+00	1.5E+01	µg/kg	13SB12C	3/17	3.03 - 4.4	1.5E+01	N	1.6E+05	2.0E+06	N	BSL
86306	N-Nitrosodiphenylamine	2.1E+01	9.5E+02	µg/kg	13SB11B	8/17	5.23 - 7.6	9.5E+02	C	1.3E+05	5.8E+05	N	BSL
85018	Phenanthrene[4]	4.0E+00	1.7E+02	µg/kg	13SB10A	14/17	2.53 - 3.68	1.7E+02	N	2.3E+05	3.1E+06	N	BSL
129000	Pyrene	3.0E+00	2.6E+02	µg/kg	13SB8A	15/17	1.63 - 2.37	2.6E+02	N	2.3E+05	3.1E+06	N	BSL
	SVOC TICs (µg/kg)												
301020	(Z)-9-Octadecenamide	8.3E+01	1.2E+02	µg/kg	13SB12A	2/17	0 - 0	1.2E+02	--	--	--	Y	NSV
15594908	1-Heneicosanol	2.2E+02	2.2E+02	µg/kg	13SB11A	1/17	0 - 0	2.2E+02	--	--	--	Y	NSV
72101190	1,1'-Biphenyl, (1,1-dimethylethoxy)-	3.6E+02	3.6E+02	µg/kg	13SB12C	1/17	0 - 0	3.6E+02	--	--	--	Y	NSV
69009901	1,1'-Biphenyl, bis(1-methylethyl)-	6.6E+01	6.6E+01	µg/kg	13SB12B - DUP AVG	1/17	0 - 0	6.6E+01	--	--	--	Y	NSV
84695	1,2-Benzenedicarboxylicacid, bis(2-methy	1.2E+02	6.7E+02	µg/kg	13SB9A	11/17	0 - 0	6.7E+02	--	--	--	Y	NSV
17851535	1,2-Benzenedicarboxylic acid, butyl 2-me	4.7E+01	5.3E+02	µg/kg	13SB10A	5/17	0 - 0	5.3E+02	--	--	--	Y	NSV
84640	1,2-Benzenedicarboxylic acid, butyl cycl	3.1E+02	3.1E+02	µg/kg	13SB11C	1/17	0 - 0	3.1E+02	--	--	--	Y	NSV
149575	2-Ethyl-hexanoic Acid	1.6E+02	1.6E+02	µg/kg	13SB12B - DUP AVG	1/17	0 - 0	1.6E+02	--	--	--	Y	NSV
101371	2,4,6-Triallyloxy-1,3,5-triazine	3.6E+01	1.5E+02	µg/kg	13SB10B	6/17	0 - 0	1.5E+02	--	--	--	Y	NSV
1000194624	4,4,6a,6b,8a,11,11,14b-Octamethyl-1,4,4a	7.1E+02	7.1E+02	µg/kg	13SB10A	1/17	0 - 0	7.1E+02	--	--	--	Y	NSV
207841	7H-Dibenzo (a,g) carbazole	2.8E+02	2.8E+02	µg/kg	13SB12B - DUP AVG	1/17	0 - 0	2.8E+02	--	--	--	Y	NSV
112798	9-Octadecenoic acid, (E)-	7.4E+01	7.4E+01	µg/kg	13SB8B	1/17	0 - 0	7.4E+01	--	--	--	Y	NSV
0118967	Benzene, 2-methyl-1,3,5-trinitro-	2.1E+02	3.5E+02	µg/kg	13SB12A	3/17	0 - 0	3.5E+02	--	--	--	Y	NSV
119755	Benzeneamine, 2-nitro-N-phenyl-	7.1E+01	7.5E+02	µg/kg	13SB12B - DUP AVG	5/17	0 - 0	7.5E+02	--	--	--	Y	NSV
142165	Bis(2-ethylhexyl)maleate	1.2E+02	1.4E+02	µg/kg	13SB11C	2/17	0 - 0	1.4E+02	--	--	--	Y	NSV
123955	Butyl Ester Octadecanioc	1.3E+02	1.3E+02	µg/kg	13SB11A	1/17	0 - 0	1.3E+02	--	--	--	Y	NSV
57885	Cholesterol	1.2E+02	4.7E+02	µg/kg	13SB10A	2/17	0 - 0	4.7E+02	--	--	--	Y	NSV
112845	Erucylamide	1.2E+02	9.0E+02	µg/kg	13SB10B	13/17	0 - 0	9.0E+02	--	--	--	Y	NSV
2136712	Ethanol, 2-(hexadecyloxy)-	3.9E+02	3.9E+02	µg/kg	13SB11A	1/17	0 - 0	3.9E+02	--	--	--	Y	NSV
24085652	Ether, bis(p-tert-butylphenyl)	8.3E+02	8.3E+02	µg/kg	13SB12C	1/17	0 - 0	8.3E+02	--	--	--	Y	NSV
83476	.Gamma.-sitosterol	7.6E+01	2.4E+03	µg/kg	13SB10A	5/17	0 - 0	2.4E+03	--	--	--	Y	NSV
630024	Octacosane	1.8E+02	1.8E+02	µg/kg	13SB12B - DUP AVG	1/17	0 - 0	1.8E+02	--	--	--	Y	NSV
1058613	Stigmast-4-en-3-one	1.4E+02	2.4E+02	µg/kg	13SB8A	2/17	0 - 0	2.4E+02	--	--	--	Y	NSV
1000214207	Stigmasterol, 22,23-dihydro-	1.6E+02	1.6E+02	µg/kg	13SB9A	1/17	0 - 0	1.6E+02	--	--	--	Y	NSV
127220	Taraxerol	2.9E+02	2.9E+02	µg/kg	13SB8A	1/17	0 - 0	2.9E+02	--	--	--	Y	NSV
638584	Tetradecanamide	6.0E+01	6.0E+01	µg/kg	13SB8B	1/17	0 - 0	6.0E+01	--	--	--	Y	NSV
102761	Triacetin	1.4E+02	1.2E+03	µg/kg	13SB12B - DUP AVG	3/17	0 - 0	1.2E+03	--	--	--	Y	NSV
115866	Triphenyl Phosphate	1.1E+02	2.0E+02	µg/kg	13SB12B - DUP AVG	2/17	0 - 0	2.0E+02	--	--	--	Y	NSV
611927	Urea, N,N'-dimethyl-N,N'-diphenyl-	4.8E+01	9.1E+02	µg/kg	13SB12A	3/17	0 - 0	9.1E+02	--	--	--	Y	NSV
10191410	Vitamin E	1.6E+02	6.0E+02	µg/kg	13SB10A	2/17	0 - 0	6.0E+02	--	--	--	Y	NSV
	PAHs (µg/kg)												
83329	Acenaphthene	1.4E+01	1.7E+01	µg/kg	13SB9A	2/17	10.3 - 15	1.7E+01	N	4.7E+05	6.1E+06	N	BSL
120127	Anthracene	1.0E+00	3.8E+01	µg/kg	13SB10A	11/17	0.77 - 1.12	3.8E+01	N	2.3E+06	3.1E+07	N	BSL
56553	Benzo(a)anthracene	1.4E+00	1.4E+02	µg/kg	13SB10A	16/17	0.88 - 1.28	1.4E+02	C	2.2E+02	3.9E+03	N	BSL
50328	Benzo(a)pyrene	4.4E+00	1.9E+02	µg/kg	13SB10A	11/17	1.1 - 1.6	1.9E+02	C	2.2E+01	3.9E+02	Y	**ARES**
205992	Benzo(b)fluoranthene	3.8E+00	1.4E+02	µg/kg	13SB10A	11/17	1.43 - 2.08	1.4E+02	C	2.2E+02	3.9E+03	N	BSL
191242	Benzo(g,h,i)perylene[4]	1.5E+01	3.9E+02	µg/kg	13SB9A	10/17	13.8 - 20	3.9E+02	N	2.3E+05	3.1E+06	N	BSL
207089	Benzo(k)fluoranthene	4.5E+00	8.0E+01	µg/kg	13SB10A	9/17	1.1 - 1.6	8.0E+01	C	2.2E+03	3.9E+04	N	BSL
218019	Chrysene	1.7E+00	1.5E+02	µg/kg	13SB10A	15/17	1.32 - 1.92	1.5E+02	C	2.2E+04	3.9E+05	N	BSL
53703	Dibenz(a,h)anthracene	2.3E+00	8.0E+00	µg/kg	13SB10B	4/17	1.54 - 2.24	8.0E+00	C	2.2E+01	3.9E+02	N	BSL
206440	Fluoranthene	3.3E+00	4.7E+02	µg/kg	13SB10A	15/17	1.87 - 2.72	4.7E+02	N	3.1E+05	4.1E+06	N	BSL
86737	Fluorene	5.9E+00	1.7E+01	µg/kg	13SB10A	3/17	1.43 - 2.08	1.7E+01	N	3.1E+05	4.1E+06	N	BSL
193395	Indeno(1,2,3-cd)pyrene	3.6E+00	1.3E+02	µg/kg	13SB10A	12/17	0.77 - 1.12	1.3E+02	C	2.2E+02	3.9E+03	N	BSL
85018	Phenanthrene[4]	1.8E+00	2.1E+02	µg/kg	13SB10A	16/17	0.66 - 0.96	2.1E+02	N	2.3E+05	3.1E+06	N	BSL
129000	Pyrene	3.0E+00	3.2E+02	µg/kg	13SB10A	16/17	0.99 - 1.44	3.2E+02	N	2.3E+05	3.1E+06	N	BSL
	Explosives (mg/kg)												
99650	1,3-Dinitrobenzene	2.0E-01	2.0E-01	mg/kg	13SB12B - DUP AVG	1/17	0.159 - 0.159	2.0E-01	N	7.8E-01	1.0E+01	N	BSL
121142	2,4-Dinitrotoluene	1.3E-01	3.9E-01	mg/kg	13SB12A	2/17	0.142 - 0.142	3.9E-01	N	1.6E+01	2.0E+02	N	BSL
--	Dinitrotoluene Mix	1.3E-01	3.9E-01	mg/kg	13SB12A	2/17	0 - 0	3.9E-01	C	9.4E-01	4.2E+00	N	BSL
118967	2,4,6-Trinitrotoluene	2.7E-01	5.6E-01	mg/kg	13SB12B - DUP AVG	4/17	0.167 - 0.167	5.6E-01	C	3.9E+01	5.1E+02	N	BSL
121824	RDX (Hexahydro-1,3,5-trinitro-1,3,5-tria	1.8E-01	1.8E-01	mg/kg	13SB12B - DUP AVG	1/17	0.131 - 0.131	1.8E-01	C	5.8E-01	2.6E+00	N	BSL

Table 4-7
HHRS COPC Selection (Total Soil) for SWMU 13
SSP Report
Radford Army Ammunition Plant, Radford, VA

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	C/N	Adjusted RBC Residential	Adjusted RBC Industrial	COPC Flag (Y/N)	Rationale for Selection or Deletion
	Nitroglycerin/PETN (mg/kg)												
55630	Nitroglycerin	4.5E-01	3.6E+01	mg/kg	13SB12B - DUP AVG	8/17	0.195 - 0.276	3.6E+01	N	1.3E+02	1.7E+03	N	BSL
	Cyanide (mg/kg)												
57125	Cyanide	7.0E-02	3.5E-01	mg/kg	13SB11B	14/17	0.0356 - 0.0356	3.5E-01	N	1.6E+02	2.0E+03	N	BSL
	Dioxins/Furans (mg/g)												
1746016	Total 2,3,7,8-TCDD Equivalents	--	--	mg/kg	13SB9A	1/1	--	2.1E-06	C	4.6E-06	1.9E-05	N	BSL

Notes:

CAS = Chemical Abstracts Service
COPC = Chemical of Potential Concern
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon
TIC = Tentatively Identified Compound
DUP AVG = results for duplicate samples averaged

[1] = Chromium VI RBC value was used
[2] = Lead criteria are Action Levels; see USEPA Region III guidance
[3] = Mercuric chloride soil RBC value used
[4] = RBC value for pyrene was used for these compounds

RBC = USEPA Region III Risk-Based Concentration (RBC) values from the October 31, 2006, RBC Table and October 10, 2006, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
C = Carcinogenic per EPA RBC Table (October 2006)
N = Noncarcinogenic per EPA RBC Table (October 2006)

ARES = Above Residential RBC
ARES/IND = Above Residential RBC/Industrial RBC
BSL = Below Residential/Industrial RBC Screening Levels
NSV = No Screening Value Available

Table 4-8
Conversion of Dioxin Detections in Soil to Equivalents of 2,3,7,8-TCDD for SWMU 13
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID Sample Date		13SB9A-DUPS AVG 09/30/03		
Dioxin/Furans Method 8290	TEF[(1)]	mg/kg	Flags	2,3,7,8-TCDD Equivalents mg/kg
1,2,3,4,6,7,8,9-OCDD	0.0003	2.21E-03	J	6.63E-07
1,2,3,4,6,7,8,9-OCDF	0.0003	7.78E-06	J	2.33E-09
1,2,3,4,6,7,8-HpCDD	0.01	4.53E-05		4.53E-07
1,2,3,4,6,7,8-HpCDF	0.01	3.63E-06	J	3.63E-08
1,2,3,4,7,8,9-HpCDF	0.01	3.52E-07	J	3.52E-09
1,2,3,4,7,8-HxCDD	0.1	6.06E-07	J	6.06E-08
1,2,3,4,7,8-HxCDF	0.1	4.79E-07	J	4.79E-08
1,2,3,6,7,8-HxCDD	0.1	1.64E-06	J	1.64E-07
1,2,3,6,7,8-HxCDF	0.1	3.89E-07	J	3.89E-08
1,2,3,7,8,9-HxCDD	0.1	1.85E-06		1.85E-07
1,2,3,7,8,9-HxCDF	0.1	< 5.88E-07		--
1,2,3,7,8-PeCDD	0.03	4.21E-07	J	1.26E-08
1,2,3,7,8-PeCDF	1	2.79E-07	J	2.79E-07
2,3,4,6,7,8-HxCDF	0.1	3.73E-07	J	3.73E-08
2,3,4,7,8-PeCDF	0.3	3.70E-07	J	1.11E-07
2,3,7,8-TCDD	1	< 1.32E-07		--
2,3,7,8-TCDF	0.1	4.89E-07	A	4.89E-08
Total HpCDD	0	9.54E-05		--
Total HpCDF	0	8.94E-06		--
Total HxCDD	0	1.61E-05		--
Total HxCDF	0	5.25E-06		--
Total PeCDD	0	3.19E-06	J	--
Total PeCDF	0	2.89E-06	J	--
Total TCDD	0	6.06E-07	J	--
Total TCDF	0	4.10E-06		--
Total 2,3,7,8-TCDD Equivalents				2.14E-06

Notes:

(1) = Developed by the World Health Organization (2005). [Van den Berg, et al. Re-evaluation of Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like compounds. ToxSci Advance Access, 7 July 2006]
mg/kg = Milligram Per Kilogram

Table 4-9
Cumulative HHRS for SWMU 13 (Surface Soil)
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Units	Detection Frequency	MDC	C/N	RBC Residential	RBC Industrial	Non Carcinogenic HI (RBC_{Res})	Excess Cancer Risk (RBC_{Res})	Non Carcinogenic HI (RBC_{ind})	Excess Cancer Risk (RBC_{ind})
	TAL Metals										
7429905	Aluminum	mg/kg	6/6	1.98E+04	--	--	--	--	--	--	--
7440382	Arsenic	mg/kg	6/6	2.55E+00	C	4.26E-01	1.91E+00	--	6.E-06	--	1.E-06
7440382	Arsenic	mg/kg	6/6	2.55E+00	N	2.35E+01	3.07E+02	1.E-01	--	8.E-03	--
7440473	Chromium[1]	mg/kg	6/6	3.80E+01	N	2.35E+02	3.07E+03	2.E-01	--	1.E-02	--
7440484	Cobalt	mg/kg	6/6	1.30E+01	--	--	--	--	--	--	--
7439896	Iron	mg/kg	6/6	3.62E+04	N	2.35E+04	3.07E+05	2.E+00	--	1.E-01	--
7439965	Manganese	mg/kg	6/6	1.32E+03	N	1.56E+03	2.04E+04	8.E-01	--	6.E-02	--
7440280	Thallium	mg/kg	6/6	8.65E-01	N	5.48E+00	7.15E+01	2.E-01	--	1.E-02	--
7440622	Vanadium	mg/kg	6/6	3.60E+01	N	7.82E+01	1.02E+03	5.E-01	--	4.E-02	--
	VOC TICs (µg/kg)										
66251	Hexanal	µg/kg	2/6	3.50E+02	--	--	--	--	--	--	--
	TCL SVOCs (µg/kg)										
59507	4-Chloro-3-Methylphenol	µg/kg	5/6	1.90E+01	--	--	--	--	--	--	--
50328	Benzo(a)pyrene	µg/kg	5/6	1.30E+02	C	2.20E+01	3.92E+02	--	6.E-06	--	3.E-07
132649	Dibenzofuran	µg/kg	2/6	1.30E+01	--	--	--	--	--	--	--
131113	Dimethylphthalate	µg/kg	2/6	1.40E+02	--	--	--	--	--	--	--
121142	2,4-Dinitrotoluene	µg/kg	3/6	7.10E+02	N	1.56E+05	2.04E+06	5.E-03	--	3.E-04	--
--	Dinitrotoluene Mix	µg/kg	2/6	9.20E+02	C	9.40E+02	4.20E+03	--	1.E-06	--	2.E-07
	SVOC TICs (µg/kg)										
301020	(Z)-9-Octadecenamide	µg/kg	1/6	1.20E+02	--	--	--	--	--	--	--
15594908	1-Heneicosanol	µg/kg	1/6	2.20E+02	--	--	--	--	--	--	--
84695	1,2-Benzenedicarboxylicacid, bis(2-methy	µg/kg	4/6	6.70E+02	--	--	--	--	--	--	--
17851535	1,2-Benzenedicarboxylic acid, butyl 2-me	µg/kg	2/6	5.30E+02	--	--	--	--	--	--	--
101371	2,4,6-Triallyloxy-1,3,5-triazine	µg/kg	2/6	6.00E+01	--	--	--	--	--	--	--
1000194624	4,4,6a,6b,8a,11,11,14b-Octamethyl-1,4,4a	µg/kg	1/6	7.10E+02	--	--	--	--	--	--	--
119755	Benzeneamine, 2-nitro-N-phenyl-	µg/kg	1/6	2.80E+02	--	--	--	--	--	--	--
123955	Butyl Ester Octadecanioc	µg/kg	1/6	1.30E+02	--	--	--	--	--	--	--
57885	Cholesterol	µg/kg	2/6	4.70E+02	--	--	--	--	--	--	--
112845	Erucylamide	µg/kg	6/6	5.70E+02	--	--	--	--	--	--	--
2136712	Ethanol, 2-(hexadecyloxy)-	µg/kg	1/6	3.90E+02	--	--	--	--	--	--	--
83476	.Gamma.-sitosterol	µg/kg	4/6	2.40E+03	--	--	--	--	--	--	--
1058613	Stigmast-4-en-3-one	µg/kg	2/6	2.40E+02	--	--	--	--	--	--	--
1000214207	Stigmasterol, 22,23-dihydro-	µg/kg	1/6	1.60E+02	--	--	--	--	--	--	--
127220	Taraxerol	µg/kg	1/6	2.90E+02	--	--	--	--	--	--	--
102761	Triacetin	µg/kg	1/6	1.40E+02	--	--	--	--	--	--	--
611927	Urea, N,N'-dimethyl-N,N'-diphenyl-	µg/kg	2/6	9.10E+02	--	--	--	--	--	--	--
10191410	Vitamin E	µg/kg	2/6	6.00E+02	--	--	--	--	--	--	--
							Cumulative Risk	3.E+00	1.E-05	3.E-01	2.E-06

Notes:

mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
CAS = Chemical Abstracts Service
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
TIC = Tentatively Identified Compound
[1] = Chromium VI RBC value was used

MDC = Maximum Detected Concentration
HI = Hazard Index
RBC = USEPA Region III Risk-Based Concentration (RBC) values from the October 31, 2006, RBC Table and October 10, 2006, Alternate RBC Table
C = Carcinogenic per EPA RBC Table (October 2006)
N = Noncarcinogenic per EPA RBC Table (October 2006)

Table 4-10
Exposure Point Concentration Summary for SWMU 13
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Medium:	Total Soil
Exposure Medium:	Total Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic (1)	Rationale (2)
Total Soil	Aluminum	mg/kg	1.38E+04	1.60E+04	2.1E+04	1.60E+04	mg/kg	95% UCL (Student's t)	85% < FOD, Normal
	Antimony	mg/kg	9.25E-01	1.21E+00	4.7E+00	1.21E+00	mg/kg	95% UCL (Land's)	50% < FOD<85%, Lognormal
	Arsenic	mg/kg	2.35E+00	2.85E+00	4.7E+00	2.85E+00	mg/kg	95% UCL (Student's t)	85% < FOD, Normal
	Chromium	mg/kg	2.94E+01	3.27E+01	3.9E+01	3.27E+01	mg/kg	95%UCL (Chebyshev)	85% < FOD, Normal
	Cobalt	mg/kg	--	--	1.6E+01	1.60E+01	mg/kg	--	--
	Iron	mg/kg	2.29E+03	3.37E+04	4.9E+04	3.37E+04	mg/kg	95% UCL (Student's t)	85% < FOD, Normal
	Manganese	mg/kg	9.13E+02	1.13E+03	1.7E+03	1.13E+03	mg/kg	95% UCL (Student's t)	85% < FOD, Normal
	Thallium	mg/kg	--	--	8.7E-01	8.70E-01	mg/kg	--	--
	Vanadium	mg/kg	2.46E+01	2.80E+01	3.6E+01	2.80E+01	mg/kg	95% UCL (Student's t)	85% < FOD, Normal
	Benzo(a)pyrene	µg/kg	4.05E+01	1.78E+02	1.9E+02	1.78E+02	ug/kg	Pro UCL-99% UCL (Chebyshev)	50% < FOD<85%, Normal
	Dinitrotoluene Mix	µg/kg	1.74E+02	2.46E+02	1.2E+03	2.46E+02	ug/kg	95% UCL (Bounding)	FOD < 50%

Notes:
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
UCL = Upper Confidence Limit

(1) See Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites (OSWER Directive 9285.6-10, December 2002) for details on the following methods for calculating the 95% UCL:
95% UCL (Bounding) = The frequency of detection is less than 50%; therefore, the 95% UCL is calculated by the bounding method.
95% UCL (Student's t, adj) = The frequency of detection is between 50% and 85%, and the underlying distribution (detects only) is normal; therefore, Aitchison's Method is used to adjust the detects-only mean and standard deviaiton, and the 95% UCL is calculated using the Student's t method.
95% UCL (Land, adj) = The frequency of detection is between 50% and 85%, and the underlying distribution (detects only) is lognormal; therefore, Aitchison's Method is used to adjust the detects-only mean and standard deviation, and the 95% UCL is calculated using Land's method.
95% UCL (Student's t) = The frequency of detection is greater than 85%, and the distribution is normal.; therefore, the 95% UCL is calculated using the Student's t method.
95% UCL (Chebyshev) = The frequency of detection is between 50% and 85% and the underlying distribution (detects only) is neither normal nor lognormal, OR the frequency of detection is greater than 85% and the distribution (with non-detects represented by half of the detection limit) is neither normal nor lognormal; therefore, the 95% UCL is calculated using Hall's bootstrap method.
Maximum: The 95% UCL exceeds the maximum detected concentration; therefore, the maximum detected concentration is used to represent the 95% UCL.

(2) FOD = Frequency of detection
FOD < 50%: Frequency of detection is less than 50%
50% < FOD < 85%, Normal: Frequency of detection is between 50% and 85%, and the underlying distribution (detects only) is normal.
50% < FOD < 85%, Lognormal: Frequency of detection is between 50% and 85%, and the underlying distribution (detects only) is lognormal.
50% < FOD < 85%, Unknown: Frequency of detection is between 50% and 85%, and the underlying distribution (detects only) is neither normal nor lognormal.
85% < FOD, Normal: Frequency of detection is greater than 85%, and the distribution is normal.
85% < FOD, Lognormal: Frequency of detection is greater than 85%, and the distribution is lognormal.
85% < FOD, Unknown: Frequency of detection is greater than 85%, and the distribution is neither normal nor lognormal.

Table 4-11
Cumulative HHRS for SWMU 13 (Total Soil)
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Units	Detection Frequency	Maximum EPC	C/N	RBC Residential	RBC Industrial	Non Carcinogenic HI (RBC_{Res})	Excess Cancer Risk (RBC_{Res})	Non Carcinogenic HI (RBC_{Ind})	Excess Cancer Risk (RBC_{Ind})
	TAL Metals										
7429905	Aluminum	mg/kg	17/17	1.60E+04	--	--	--	--	--	--	--
7440360	Antimony	mg/kg	13/17	1.21E+00	N	3.13E+01	4.09E+02	4.E-02	--	3.E-03	--
7440382	Arsenic	mg/kg	17/17	2.85E+00	C	4.26E-01	1.91E+00	--	7.E-06	--	1.E-06
7440382	Arsenic	mg/kg	17/17	2.85E+00	N	2.35E+01	3.07E+02	1.E-01	--	9.E-03	--
7440473	Chromium[1]	mg/kg	17/17	3.27E+01	N	2.35E+02	3.07E+03	1.E-01	--	1.E-02	--
7440484	Cobalt	mg/kg	17/17	3.37E+01	--	--	--	--	--	--	--
7439896	Iron	mg/kg	17/17	3.37E+04	N	2.35E+04	3.07E+05	1.E+00	--	1.E-01	--
7439965	Manganese	mg/kg	17/17	1.13E+03	N	1.56E+03	2.04E+04	7.E-01	--	6.E-02	--
7440280	Thallium	mg/kg	17/17	8.70E-01	N	5.48E+00	7.15E+01	2.E-01	--	1.E-02	--
7440622	Vanadium	mg/kg	17/17	2.80E+01	N	7.82E+01	1.02E+03	4.E-01	--	3.E-02	--
	VOC TICs (µg/kg)										
66251	Hexanal	ug/kg	6/17	3.50E+02	--	--	--	--	--	--	--
	TCL SVOCs (µg/kg)										
59507	4-Chloro-3-Methylphenol	ug/kg	11/17	2.40E+01	--	--	--	--	--	--	--
50328	Benzo(a)pyrene	ug/kg	13/17	1.78E+02	C	2.20E+01	3.92E+02	--	8.E-06	--	5.E-07
132649	Dibenzofuran	ug/kg	2/17	1.30E+01	--	--	--	--	--	--	--
131113	Dimethylphthalate	ug/kg	4/17	5.50E+02	--	--	--	--	--	--	--
121142	2,4-Dinitrotoluene	ug/kg	7/17	1.10E+03	N	1.56E+05	2.04E+06	7.E-03	--	5.E-04	--
606202	2,6-Dinitrotoluene	ug/kg	3/17	2.10E+02	N	7.82E+04	1.02E+06	3.E-03	--	2.E-04	--
--	Dinitrotoluene Mix	ug/kg	5/17	2.46E+02	C	9.40E+02	4.20E+03	--	3.E-07	--	6.E-08
	SVOC TICs (µg/kg)										
301020	(Z)-9-Octadecenamide	ug/kg	2/17	1.20E+02	--	--	--	--	--	--	--
15594908	1-Heneicosanol	ug/kg	1/17	2.20E+02	--	--	--	--	--	--	--
72101190	1,1'-Biphenyl, (1,1-dimethylethoxy)-	ug/kg	1/17	3.60E+02	--	--	--	--	--	--	--
69009901	1,1'-Biphenyl, bis(1-methylethyl)-	ug/kg	1/17	6.60E+01	--	--	--	--	--	--	--
84695	1,2-Benzenedicarboxylicacid, bis(2-methy	ug/kg	11/17	6.70E+02	--	--	--	--	--	--	--
17851535	1,2-Benzenedicarboxylic acid, butyl 2-me	ug/kg	5/17	5.30E+02	--	--	--	--	--	--	--
84640	1,2-Benzenedicarboxylic acid, butyl cycl	ug/kg	1/17	3.10E+02	--	--	--	--	--	--	--
149575	2-Ethyl-hexanoic Acid	ug/kg	1/17	1.60E+02	--	--	--	--	--	--	--
101371	2,4,6-Triallyloxy-1,3,5-triazine	ug/kg	6/17	1.50E+02	--	--	--	--	--	--	--
1000194624	4,4,6a,6b,8a,11,11,14b-Octamethyl-1,4,4a	ug/kg	1/17	7.10E+02	--	--	--	--	--	--	--
207841	7H-Dibenzo (a,g) carbazole	ug/kg	1/17	2.80E+02	--	--	--	--	--	--	--
112798	9-Octadecenoic acid, (E)-	ug/kg	1/17	7.40E+01	--	--	--	--	--	--	--
119755	Benzeneamine, 2-nitro-N-phenyl-	ug/kg	5/17	7.50E+02	--	--	--	--	--	--	--
142165	Bis(2-ethylhexyl)maleate	ug/kg	2/17	1.40E+02	--	--	--	--	--	--	--
123955	Butyl Ester Octadecanioc	ug/kg	1/17	1.30E+02	--	--	--	--	--	--	--
57885	Cholesterol	ug/kg	2/17	4.70E+02	--	--	--	--	--	--	--
112845	Erucylamide	ug/kg	13/17	9.00E+02	--	--	--	--	--	--	--
2136712	Ethanol, 2-(hexadecyloxy)-	ug/kg	1/17	3.90E+02	--	--	--	--	--	--	--
24085652	Ether, bis(p-tert-butylphenyl)	ug/kg	1/17	8.30E+02	--	--	--	--	--	--	--
83476	.Gamma.-sitosterol	ug/kg	5/17	2.40E+03	--	--	--	--	--	--	--
630024	Octacosane	ug/kg	1/17	1.80E+02	--	--	--	--	--	--	--
1058613	Stigmast-4-en-3-one	ug/kg	2/17	2.40E+02	--	--	--	--	--	--	--
1000214207	Stigmasterol, 22,23-dihydro-	ug/kg	1/17	1.60E+02	--	--	--	--	--	--	--
127220	Taraxerol	ug/kg	1/17	2.90E+02	--	--	--	--	--	--	--
638584	Tetradecanamide	ug/kg	1/17	6.00E+01	--	--	--	--	--	--	--
102761	Triacetin	ug/kg	3/17	1.15E+03	--	--	--	--	--	--	--
115866	Triphenyl Phosphate	ug/kg	2/17	2.00E+02	--	--	--	--	--	--	--
611927	Urea, N,N'-dimethyl-N,N'-diphenyl-	ug/kg	3/17	9.10E+02	--	--	--	--	--	--	--
10191410	Vitamin E	ug/kg	2/17	6.00E+02	--	--	--	--	--	--	--
							Cumulative Risk	3.E+00	2.E-05	2.E-01	2.E-06

Notes:

CAS = Chemical Abstracts Service
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
TIC = Tentatively Identified Compound

mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
[1] = Chromium VI RBC value was used
HI = Hazard Index
EPC = Exposure Point Concentration

RBC = USEPA Region III Risk-Based Concentration (RBC) values from the October 31, 2006, RBC Table and October 10, 2006, Alternate RBC Table
C = Carcinogenic per EPA RBC Table (October 2006)
N = Noncarcinogenic per EPA RBC Table (October 2006)

Table 4-12
HHRS SSL Comparison for SWMU 13 (Soil)
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Soil to Groundwater SSL (DAF 20)	COPC Flag (Y/N)	Rationale for Selection or Deletion
	TAL Metals (mg/kg)										
7429905	Aluminum	4,250	21,400	mg/kg	13SB7C	11/11	1.83 - 1.83	21,400	--	Y	NSV
7440360	Antimony	0.09	4.7	mg/kg	13SB11B	8/11	0.0518 - 0.0518	4.7	13.2	N	BSL
7440382	Arsenic	0.12	4.7	mg/kg	13SB11C	11/11	0.0232 - 0.0232	4.7	0.026	N	BSL
7440393	Barium	29	211	mg/kg	13SB11C	11/11	0.106 - 0.106	211	6,015.2	N	BSL
7440417	Beryllium	0.65	1.3	mg/kg	13SB7C	6/11	0.0333 - 0.167	1.3	1,153.7	N	BSL
7440439	Cadmium	0.72	2.7	mg/kg	13SB11C	11/11	0.182 - 0.182	2.7	27.4	N	BSL
7440702	Calcium	1,300	4,730	mg/kg	13SB12B - DUP AVG	11/11	16.6 - 16.6	4,730	Nutrient	N	Nutrient
7440473	Chromium[1]	11	39	mg/kg	13SB11C	11/11	0.912 - 0.912	39	42	N	BSL
7440484	Cobalt	3.90	16	mg/kg	13SB11C	11/11	0.208 - 0.208	16	--	Y	NSV
7440508	Copper	2.50	98	mg/kg	13SB11B	11/11	0.368 - 1.84	98	10,517.8	N	BSL
7439896	Iron	5,330	48,600	mg/kg	13SB11C	11/11	4.24 - 42.4	48,600	--	Y	NSV
7439921	Lead [2]	12.00	26,500	mg/kg	13SB11B	11/11	0.0218 - 109	26,500	--	Y	NSV
7439954	Magnesium	1,210	3,980	mg/kg	13SB12C	11/11	3.21 - 3.21	3,980	Nutrient	N	Nutrient
7439965	Manganese	59	1,700	mg/kg	13SB11C	11/11	0.264 - 6.6	1,700	951.9	N	BSL
7439976	Mercury [3]	0.01	0.13	mg/kg	13SB12C	10/11	0.0077 - 0.0077	0.13	--	Y	NSV
7440020	Nickel	3.80	21.00	mg/kg	13SB11C	11/11	0.0356 - 0.0356	21	--	Y	NSV
7440097	Potassium	548	2,150	mg/kg	13SB12C	11/11	5 - 5	2,150	Nutrient	N	Nutrient
7782492	Selenium	0.23	1.50	mg/kg	13SB11C	11/11	0.0502 - 0.0502	1.50	19	N	BSL
7440224	Silver	0.02	0.45	mg/kg	13SB8B	11/11	0.0044 - 0.0044	0.45	31	N	BSL
7440235	Sodium	46	170	mg/kg	13SB12B - DUP AVG	11/11	18.1 - 18.1	170	Nutrient	N	Nutrient
7440280	Thallium	0.05	0.86	mg/kg	13SB7C	11/11	0.027 - 0.027	0.86	3.6	N	BSL
7440622	Vanadium	11	36	mg/kg	13SB7C	11/11	0.207 - 0.207	36	730	N	BSL
7440666	Zinc	46	1,070	mg/kg	13SB11C	11/11	0.517 - 12.9	1,070	13,622	N	BSL
	TCL VOCs (µg/kg)										
78933	2-Butanone	2.4E+01	4.0E+02	µg/kg	13SB9B	10/11	5.5 - 8	4.0E+02	2.9E+04	N	BSL
67641	Acetone	3.1E+01	2.0E+02	µg/kg	13SB11C	11/11	5.5 - 8	2.0E+02	2.2E+04	N	BSL
71432	Benzene	6.9E-01	1.5E+00	µg/kg	13SB11B	3/11	0.58 - 0.843	1.5E+00	1.9E+00	N	BSL
156592	cis-1,2-Dichloroethene	1.9E+00	4.2E+00	µg/kg	13SB11C	2/11	0.781 - 1.14	4.2E+00	--	Y	NSV
75092	Methylene chloride	5.0E+00	7.4E+00	µg/kg	13SB10C	10/11	3.09 - 4.5	7.4E+00	1.9E+01	N	BSL
108883	Toluene	1.0E+00	1.4E+00	µg/kg	13SB11B	3/11	0.51 - 0.742	1.4E+00	2.7E+04	N	BSL
79016	Trichloroethene	3.1E+01	5.7E+01	µg/kg	13SB11C	2/11	0.745 - 1.08	5.7E+01	2.6E-01	Y	**ASSL**
	VOC TICs (µg/kg)										
60297	Ethyl Ether	2.8E+01	2.8E+01	µg/kg	13SB12C	1/11	0 - 0	2.8E+01	8.5E+03	N	BSL
66251	Hexanal	4.7E+00	9.0E+00	µg/kg	13SB10B	4/11	0 - 0	9.0E+00	--	Y	NSV
	TCL SVOCs (µg/kg)										
91576	2-Methylnaphthalene	4.0E+00	4.0E+00	µg/kg	13SB10B	1/11	3.01 - 4.38	4.0E+00	4.4E+03	N	BSL
121142	2,4-Dinitrotoluene	5.1E+01	1.1E+03	µg/kg	13SB12B - DUP AVG	4/11	3.47 - 5.04	1.1E+03	5.7E+02	N	BSL
606202	2,6-Dinitrotoluene	3.2E+01	5.9E+01	µg/kg	13SB12B - DUP AVG	2/11	30.5 - 44.3	5.9E+01	2.5E+02	N	BSL
--	Dinitrotoluene Mix	6.5E+01	1.2E+03	µg/kg	13SB12B - DUP AVG	3/11	0 - 0	1.2E+03	--	Y	NSV
59507	4-Chloro-3-Methylphenol	8.0E+00	2.4E+01	µg/kg	13SB8B	6/11	5.73 - 8.34	2.4E+01	--	Y	NSV
83329	Acenaphthene	3.0E+00	4.0E+00	µg/kg	13SB10B	2/11	1.89 - 2.75	4.0E+00	1.0E+05	N	BSL
208968	Acenaphthylene [4]	2.0E+00	6.0E+00	µg/kg	13SB10B	3/11	1.65 - 2.4	6.0E+00	--	Y	NSV
120127	Anthracene	1.6E+01	2.2E+01	µg/kg	13SB10C	2/11	5.08 - 7.39	2.2E+01	4.7E+05	N	BSL
56553	Benzo(a)anthracene	2.2E+01	7.3E+01	µg/kg	13SB10B	4/11	1.86 - 21.3	7.3E+01	4.8E+02	N	BSL
50328	Benzo(a)pyrene	7.0E+00	9.5E+01	µg/kg	13SB10B	8/11	4.72 - 9.14	9.5E+01	1.2E+02	N	BSL
205992	Benzo(b)fluoranthene	1.3E+01	1.5E+02	µg/kg	13SB10B	8/11	10.7 - 15.6	1.5E+02	1.5E+03	N	BSL
191242	Benzo(g,h,i)perylene [4]	1.4E+01	6.0E+01	µg/kg	13SB10B	5/11	9.59 - 14	6.0E+01	--	Y	NSV
207089	Benzo(k)fluoranthene	2.2E+01	6.4E+01	µg/kg	13SB10B	3/11	14.7 - 21.4	6.4E+01	1.5E+04	N	BSL
117817	Bis(2-ethylhexyl)phthalate	1.5E+01	1.0E+03	µg/kg	13SB12C	11/11	2.28 - 3.31	1.0E+03	2.9E+06	N	BSL
85687	Butylbenzylphthalate	6.0E+00	4.0E+01	µg/kg	13SB11C	4/11	4.93 - 7.17	4.0E+01	1.7E+07	N	BSL
218019	Chrysene	1.6E+01	1.0E+02	µg/kg	13SB10B	7/11	11.2 - 16.3	1.0E+02	4.8E+04	N	BSL
53703	Dibenz(a,h)anthracene	1.3E+01	1.6E+01	µg/kg	13SB10B	2/11	6.49 - 9.44	1.6E+01	4.6E+02	N	BSL

Table 4-12
HHRS SSL Comparison for SWMU 13 (Soil)
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Soil to Groundwater SSL (DAF 20)	COPC Flag (Y/N)	Rationale for Selection or Deletion
84662	Diethylphthalate	3.0E+00	2.3E+03	µg/kg	13SB12B - DUP AVG	11/11	2.09 - 5.32	2.3E+03	4.5E+05	N	BSL
131113	Dimethylphthalate	1.7E+01	5.5E+02	µg/kg	13SB11B	2/11	3.64 - 5.3	5.5E+02	--	Y	NSV
84742	Di-n-butylphthalate	8.5E+01	1.6E+03	µg/kg	13SB12B - DUP AVG	11/11	4.2 - 10.7	1.6E+03	5.0E+06	N	BSL
206440	Fluoranthene	1.1E+01	9.0E+01	µg/kg	13SB10B	8/11	2.59 - 3.76	9.0E+01	6.3E+06	N	BSL
86737	Fluorene	4.0E+00	4.0E+00	µg/kg	13SB10B	2/11	1.85 - 2.69	4.0E+00	1.4E+05	N	BSL
193395	Indeno(1,2,3-cd)pyrene	5.0E+00	5.4E+01	µg/kg	13SB10B	7/11	4.31 - 6.27	5.4E+01	4.2E+03	N	BSL
91203	Naphthalene	1.5E+01	1.5E+01	µg/kg	13SB12C	1/11	3.03 - 4.4	1.5E+01	1.5E+02	N	BSL
86306	N-Nitrosodiphenylamine	1.2E+02	9.5E+02	µg/kg	13SB11B	4/11	5.23 - 7.6	9.5E+02	7.6E+02	N	BSL
85018	Phenanthrene [4]	5.3E+00	5.2E+01	µg/kg	13SB12C	8/11	2.53 - 3.68	5.2E+01	--	Y	NSV
129000	Pyrene	3.0E+00	8.3E+01	µg/kg	13SB10B	9/11	1.63 - 2.37	8.3E+01	6.8E+05	N	BSL
	SVOC TICs (µg/kg)										
301020	(Z)-9-Octadecenamide	8.3E+01	8.3E+01	µg/kg	13SB9B	1/11	0 - 0	8.3E+01	--	Y	NSV
72101190	1,1'-Biphenyl, (1,1-dimethylethoxy)-	3.6E+02	3.6E+02	µg/kg	13SB12C	1/11	0 - 0	3.6E+02	--	Y	NSV
69009901	1,1'-Biphenyl, bis(1-methylethyl)-	6.6E+01	6.6E+01	µg/kg	13SB12B - DUP AVG	1/11	0 - 0	6.6E+01	--	Y	NSV
84695	1,2-Benzenedicarboxylicacid, bis(2-methy	1.4E+02	5.3E+02	µg/kg	13SB10C	7/11	0 - 0	5.3E+02	--	Y	NSV
17851535	1,2-Benzenedicarboxylic acid, butyl 2-me	4.7E+01	3.5E+02	µg/kg	13SB9C	3/11	0 - 0	3.5E+02	--	Y	NSV
84640	1,2-Benzenedicarboxylic acid, butyl cycl	3.1E+02	3.1E+02	µg/kg	13SB11C	1/11	0 - 0	3.1E+02	--	Y	NSV
149575	2-Ethyl-hexanoic Acid	1.6E+02	1.6E+02	µg/kg	13SB12B - DUP AVG	1/11	0 - 0	1.6E+02	--	Y	NSV
101371	2,4,6-Triallyloxy-1,3,5-triazine	3.6E+01	1.5E+02	µg/kg	13SB10B	4/11	0 - 0	1.5E+02	--	Y	NSV
207841	7H-Dibenzo (a,g) carbazole	2.8E+02	2.8E+02	µg/kg	13SB12B - DUP AVG	1/11	0 - 0	2.8E+02	--	Y	NSV
112798	9-Octadecenoic acid, (E)-	7.4E+01	7.4E+01	µg/kg	13SB8B	1/11	0 - 0	7.4E+01	--	Y	NSV
0118967	Benzene, 2-methyl-1,3,5-trinitro-	2.1E+02	2.1E+02	µg/kg	13SB12B - DUP AVG	1/11	0 - 0	2.1E+02	--	Y	NSV
119755	Benzeneamine, 2-nitro-N-phenyl-	7.1E+01	7.5E+02	µg/kg	13SB12B - DUP AVG	4/11	0 - 0	7.5E+02	--	Y	NSV
142165	Bis(2-ethylhexyl)maleate	1.2E+02	1.4E+02	µg/kg	13SB11C	2/11	0 - 0	1.4E+02	--	Y	NSV
112845	Erucylamide	1.2E+02	9.0E+02	µg/kg	13SB10B	7/11	0 - 0	9.0E+02	--	Y	NSV
24085652	Ether, bis(p-tert-butylphenyl)	8.3E+02	8.3E+02	µg/kg	13SB12C	1/11	0 - 0	8.3E+02	--	Y	NSV
83476	.Gamma.-sitosterol	7.6E+01	7.6E+01	µg/kg	13SB8B	1/11	0 - 0	7.6E+01	--	Y	NSV
630024	Octacosane	1.8E+02	1.8E+02	µg/kg	13SB12B - DUP AVG	1/11	0 - 0	1.8E+02	--	Y	NSV
638584	Tetradecanamide	6.0E+01	6.0E+01	µg/kg	13SB8B	1/11	0 - 0	6.0E+01	--	Y	NSV
102761	Triacetin	2.4E+02	1.2E+03	µg/kg	13SB12B - DUP AVG	2/11	0 - 0	1.2E+03	--	Y	NSV
115866	Triphenyl Phosphate	1.1E+02	2.0E+02	µg/kg	13SB12B - DUP AVG	2/11	0 - 0	2.0E+02	--	Y	NSV
611927	Urea, N,N'-dimethyl-N,N'-diphenyl-	1.0E+02	1.0E+02	µg/kg	13SB12B	1/11	0 - 0	1.0E+02	--	Y	NSV
	PAHs (µg/kg)										
120127	Anthracene	1.0E+00	1.4E+01	µg/kg	13SB10B	7/11	0.77 - 1.12	1.4E+01	4.7E+05	N	BSL
56553	Benzo(a)anthracene	1.4E+00	5.6E+01	µg/kg	13SB10B	10/11	0.88 - 1.28	5.6E+01	4.8E+02	N	BSL
50328	Benzo(a)pyrene	4.4E+00	1.3E+02	µg/kg	13SB10B	6/11	1.1 - 1.6	1.3E+02	1.2E+02	N	BSL
205992	Benzo(b)fluoranthene	3.8E+00	9.1E+01	µg/kg	13SB10B	6/11	1.43 - 2.08	9.1E+01	1.5E+03	N	BSL
191242	Benzo(g,h,i)perylene [4]	1.5E+01	2.9E+02	µg/kg	13SB10B	6/11	13.8 - 20	2.9E+02	--	Y	NSV
207089	Benzo(k)fluoranthene	4.5E+00	5.2E+01	µg/kg	13SB10B	5/11	1.1 - 1.6	5.2E+01	1.5E+04	N	BSL
218019	Chrysene	1.7E+00	8.0E+01	µg/kg	13SB10B	9/11	1.32 - 1.92	8.0E+01	4.8E+04	N	BSL
53703	Dibenz(a,h)anthracene	5.3E+00	8.0E+00	µg/kg	13SB10B	2/11	1.54 - 2.24	8.0E+00	4.6E+02	N	BSL
206440	Fluoranthene	3.3E+00	1.3E+02	µg/kg	13SB12C	9/11	1.87 - 2.72	1.3E+02	6.3E+06	N	BSL
86737	Fluorene	1.2E+01	1.2E+01	µg/kg	13SB11B	1/11	1.43 - 2.08	1.2E+01	1.4E+05	N	BSL
193395	Indeno(1,2,3-cd)pyrene	3.6E+00	1.1E+02	µg/kg	13SB10B	7/11	0.77 - 1.12	1.1E+02	4.2E+03	N	BSL
85018	Phenanthrene [4]	1.8E+00	1.1E+02	µg/kg	13SB11B	10/11	0.66 - 0.96	1.1E+02	--	Y	NSV
129000	Pyrene	3.0E+00	9.9E+01	µg/kg	13SB12C	10/11	0.99 - 1.44	9.9E+01	6.8E+05	N	BSL
	Explosives (mg/kg)										
99650	1,3-Dinitrobenzene	2.0E-01	2.0E-01	mg/kg	13SB12B - DUP AVG	1/11	0.159 - 0.159	2.0E-01	3.7E-02	Y	**ASSL**
121142	2,4-Dinitrotoluene	1.3E-01	1.3E-01	mg/kg	13SB12B - DUP AVG	1/11	0.142 - 0.142	1.3E-01	5.7E-01	N	BSL
--	Dinitrotoluene Mix	1.3E-01	1.3E-01	mg/kg	13SB12B - DUP AVG	1/11	0 - 0	1.3E-01	--	Y	NSV
118967	2,4,6-Trinitrotoluene	5.4E-01	5.6E-01	mg/kg	13SB12B - DUP AVG	2/11	0.167 - 0.167	5.6E-01	--	Y	NSV
121824	RDX (Hexahydro-1,3,5-trinitro-1,3,5-tria	1.8E-01	1.8E-01	mg/kg	13SB12B - DUP AVG	1/11	0.131 - 0.131	1.8E-01	--	Y	NSV

Table 4-12
HHRS SSL Comparison for SWMU 13 (Soil)
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Soil to Groundwater SSL (DAF 20)	COPC Flag (Y/N)	Rationale for Selection or Deletion
	Nitroglycerin/PETN (mg/kg)										
55630	Nitroglycerin	9.5E-01	3.6E+01	mg/kg	13SB12B - DUP AVG	5/11	0.2 - 0.265	3.6E+01	--	Y	NSV
	Cyanide (mg/kg)										
57125	Cyanide	1.1E-01	3.5E-01	mg/kg	13SB11B	8/11	0.0356 - 0.0356	3.5E-01	1.5E+02	N	BSL

Notes:

CAS = Chemical Abstracts Service
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
PAH = Polynuclear Aromatic Compound
TIC = Tentatively Identified Compound
[1] = Chromium VI SSL DAF20 value was used
[2] = Lead criteria are Action Levels; see USEPA Region III guidance
[3] = Mercuric chloride soil RBC value used
[4] = RBC value for pyrene was used for these compounds

DUP AVG = results for duplicate samples averaged
SSL DAF20 = Soil Screening Levels at a Dilution Attenuation Factor of 20 Per (SSL) values from the October 31, 2006, RBC Table

ASSL = Above Soil Screening Level
BSL = Below Soil Screening Levels
NSV = No Screening Value Available
* = Surface Soil Detections used for SSL Screening due to testing of one surface soil sample for PCB/Pesticides/Herbicides

Table 4-13
COPC/Background Comparison for SWMU 13
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Surface Soil COPC/Background Comparison

CAS #	Chemical	Minimum Concentration Surface Soil	Maximum Concentration Surface Soil	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Point Estimate[A]	Background Comparison
	TAL Metals (mg/kg)								
7429905	Aluminum	6,630	19,800	13SB11A	6/6	1.83 - 1.83	19,800	40,041	N
7440360	Antimony	0.069	1.1	13SB12A	5/6	0.0518 - 0.0518	1.1	--	NBE
7440382	Arsenic	1.6	2.55	13SB9A	6/6	0.0232 - 0.0232	2.55	16	N
7440473	Chromium	18	38	13SB11A	6/6	0.912 - 0.912	38	65	N
7440484	Cobalt	5.10	13	13SB11A	6/6	0.208 - 0.208	13	72	N
7439896	Iron	14,800	36,200	13SB9A	6/6	21.2 - 42.4	36,200	50,962	N
7439921	Lead	111.00	8,620	13SB8A	6/6	0.545 - 21.8	8,620	27	**Y**
7439965	Manganese	301	1,315	13SB9A	6/6	0.264 - 1.32	1,315	2,543	N
7440280	Thallium	0.13	0.865	13SB9A	6/6	0.027 - 0.027	0.865	2.11	N
7440622	Vanadium	14	36	13SB9A	6/6	0.207 - 0.207	36	108	N

Total Soil COPC/Background Comparison

CAS #	Chemical	Minimum Concentration Total Soil	Maximum Concentration Total Soil	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Point Estimate[A]	Background Comparison
	TAL Metals (mg/kg)								
7429905	Aluminum	4,250	21,400	13SB7C	17/17	1.83	21,400	40,041	N
7440360	Antimony	0.069	4.7	13SB11B	13/17	0.0518	4.7	--	NBE
7440382	Arsenic	0.12	4.7	13SB11C	17/17	0.0232	4.7	16	N
7440473	Chromium	11	39	13SB11C	17/17	0.912	39	65	N
7440484	Cobalt	3.90	16	13SB11C	17/17	0.208	16	72	N
7439896	Iron	5,330	48,600	13SB11C	17/17	4.24	48,600	50,962	N
7439921	Lead	12.00	26,500	13SB11B	17/17	0.0218	26,500	27	**Y**
7439965	Manganese	59	1,700	13SB11C	17/17	0.264	1,700	2,543	N
7440280	Thallium	0.047	0.865	13SB9A	17/17	0.027	0.865	2.11	N
7440622	Vanadium	11	36	13SB7C	17/17	0.207	36	108	N

Notes:
CAS = Chemical Abstracts Service
TAL = Target Analyte List
mg/kg = Milligram Per Kilogram
[A] = Facility-Wide Background Point Estimate as
Reported in the Facility-Wide Background Study Report (IT 2001a)
NBE = No Background Estimate Available

Table 4-14
HHRS COPC Selection (Sediment) for SWMU 13
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	C/N	Adjusted RBC Residential	Adjusted RBC Industrial	COPC Flag (Y/N)	Rationale for Selection or Deletion
	TAL Metals (mg/kg)												
7429905	Aluminum	9,870	21,500	mg/kg	13SD3-DUP AVG	2/2	1.83 - 5.1	21,500	--	--	--	Y	**NSV**
7440360	Antimony	0.18	2.7	mg/kg	13SD3-DUP AVG	2/2	0.0518 - 0.0518	2.7	N	3.13	40.9	N	BSL
7440382	Arsenic	3.30	3.55	mg/kg	13SD3-DUP AVG	2/2	0.0232 - 0.0232	3.55	C	0.43	1.91	Y	***ARES/IND***
7440393	Barium	101	150	mg/kg	13SD3-DUP AVG	2/2	0.106 - 0.106	150	N	1,564	20,440	N	BSL
7440417	Beryllium	0.83	1.3	mg/kg	13SD3-DUP AVG	2/2	0.167 - 0.167	1.3	N	16	204	N	BSL
7440439	Cadmium	0.57	0.97	mg/kg	13SD3-DUP AVG	2/2	0.182 - 0.182	0.97	N	3.91	51	N	BSL
7440702	Calcium	1,270	1,850	mg/kg	13SD3-DUP AVG	2/2	16.6 - 16.6	1,850	--	Nutrient	Nutrient	N	Nutrient
7440473	Chromium[1]	27	36	mg/kg	13SD3-DUP AVG	2/2	0.912 - 0.912	36	N	23.5	306.60	Y	**ARES**
7440484	Cobalt	9.90	13	mg/kg	13SD3-DUP AVG	2/2	0.208 - 0.208	12.5	--	--	--	Y	NSV
7440508	Copper	14.00	34	mg/kg	13SD3-DUP AVG	2/2	0.368 - 0.368	34	N	313	4,088	N	BSL
7439896	Iron	34,550	34,600	mg/kg	13SD2	2/2	71.6 - 71.6	34,600	N	2,346	30,660	Y	***ARES/IND***
7439921	Lead[2]	132.00	259	mg/kg	13SD3-DUP AVG	2/2	0.545 - 1.09	259	--	400	750	N	BSL
7439954	Magnesium	2,130	3,450	mg/kg	13SD3-DUP AVG	2/2	3.21 - 3.21	3,450	--	Nutrient	Nutrient	N	Nutrient
7439965	Manganese	594	720	mg/kg	13SD2	2/2	0.264 - 0.264	720	N	156	2,044	Y	**ARES**
7439976	Mercury[3]	0.03	0.12	mg/kg	13SD3-DUP AVG	2/2	0.0077 - 0.0077	0.12	--	0.8	10	N	BSL
7440020	Nickel	12.00	18.50	mg/kg	13SD3-DUP AVG	2/2	0.0356 - 0.0356	18.5	N	156	2,044	N	BSL
7440097	Potassium	1,020	1,735	mg/kg	13SD3-DUP AVG	2/2	5 - 5	1,735	--	Nutrient	Nutrient	N	Nutrient
7782492	Selenium	0.85	1.20	mg/kg	13SD3-DUP AVG	2/2	0.0502 - 0.0502	1.20	N	39.1	511	N	BSL
7440224	Silver	0.12	0.13	mg/kg	13SD3-DUP AVG	2/2	0.0044 - 0.0044	0.13	N	39.1	511	N	BSL
7440235	Sodium	45	53	mg/kg	13SD2	2/2	8.92 - 8.92	53	--	Nutrient	Nutrient	N	Nutrient
7440280	Thallium	0.46	0.51	mg/kg	13SD3-DUP AVG	2/2	0.027 - 0.027	0.51	N	0.55	7.15	N	BSL
7440622	Vanadium	19	38	mg/kg	13SD3-DUP AVG	2/2	0.207 - 0.207	38	N	7.8	102	Y	**ARES**
7440666	Zinc	442	541	mg/kg	13SD3-DUP AVG	2/2	3.35 - 3.35	541	N	2,346	30,660	N	BSL
	TCL VOCs (µg/kg)												
78933	2-Butanone	3.1E+01	4.2E+01	µg/kg	13SD2	2/2	7.5 - 7.5	42	N	4.7E+06	6.1E+07	N	BSL
67641	Acetone	7.0E+01	1.8E+02	µg/kg	13SD2	2/2	7.5 - 7.5	180	N	7.0E+06	9.2E+07	N	BSL
156592	cis-1,2-Dichloroethene	9.5E+00	9.5E+00	µg/kg	13SD3-DUP AVG	1/2	1.07 - 1.07	9.5	N	7.8E+04	1.0E+06	N	BSL
75092	Methylene chloride	4.4E+00	4.4E+00	µg/kg	13SD3-DUP AVG	1/2	4.22 - 4.22	4.36	C	8.5E+04	3.8E+05	N	BSL
127184	Tetrachloroethene	3.6E+00	3.6E+00	µg/kg	13SD3-DUP AVG	1/2	0.92 - 0.92	3.55	C	1.2E+03	5.3E+03	N	BSL
108883	Toluene	1.1E+00	1.4E+00	µg/kg	13SD3-DUP AVG	2/2	0.696 - 0.696	1.4	N	6.3E+05	8.2E+06	N	BSL
79016	Trichloroethene	5.1E+01	5.1E+01	µg/kg	13SD3-DUP AVG	1/2	1.02 - 1.02	51	C	1.6E+03	7.2E+03	N	BSL
	TCL SVOCs (µg/kg)												
91576	2-Methylnaphthalene	7.0E+00	1.2E+01	µg/kg	13SD2	2/2	4.11 - 4.11	12	N	3.1E+04	4.1E+05	N	BSL
83329	Acenaphthene	5.0E+00	5.0E+00	µg/kg	13SD2	1/2	2.58 - 2.58	5	N	4.7E+05	6.1E+06	N	BSL
208968	Acenaphthylene[4]	6.0E+00	6.0E+00	µg/kg	13SD3-DUP AVG	1/2	2.25 - 2.25	6	N	2.3E+05	3.1E+06	N	BSL
120127	Anthracene	2.8E+01	2.8E+01	µg/kg	13SD3-DUP AVG	1/2	6.93 - 6.93	28	N	2.3E+06	3.1E+07	N	BSL
56553	Benzo(a)anthracene	3.3E+01	5.8E+01	µg/kg	13SD3-DUP AVG	2/2	20 - 20	58	C	2.2E+02	3.9E+03	N	BSL
50328	Benzo(a)pyrene	4.2E+01	9.7E+01	µg/kg	13SD3-DUP AVG	2/2	8.57 - 8.57	96.5	C	2.2E+01	3.9E+02	Y	**ARES**
205992	Benzo(b)fluoranthene	6.4E+01	1.4E+02	µg/kg	13SD3-DUP AVG	2/2	14.6 - 14.6	138	C	2.2E+02	3.9E+03	N	BSL
191242	Benzo(g,h,i)perylene[4]	3.5E+01	6.9E+01	µg/kg	13SD3-DUP AVG	2/2	13.1 - 13.1	68.5	N	2.3E+05	3.1E+06	N	BSL
207089	Benzo(k)fluoranthene	2.7E+01	6.4E+01	µg/kg	13SD3-DUP AVG	2/2	20.1 - 20.1	64	C	2.2E+03	3.9E+04	N	BSL
117817	Bis(2-ethylhexyl)phthalate	2.8E+01	3.8E+01	µg/kg	13SD3-DUP AVG	2/2	3.11 - 3.11	38	C	4.6E+04	2.0E+05	N	BSL
218019	Chrysene	3.7E+01	1.4E+02	µg/kg	13SD3-DUP AVG	2/2	15.3 - 15.3	142	C	2.2E+04	3.9E+05	N	BSL
53703	Dibenz(a,h)anthracene	1.5E+01	2.3E+01	µg/kg	13SD3-DUP AVG	2/2	8.85 - 8.85	23.4	C	2.2E+01	3.9E+02	Y	**ARES**
84662	Diethylphthalate	1.4E+01	2.0E+01	µg/kg	13SD3-DUP AVG	2/2	2.85 - 2.85	20	N	6.3E+06	8.2E+07	N	BSL
131113	Dimethylphthalate	7.0E+02	7.0E+02	µg/kg	13SD3-DUP AVG	1/2	4.97 - 4.97	701	--	--	--	Y	NSV
84742	Di-n-butylphthalate	6.9E+01	1.2E+02	µg/kg	13SD3-DUP AVG	2/2	5.73 - 5.73	120	N	7.8E+05	1.0E+07	N	BSL
206440	Fluoranthene	3.0E+01	5.6E+01	µg/kg	13SD2	2/2	3.53 - 3.53	56	N	3.1E+05	4.1E+06	N	BSL
86737	Fluorene	2.7E+00	5.0E+00	µg/kg	13SD2	2/2	2.52 - 2.52	5	N	3.1E+05	4.1E+06	N	BSL
193395	Indeno(1,2,3-cd)pyrene	3.1E+01	6.5E+01	µg/kg	13SD3-DUP AVG	2/2	5.88 - 5.88	65	C	2.2E+02	3.9E+03	N	BSL
91203	Naphthalene	3.6E+00	3.6E+00	µg/kg	13SD3-DUP AVG	1/2	4.13 - 4.13	3.6	N	1.6E+05	2.0E+06	N	BSL
85018	Phenanthrene[4]	2.2E+01	3.4E+01	µg/kg	13SD2	2/2	3.45 - 3.45	34	N	2.3E+05	3.1E+06	N	BSL
129000	Pyrene	3.0E+01	5.1E+01	µg/kg	13SD2	2/2	2.22 - 2.22	51	N	2.3E+05	3.1E+06	N	BSL
	SVOC TICs (µg/kg)												
301020	(Z)-9-Octadecenamide	6.6E+01	6.6E+01	µg/kg	13SD2	1/2	0 - 0	66	--	--	--	Y	NSV
84695	1,2-Benzenedicarboxylicacid, bis(2-methy	2.4E+02	2.4E+02	µg/kg	13SD3-DUP AVG	1/2	0 - 0	235	--	--	--	Y	NSV
17851535	1,2-Benzenedicarboxylic acid, butyl 2-me	9.1E+01	9.1E+01	µg/kg	13SD2	1/2	0 - 0	91	--	--	--	Y	NSV
119755	Benzeneamine, 2-nitro-N-phenyl-	2.1E+02	2.1E+02	µg/kg	13SD3-DUP AVG	1/2	0 - 0	205	--	--	--	Y	NSV
112845	Erucylamide	4.0E+02	4.0E+02	µg/kg	13SD3-DUP AVG	1/2	0 - 0	400	--	--	--	Y	NSV
198550	Perylene	1.1E+02	1.1E+02	µg/kg	13SD3-DUP AVG	1/2	0 - 0	113.5	--	--	--	Y	NSV

Table 4-14
HHRS COPC Selection (Sediment) for SWMU 13
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	C/N	Adjusted RBC Residential	Adjusted RBC Industrial	COPC Flag (Y/N)	Rationale for Selection or Deletion
	PAHs (µg/kg)												
120127	Anthracene	3.8E+00	9.4E+00	µg/kg	13SD3-DUP AVG	2/2	1.05 - 1.05	9.4	N	2.3E+06	3.1E+07	N	BSL
56553	Benzo(a)anthracene	2.1E+01	3.0E+01	µg/kg	13SD3-DUP AVG	2/2	1.2 - 1.2	30	C	2.2E+02	3.9E+03	N	BSL
50328	Benzo(a)pyrene	2.6E+01	4.9E+01	µg/kg	13SD3-DUP AVG	2/2	1.5 - 1.5	49	C	2.2E+01	3.9E+02	Y	**ARES**
205992	Benzo(b)fluoranthene	2.3E+01	3.6E+01	µg/kg	13SD3-DUP AVG	2/2	1.95 - 1.95	36	C	2.2E+02	3.9E+03	N	BSL
191242	Benzo(g,h,i)perylene[4]	4.0E+01	8.8E+01	µg/kg	13SD3-DUP AVG	2/2	18.8 - 18.8	88	N	2.3E+05	3.1E+06	N	BSL
207089	Benzo(k)fluoranthene	1.2E+01	2.4E+01	µg/kg	13SD3-DUP AVG	2/2	1.5 - 1.5	24	C	2.2E+03	3.9E+04	N	BSL
218019	Chrysene	1.9E+01	4.3E+01	µg/kg	13SD3-DUP AVG	2/2	1.8 - 1.8	43.3	C	2.2E+04	3.9E+05	N	BSL
53703	Dibenz(a,h)anthracene	6.2E+00	6.2E+00	µg/kg	13SD3-DUP AVG	1/2	2.1 - 2.1	6.2	C	2.2E+01	3.9E+02	N	BSL
206440	Fluoranthene	1.9E+01	4.8E+01	µg/kg	13SD2	2/2	2.55 - 2.55	48	N	3.1E+05	4.1E+06	N	BSL
193395	Indeno(1,2,3-cd)pyrene	1.8E+01	4.5E+01	µg/kg	13SD3-DUP AVG	2/2	1.05 - 1.05	45	C	2.2E+02	3.9E+03	N	BSL
85018	Phenanthrene[4]	5.2E+00	1.6E+01	µg/kg	13SD2	2/2	0.9 - 0.9	16	N	2.3E+05	3.1E+06	N	BSL
129000	Pyrene	1.4E+01	4.5E+01	µg/kg	13SD2	2/2	1.35 - 1.35	45	N	2.3E+05	3.1E+06	N	BSL
	Cyanide (mg/kg)												
57125	Cyanide	7.0E-02	3.0E-01	µg/kg	13SD3-DUP AVG	2/2	0.0356 - 0.0356	0.295	N	1.6E+02	2.0E+03	N	BSL

Notes:

CAS = Chemical Abstracts Service
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
COPC = Chemical of Potential Concern
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon
TIC = Tentatively Identified Compound
[1] = Chromium VI RBC value was used
[2] = Lead criteria are Action Levels; see USEPA Region III guidance
[3] = Mercuric chloride soil RBC value used
[4] = RBC value for pyrene was used for these compounds

DUP AVG = results for duplicate samples averaged
RBC = USEPA Region III Risk-Based Concentration (RBC) values from the October 31, 2006, RBC Table and October 10, 2006, Alternate RBC Table
C = Carcinogenic per EPA RBC Table (October 2006)
N = Noncarcinogenic per EPA RBC Table (October 2006)

ARES = Above Residential RBC
ARES/IND = Above Residential RBC/Industrial RBC
BSL = Below Residential/Industrial RBC Screening Levels
NSV = No Screening Value Available

Table 4-15
Cumulative HHRS for SWMU 13 (Sediment)
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Units	Detection Frequency	MDC	C/N	RBC Residential	RBC Industrial	Non Carcinogenic HI (RBC_{Res})	Excess Cancer Risk (RBC_{Res})	Non Carcinogenic HI (RBC_{Ind})	Excess Cancer Risk (RBC_{Ind})
	TAL Metals										
7429905	Aluminum	mg/kg	2/2	2.15E+04	--	--	--	--	--	--	--
7440382	Arsenic	mg/kg	2/2	3.55E+00	C	4.26E-01	1.91E+00	--	8.E-06	--	2.E-06
7440382	Arsenic	mg/kg	2/2	3.55E+00	N	2.35E+01	3.07E+02	2.E-01	--	1.E-02	--
7440473	Chromium[1]	mg/kg	2/2	3.55E+01	N	2.35E+02	3.07E+03	2.E-01	--	1.E-02	--
7440484	Cobalt	mg/kg	2/2	1.25E+01	--	--	--	--	--	--	--
7439896	Iron	mg/kg	2/2	3.46E+04	N	2.35E+04	3.07E+05	1.E+00	--	1.E-01	--
7439965	Manganese	mg/kg	2/2	7.20E+02	N	1.56E+03	2.04E+04	5.E-01	--	4.E-02	--
7440622	Vanadium	mg/kg	2/2	3.80E+01	N	7.82E+01	1.02E+03	5.E-01	--	4.E-02	--
	TCL SVOCs										
50328	Benzo(a)pyrene	µg/kg	2/2	9.65E+01	C	2.20E+01	3.92E+02	--	4.E-06	--	2.E-07
53703	Dibenz(a,h)anthracene	µg/kg	2/2	2.34E+01	C	2.20E+01	3.92E+02	--	1.E-06	--	6.E-08
131113	Dimethylphthalate	µg/kg	1/2	7.01E+02	--	--	--	--		--	
	SVOC TICs										
301020	(Z)-9-Octadecenamide	µg/kg	1/2	6.60E+01	--	--	--	--	--	--	--
84695	1,2-Benzenedicarboxylicacid, bis(2-methy	µg/kg	1/2	2.35E+02	--	--	--	--	--	--	--
17851535	1,2-Benzenedicarboxylic acid, butyl 2-me	µg/kg	1/2	9.10E+01	--	--	--	--	--	--	--
119755	Benzeneamine, 2-nitro-N-phenyl-	µg/kg	1/2	2.05E+02	--	--	--	--	--	--	--
112845	Erucylamide	µg/kg	1/2	4.00E+02	--	--	--	--	--	--	--
198550	Perylene	µg/kg	1/2	1.14E+02	--	--	--	--	--	--	--
							Cumulative Risk	3.E+00	1.E-05	2.E-01	2.E-06

Notes:
CAS = Chemical Abstracts Service
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
SVOC = Semivolatile Organic Compound
TIC = Tentatively Identified Compound
[1] = Chromium VI RBC value was used

HI = Hazard Index
MDC = Maximum Detected Concentration
RBC = USEPA Region III Risk-Based Concentration (RBC) values from the October 31, 2006, RBC Table and October 14, 2006, Alternate RBC Table
C = Carcinogenic per EPA RBC Table (April 2006)
N = Noncarcinogenic per EPA RBC Table (April 2006)

Table 4-16
HHRS SSL Comparison for SWMU 13 (Sediment)
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Soil to Groundwater SSL (DAF 20)	COPC Flag (Y/N)	Rationale for Selection or Deletion
	TAL Metals (mg/kg)										
7429905	Aluminum	9,870	21,500	mg/kg	13SD3-DUP AVG	2/2	1.83 - 5.1	21,500	--	Y	NSV
7440360	Antimony	0.18	2.7	mg/kg	13SD3-DUP AVG	2/2	0.0518 - 0.0518	2.7	13.2	N	BSL
7440382	Arsenic	3.3	3.55	mg/kg	13SD3-DUP AVG	2/2	0.0232 - 0.0232	3.55	0.026	N	BSL
7440393	Barium	101	150	mg/kg	13SD3-DUP AVG	2/2	0.106 - 0.106	150	6,015.2	N	BSL
7440417	Beryllium	0.83	1.3	mg/kg	13SD3-DUP AVG	2/2	0.167 - 0.167	1.3	1,153.7	N	BSL
7440439	Cadmium	0.57	0.97	mg/kg	13SD3-DUP AVG	2/2	0.182 - 0.182	0.97	27.4	N	BSL
7440702	Calcium	1,270	1,850	mg/kg	13SD3-DUP AVG	2/2	16.6 - 16.6	1,850	Nutrient	N	Nutrient
7440473	Chromium	27	36	mg/kg	13SD3-DUP AVG	2/2	0.912 - 0.912	36	42.05	N	BSL
7440484	Cobalt	9.90	12.5	mg/kg	13SD3-DUP AVG	2/2	0.208 - 0.208	12.5	--	Y	NSV
7440508	Copper	14.00	34	mg/kg	13SD3-DUP AVG	2/2	0.368 - 0.368	34	10,518	N	BSL
7439896	Iron	34,550	34,600	mg/kg	13SD2	2/2	71.6 - 71.6	34,600	--	Y	NSV
7439921	Lead	132.00	259	mg/kg	13SD3-DUP AVG	2/2	0.545 - 1.09	259	--	Y	NSV
7439954	Magnesium	2,130	3,450	mg/kg	13SD3-DUP AVG	2/2	3.21 - 3.21	3,450	Nutrient	N	Nutrient
7439965	Manganese	594	720	mg/kg	13SD2	2/2	0.264 - 0.264	720	951.9	N	BSL
7439976	Mercury	0.03	0.12	mg/kg	13SD3-DUP AVG	2/2	0.0077 - 0.0077	0.12	--	Y	NSV
7440020	Nickel	12.00	18.5	mg/kg	13SD3-DUP AVG	2/2	0.0356 - 0.0356	18.5	--	Y	NSV
7440097	Potassium	1,020	1,735	mg/kg	13SD3-DUP AVG	2/2	5 - 5	1,735	Nutrient	N	Nutrient
7782492	Selenium	0.85	1.2	mg/kg	13SD3-DUP AVG	2/2	0.0502 - 0.0502	1.2	18.98	N	BSL
7440224	Silver	0.12	0.13	mg/kg	13SD3-DUP AVG	2/2	0.0044 - 0.0044	0.13	31.03	N	BSL
7440235	Sodium	45	53	mg/kg	13SD2	2/2	8.92 - 8.92	53	Nutrient	N	Nutrient
7440280	Thallium	0.46	0.51	mg/kg	13SD3-DUP AVG	2/2	0.027 - 0.027	0.51	3.6	N	BSL
7440622	Vanadium	19	38	mg/kg	13SD3-DUP AVG	2/2	0.207 - 0.207	38	730	N	BSL
7440666	Zinc	442	541	mg/kg	13SD3-DUP AVG	2/2	3.35 - 3.35	541	13,622	N	BSL
	TCL VOCs (µg/kg)										
78933	2-Butanone	3.1E+01	4.2E+01	µg/kg	13SD2	2/2	7.5 - 7.5	4.2E+01	2.9E+04	N	BSL
67641	Acetone	7.0E+01	1.8E+02	µg/kg	13SD2	2/2	7.5 - 7.5	1.8E+02	2.2E+04	N	BSL
156592	cis-1,2-Dichloroethene	9.5E+00	9.5E+00	µg/kg	13SD3-DUP AVG	1/2	1.07 - 1.07	9.5E+00	--	Y	NSV
75092	Methylene chloride	4.4E+00	4.4E+00	µg/kg	13SD3-DUP AVG	1/2	4.22 - 4.22	4.4E+00	1.9E+01	N	BSL
127184	Tetrachloroethene	3.6E+00	3.6E+00	µg/kg	13SD3-DUP AVG	1/2	0.92 - 0.92	3.6E+00	4.7E+00	N	BSL
108883	Toluene	1.1E+00	1.4E+00	µg/kg	13SD3-DUP AVG	2/2	0.696 - 0.696	1.4E+00	2.7E+04	N	BSL
79016	Trichloroethene	5.1E+01	5.1E+01	µg/kg	13SD3-DUP AVG	1/2	1.02 - 1.02	5.1E+01	2.6E-01	Y	**ASSL**
	TCL SVOCs (µg/kg)										
91576	2-Methylnaphthalene	7.0E+00	1.2E+01	µg/kg	13SD2	2/2	4.11 - 4.11	1.2E+01	4.4E+03	N	BSL
83329	Acenaphthene	5.0E+00	5.0E+00	µg/kg	13SD2	1/2	2.58 - 2.58	5.0E+00	1.0E+05	N	BSL
208968	Acenaphthylene	6.0E+00	6.0E+00	µg/kg	13SD3-DUP AVG	1/2	2.25 - 2.25	6.0E+00	--	Y	NSV
120127	Anthracene	2.8E+01	2.8E+01	µg/kg	13SD3-DUP AVG	1/2	6.93 - 6.93	2.8E+01	4.7E+05	N	BSL
56553	Benzo(a)anthracene	3.3E+01	5.8E+01	µg/kg	13SD3-DUP AVG	2/2	20 - 20	5.8E+01	4.8E+02	N	BSL
50328	Benzo(a)pyrene	4.2E+01	9.7E+01	µg/kg	13SD3-DUP AVG	2/2	8.57 - 8.57	9.7E+01	1.2E+02	N	BSL
205992	Benzo(b)fluoranthene	6.4E+01	1.4E+02	µg/kg	13SD3-DUP AVG	2/2	14.6 - 14.6	1.4E+02	1.5E+03	N	BSL
191242	Benzo(g,h,i)perylene	3.5E+01	6.9E+01	µg/kg	13SD3-DUP AVG	2/2	13.1 - 13.1	6.9E+01	--	Y	NSV
207089	Benzo(k)fluoranthene	2.7E+01	6.4E+01	µg/kg	13SD3-DUP AVG	2/2	20.1 - 20.1	6.4E+01	1.5E+04	N	BSL
117817	Bis(2-ethylhexyl)phthalate	2.8E+01	3.8E+01	µg/kg	13SD3-DUP AVG	2/2	3.11 - 3.11	3.8E+01	2.9E+06	N	BSL
218019	Chrysene	3.7E+01	1.4E+02	µg/kg	13SD3-DUP AVG	2/2	15.3 - 15.3	1.4E+02	4.8E+04	N	BSL
53703	Dibenz(a,h)anthracene	1.5E+01	2.3E+01	µg/kg	13SD3-DUP AVG	2/2	8.85 - 8.85	2.3E+01	4.6E+02	N	BSL
84662	Diethylphthalate	1.4E+01	2.0E+01	µg/kg	13SD3-DUP AVG	2/2	2.85 - 2.85	2.0E+01	4.5E+05	N	BSL
131113	Dimethylphthalate	7.0E+02	7.0E+02	µg/kg	13SD3-DUP AVG	1/2	4.97 - 4.97	7.0E+02	--	Y	NSV
84742	Di-n-butylphthalate	6.9E+01	1.2E+02	µg/kg	13SD3-DUP AVG	2/2	5.73 - 5.73	1.2E+02	5.0E+06	N	BSL
206440	Fluoranthene	3.0E+01	5.6E+01	µg/kg	13SD2	2/2	3.53 - 3.53	5.6E+01	6.3E+06	N	BSL
86737	Fluorene	2.7E+00	5.0E+00	µg/kg	13SD2	2/2	2.52 - 2.52	5.0E+00	1.4E+05	N	BSL
193395	Indeno(1,2,3-cd)pyrene	3.1E+01	6.5E+01	µg/kg	13SD3-DUP AVG	2/2	5.88 - 5.88	6.5E+01	4.2E+03	N	BSL
91203	Naphthalene	3.6E+00	3.6E+00	µg/kg	13SD3-DUP AVG	1/2	4.13 - 4.13	3.6E+00	1.5E+02	N	BSL
85018	Phenanthrene	2.2E+01	3.4E+01	µg/kg	13SD2	2/2	3.45 - 3.45	3.4E+01	--	Y	NSV
129000	Pyrene	3.0E+01	5.1E+01	µg/kg	13SD2	2/2	2.22 - 2.22	5.1E+01	6.8E+05	N	BSL

Table 4-16
HHRS SSL Comparison for SWMU 13 (Sediment)
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Soil to Groundwater SSL (DAF 20)	COPC Flag (Y/N)	Rationale for Selection or Deletion
	SVOC TICs (µg/kg)										
301020	(Z)-9-Octadecenamide	6.6E+01	6.6E+01	µg/kg	13SD2	1/2	0 - 0	6.6E+01	--	Y	NSV
84695	1,2-Benzenedicarboxylicacid, bis(2-methy	2.4E+02	2.4E+02	µg/kg	13SD3-DUP AVG	1/2	0 - 0	2.4E+02	--	Y	NSV
17851535	1,2-Benzenedicarboxylic acid, butyl 2-me	9.1E+01	9.1E+01	µg/kg	13SD2	1/2	0 - 0	9.1E+01	--	Y	NSV
119755	Benzeneamine, 2-nitro-N-phenyl-	2.1E+02	2.1E+02	µg/kg	13SD3-DUP AVG	1/2	0 - 0	2.1E+02	--	Y	NSV
112845	Erucylamide	4.0E+02	4.0E+02	µg/kg	13SD3-DUP AVG	1/2	0 - 0	4.0E+02	--	Y	NSV
198550	Perylene	1.1E+02	1.1E+02	µg/kg	13SD3-DUP AVG	1/2	0 - 0	1.1E+02	--	Y	NSV
	PAHs (µg/kg)										
120127	Anthracene	3.8E+00	9.4E+00	µg/kg	13SD3-DUP AVG	2/2	1.05 - 1.05	9.4E+00	4.7E+05	N	BSL
56553	Benzo(a)anthracene	2.1E+01	3.0E+01	µg/kg	13SD3-DUP AVG	2/2	1.2 - 1.2	3.0E+01	4.8E+02	N	BSL
50328	Benzo(a)pyrene	2.6E+01	4.9E+01	µg/kg	13SD3-DUP AVG	2/2	1.5 - 1.5	4.9E+01	1.2E+02	N	BSL
205992	Benzo(b)fluoranthene	2.3E+01	3.6E+01	µg/kg	13SD3-DUP AVG	2/2	1.95 - 1.95	3.6E+01	1.5E+03	N	BSL
191242	Benzo(g,h,i)perylene	4.0E+01	8.8E+01	µg/kg	13SD3-DUP AVG	2/2	18.8 - 18.8	8.8E+01			
207089	Benzo(k)fluoranthene	1.2E+01	2.4E+01	µg/kg	13SD3-DUP AVG	2/2	1.5 - 1.5	2.4E+01	1.5E+04	N	BSL
218019	Chrysene	1.9E+01	4.3E+01	µg/kg	13SD3-DUP AVG	2/2	1.8 - 1.8	4.3E+01	4.8E+04	N	BSL
53703	Dibenz(a,h)anthracene	6.2E+00	6.2E+00	µg/kg	13SD3-DUP AVG	1/2	2.1 - 2.1	6.2E+00	4.6E+02	N	BSL
206440	Fluoranthene	1.9E+01	4.8E+01	µg/kg	13SD2	2/2	2.55 - 2.55	4.8E+01	6.3E+06	N	BSL
193395	Indeno(1,2,3-cd)pyrene	1.8E+01	4.5E+01	µg/kg	13SD3-DUP AVG	2/2	1.05 - 1.05	4.5E+01	4.2E+03	N	BSL
85018	Phenanthrene	5.2E+00	1.6E+01	µg/kg	13SD2	2/2	0.9 - 0.9	1.6E+01	--	Y	NSV
129000	Pyrene	1.4E+01	4.5E+01	µg/kg	13SD2	2/2	1.35 - 1.35	4.5E+01	6.8E+05	N	BSL
	Cyanide (mg/kg)										
57125	Cyanide	7.0E-02	3.0E-01	µg/kg	13SD3-DUP AVG	2/2	0.0356 - 0.0356	3.0E-01	1.5E+02	N	BSL

Notes:

CAS = Chemical Abstracts Service
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
PAH = Polynuclear Aromatic Compound
TIC = Tentatively Identified Compound
[1] = Chromium VI RBC value was used
[2] = Lead criteria are Action Levels; see USEPA Region III guidance
[3] = Mercuric chloride soil RBC value used
[4] = RBC value for pyrene was used for these compounds

DUP AVG = results for duplicate samples averaged
SSL DAF20 = Soil Screening Levels at a Dilution Attenuation Factor of 20
Per (SSL) values from the October 31, 2006, RBC Table

ASSL = Above Soil Screening Level
BSL = Below Soil Screening Levels
NSV = No Screening Value Available
* = Surface Soil Detections used for SSL Screening due to testing of one surface soil sample for PCB/Pesticides/Herbicides

Table 4-17
HHRS COPC Selection (Surface Water) for SWMU 13
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	C/N	Adjusted Tap Water RBC	MCL	Virginia Water Quality Criteria[A]	COPC Flag (Y/N)	Rationale for Selection or Deletion
	TAL Metals (mg/kg)													
7429905	Aluminum	59.5	74	ug/L	13SW2	2/2	18.7 - 18.7	74	N	--	--	--	Y	NSV
7440360	Antimony	0.7	0.7	ug/L	13SW3-DUP AVG	1/2	0.552 - 0.552	0.7	N	1.5	6	--	N	BSL
7440360	Antimony, Dissolved	0.8	0.8	ug/L	13SW3-DUP AVG	1/2	0.552 - 0.552	0.8	N	1.5	6	--	N	BSL
7440393	Barium	21	22	ug/L	13SW2	2/2	1.82 - 1.82	22	N	730	2,000	2,000	N	BSL
7440393	Barium, Dissolved	17.5	18	ug/L	13SW2	2/2	1.82 - 1.82	18	N	256	2,000	2,000	N	BSL
7440702	Calcium	13,000	13,000	ug/L	13SW2	2/2	170 - 170	13,000	--	--	--	--	N	Nutrient
7440702	Calcium, Dissolved	13,000	13,000	ug/L	13SW2	2/2	170 - 170	13,000		--	--	--	N	Nutrient
7440473	Chromium	0.7	0.8	ug/L	13SW2	2/2	0.554 - 0.554	0.8	N	11	100	--	N	BSL
7440473	Chromium, Dissolved	0.7	0.7	ug/L	13SW3-DUP AVG	1/2	0.554 - 0.554	0.7	N	11	100	--	N	BSL
7439896	Iron	175	190	ug/L	13SW2	2/2	2.95 - 2.95	190	N	1,095	--	300	N	BSL
7439896	Iron, Dissolved	37	37	ug/L	13SW2	2/2	2.95 - 2.95	37	N	1,095	--	300	N	BSL
7439921	Lead	0.6	0.9	ug/L	13SW3-DUP AVG	2/2	0.281 - 0.281	0.9	--	--	15	15	N	BSL
7439954	Magnesium	5,350	5,700	ug/L	13SW2	2/2	57.4 - 57.4	5,700	--	--	--	--	N	Nutrient
7439954	Magnesium, Dissolved	5,450	5,600	ug/L	13SW2	2/2	57.4 - 57.4	5,600	--	--	--	--	N	Nutrient
7439965	Manganese	27	27	ug/L	13SW2	2/2	3.16 - 3.16	27	N	73	--	50	N	BSL
7439965	Manganese, Dissolved	6.1	10	ug/L	13SW2	2/2	3.16 - 3.16	10	N	73	--	50	N	BSL
7440020	Nickel	0.8	1	ug/L	13SW2	2/2	0.41 - 0.41	1	N	73	--	610	N	BSL
7440020	Nickel, Dissolved	0.9	1.1	ug/L	13SW2	2/2	0.41 - 0.41	1.1	N	73	--	610	N	BSL
7440097	Potassium	1,800	1,850	ug/L	13SW3-DUP AVG	2/2	59.7 - 59.7	1,850	--	--	--	--	N	Nutrient
7440097	Potassium, Dissolved	1,600	1,650	ug/L	13SW3-DUP AVG	2/2	59.7 - 59.7	1,650	--	--	--	--	N	Nutrient
7440235	Sodium	5,050	5,100	ug/L	13SW2	2/2	76.9 - 76.9	5,100	--	--	--	--	N	Nutrient
7440235	Sodium, Dissolved	5,050	5,100	ug/L	13SW2	2/2	76.9 - 76.9	5,100	--	--	--	--	N	Nutrient
7440280	Thallium	0.27	0.27	ug/L	13SW3-DUP AVG	1/2	0.208 - 0.208	0.3	N	0.26	2	--	Y	**ARBC**
7440666	Zinc	5.5	5.5	ug/L	13SW2	1/2	4.55 - 4.55	5.5	N	1,095	--	5,000	N	BSL
	TCL SVOCs (µg/L)													
117817	Bis(2-ethylhexyl)phthalate	0.3	0.3	ug/L	13SW2	2/2	0.149 - 0.149	0.3	C	5	--	--	N	BSL
85687	Butylbenzylphthalate	0.1	0.1	ug/L	13SW2	2/2	0.015 - 0.015	0.1	N	730	--	3,000	N	BSL
84662	Diethylphthalate	0.1	0.1	ug/L	13SW2	1/2	0.074 - 0.074	0.1	N	2,920	--	23,000	N	BSL
	SVOC TICs (µg/L)													
629969	(M) 1-Eicosanol	0.8	0.9	ug/L	13SW2	2/2	0 - 0	0.9	--	--	--	--	Y	NSV
301020	(Z)-9-Octadecenamide	10.4	10.4	ug/L	13SW3-DUP AVG	1/2	0 - 0	10.4	--	--	--	--	Y	NSV
36653824	1-Hexadecanol	0.5	0.5	ug/L	13SW2	1/2	0 - 0	0.5	--	--	--	--	Y	NSV
84695	1,2-Benzenedicarboxylicacid, bis(2-methy	0.5	0.8	ug/L	13SW2	2/2	0 - 0	0.8	--	--	--	--	Y	NSV
17851535	1,2-Benzenedicarboxylic acid, butyl 2-me	0.5	0.5	ug/L	13SW3-DUP AVG	1/2	0 - 0	0.5	--	--	--	--	Y	NSV
101371	2,4,6-Triallyloxy-1,3,5-triazine	1.2	1.6	ug/L	13SW2	2/2	0 - 0	1.6	--	--	--	--	Y	NSV
629970	Docosane, 11-butyl-	0.5	0.5	ug/L	13SW3-DUP AVG	1/2	0 - 0	0.5	--	--	--	--	Y	NSV
112958	Eicosane	0.5	0.5	ug/L	13SW2	1/2	0 - 0	0.5	--	--	--	--	Y	NSV
112845	Erucylamide	9.6	20.8	ug/L	13SW2	2/2	0 - 0	20.8	--	--	--	--	Y	NSV

Notes:

CAS = Chemical Abstracts Service
µg/L = Microgram Per Liter
TAL = Target Analyte List
TCL = Target Compound List
SVOC = Semivolatile Organic Compound
TIC = Tentatively Identified Compound
COPC = Chemical of Potential Concern
DUP AVG = results for duplicate samples averaged

MCL = Maximum Contaminant Level
RBC = USEPA Region III Risk-Based Concentration (RBC) values from the October 31, 2006, RBC Table and October 10, 2006, Alternate RBC Table
C = Carcinogenic per EPA RBC Table (October 2006)
N = Noncarcinogenic per EPA RBC Table (October 2006)
[A] = Virginia Water Quality Criteria Values Taken from 9 VAC 25-260-140 Human Health - Public Water Supplies Values Used

ARBC = Above Tap Water RBC
BSL = Below Tap Water RBC/MCL
NSV = No Screening Value Available

Table 4-18
Cumulative HHRS for SWMU 13 (Surface Water)
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Units	Detection Frequency	MDC	C/N	Non Carcinogenic HI ($RBC_{Tap\ Water}$)	Excess Cancer Risk ($RBC_{Tap\ Water}$)
	TAL Metals						
7429905	Aluminum	µg/L	2/2	7.40E+01	N	--	--
7440280	Thallium	µg/L	1/2	2.70E-01	N	1.E-01	--
	SVOC TICs (µg/l)						
629969	(M) 1-Eicosanol	µg/L	2/2	9.10E-01	--	--	--
301020	(Z)-9-Octadecenamide	µg/L	1/2	1.04E+01	--	--	--
36653824	1-Hexadecanol	µg/L	1/2	5.10E-01	--	--	--
84695	1,2-Benzenedicarboxylicacid, bis(2-methy	µg/L	2/2	8.40E-01	--	--	--
17851535	1,2-Benzenedicarboxylic acid, butyl 2-me	µg/L	1/2	5.10E-01	--	--	--
101371	2,4,6-Triallyloxy-1,3,5-triazine	µg/L	2/2	1.63E+00	--	--	--
629970	Docosane, 11-butyl-	µg/L	1/2	4.90E-01	--	--	--
112958	Eicosane	µg/L	1/2	5.40E-01	--	--	--
112845	Erucylamide	µg/L	2/2	2.08E+01	--	--	--
						1.E-01	--

Notes:
CAS = Chemical Abstracts Service
µg/L = Microgram Per Liter
TAL = Target Analyte List
SVOC = Semivolatile Organic Compound
TIC = Tentatively Identified Compound
MDC = Maximum Detected Concentration
HI = Hazard Index

RBC = USEPA Region III Risk-Based Concentration (RBC) values from the October 31, 2006, RBC Table and October 10, 2006, Alternate RBC Table
C = Carcinogenic per EPA RBC Table (October 2006)
N = Noncarcinogenic per EPA RBC Table (October 2006)

Table 4-19
Detected Chemical Occurrence for SWMU 13 - Soil
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening
	TAL Metals (mg/kg)							
7429905	Aluminum	6,630	20,400	mg/kg	13SB9A	6/6	1.83 - 1.83	20,400
7440360	Antimony	0.07	1.1	mg/kg	13SB12A	5/6	0.0518 - 0.0518	1.1
7440382	Arsenic	1.6	2.7	mg/kg	13SB9A	6/6	0.0232 - 0.0232	3
7440393	Barium	78	175	mg/kg	13SB9A	6/6	0.106 - 0.106	175
7440417	Beryllium	0.66	1.2	mg/kg	13SB9A	5/6	0.0333 - 0.167	1.20
7440439	Cadmium	0.9	2.2	mg/kg	13SB9A	6/6	0.182 - 0.182	2.20
7440702	Calcium	1,890	12,400	mg/kg	13SB12A	6/6	16.6 - 16.6	12,400
18540299	Chromium	18	38	mg/kg	13SB11A	6/6	0.912 - 0.912	38
7440484	Cobalt	5.1	13	mg/kg	13SB11A	6/6	0.208 - 0.208	13
7440508	Copper	13	45	mg/kg	13SB12A	6/6	0.368 - 0.368	45
7439896	Iron	14,800	36,500	mg/kg	13SB9A	6/6	21.2 - 42.4	36,500
7439921	Lead	111	8,620	mg/kg	13SB8A	6/6	0.545 - 21.8	8,620
7439954	Magnesium	3,240	5,330	mg/kg	13SB12A	6/6	3.21 - 3.21	5,330
7439965	Manganese	301	1,240	mg/kg	13SB9A	6/6	0.264 - 1.32	1,240
7439976	Mercury	0.016	0.052	mg/kg	13SB11A	6/6	0.0077 - 0.0077	0.05
7440020	Nickel	8.3	19	mg/kg	13SB9A	6/6	0.0356 - 0.0356	19
7440097	Potassium	1,050	2,680	mg/kg	13SB11A	6/6	5 - 5	2,680
7782492	Selenium	0.32	0.9	mg/kg	13SB9A	6/6	0.0502 - 0.0502	0.93
7440224	Silver	0.06	0.14	mg/kg	13SB8A	6/6	0.0044 - 0.0044	0.14
7440235	Sodium	36	102	mg/kg	13SB12A	6/6	18.1 - 18.1	102
7440280	Thallium	0.13	0.78	mg/kg	13SB9A	6/6	0.027 - 0.027	0.78
7440622	Vanadium	14	37	mg/kg	13SB9A	6/6	0.207 - 0.207	37
7440666	Zinc	214	1,010	mg/kg	13SB9A	6/6	2.59 - 12.9	1,010
	TCL VOCs (µg/kg)							
120821	1,2,4-Trichlorobenzene	9.6E-01	9.6E-01	µg/kg	13SB10A	1/6	0.492 - 0.574	9.6E-01
78933	2-Butanone	2.6E+01	4.5E+01	µg/kg	13SB11A	6/6	6 - 7	4.5E+01
67641	Acetone	4.9E+01	3.2E+02	µg/kg	13SB10A	6/6	6 - 7	3.2E+02
71432	Benzene	9.1E-01	9.1E-01	µg/kg	13SB11A	1/6	0.632 - 0.738	9.1E-01
75092	Methylene chloride	4.1E+00	1.1E+01	µg/kg	13SB10A	6/6	3.37 - 3.93	1.1E+01
108883	Toluene	6.6E-01	3.5E+00	µg/kg	13SB10A	5/6	0.557 - 0.65	3.5E+00
79016	Trichloroethene	9.6E+00	9.6E+00	µg/kg	13SB11A	1/6	0.812 - 0.948	9.6E+00

Table 4-19
Detected Chemical Occurrence for SWMU 13 - Soil
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening
	TCL SVOCs[1] (µg/kg)							
91576	2-Methylnaphthalene	4.0E+00	2.2E+01	µg/kg	13SB8A	3/6	3.29 - 3.84	2.2E+01
606202	2,6-Dinitrotoluene	2.1E+02	2.1E+02	µg/kg	13SB12A	1/6	33.2 - 38.8	2.1E+02
59507	4-Chloro-3-Methylphenol	9.0E+00	2.5E+01	µg/kg	13SB9A	5/6	6.25 - 7.29	2.5E+01
208968	Acenaphthylene	2.0E+00	7.0E+00	µg/kg	13SB9A	4/6	1.8 - 2.1	7.0E+00
117817	Bis(2-ethylhexyl)phthalate	1.9E+01	4.5E+02	µg/kg	13SB10A	6/6	2.48 - 2.9	4.5E+02
85687	Butylbenzylphthalate	6.0E+00	3.8E+01	µg/kg	13SB10A	3/6	5.38 - 6.27	3.8E+01
132649	Dibenzofuran	6.0E+00	1.3E+01	µg/kg	13SB8A	2/6	3.79 - 4.42	1.3E+01
84662	Diethylphthalate	9.0E+00	9.5E+02	µg/kg	13SB12A	6/6	2.28 - 2.66	9.5E+02
131113	Dimethylphthalate	1.8E+01	1.4E+02	µg/kg	13SB10A	2/6	3.97 - 4.63	1.4E+02
84742	Di-n-butylphthalate	6.2E+01	6.8E+02	µg/kg	13SB12A	6/6	4.58 - 5.35	6.8E+02
91203	Naphthalene	4.0E+00	1.0E+01	µg/kg	13SB8A	2/6	3.3 - 3.85	1.0E+01
86306	N-Nitrosodiphenylamine	2.1E+01	6.3E+02	µg/kg	13SB12A	4/6	5.7 - 6.65	6.3E+02
	PAHs[2] (µg/kg)							
83329	Acenaphthene	1.4E+01	1.7E+01	µg/kg	13SB9A	2/6	11.3 - 13.2	1.7E+01
120127	Anthracene	6.6E+00	3.8E+01	µg/kg	13SB9A	4/6	0.84 - 0.98	3.8E+01
56553	Benzo(a)anthracene	2.1E+00	1.4E+02	µg/kg	13SB10A	6/6	0.96 - 1.12	1.4E+02
50328	Benzo(a)pyrene	6.5E+00	1.9E+02	µg/kg	13SB10A	5/6	1.2 - 1.4	1.9E+02
205992	Benzo(b)fluoranthene	4.9E+00	1.4E+02	µg/kg	13SB10A	5/6	1.56 - 1.82	1.4E+02
191242	Benzo(g,h,i)perylene	8.2E+01	5.4E+02	µg/kg	13SB9A	4/6	15 - 17.5	5.4E+02
207089	Benzo(k)fluoranthene	2.0E+01	8.0E+01	µg/kg	13SB10A	4/6	1.2 - 1.4	8.0E+01
218019	Chrysene	2.4E+00	1.5E+02	µg/kg	13SB9A	6/6	1.44 - 1.68	1.5E+02
53703	Dibenz(a,h)anthracene	2.3E+00	5.2E+00	µg/kg	13SB10A	2/6	1.68 - 1.96	5.2E+00
206440	Fluoranthene	5.0E+00	4.7E+02	µg/kg	13SB10A	6/6	2.04 - 2.38	4.7E+02
86737	Fluorene	1.1E+01	1.7E+01	µg/kg	13SB10A	2/6	1.56 - 1.82	1.7E+01
193395	Indeno(1,2,3-cd)pyrene	5.9E+00	1.3E+02	µg/kg	13SB10A	5/6	0.84 - 0.98	1.3E+02
85018	Phenanthrene	2.1E+00	2.1E+02	µg/kg	13SB10A	6/6	0.72 - 0.84	2.1E+02
129000	Pyrene	3.6E+00	3.2E+02	µg/kg	13SB10A	6/6	1.08 - 1.26	3.2E+02
	Explosives[3] (mg/kg)							
121142	2,4-Dinitrotoluene	3.9E-01	3.9E-01	mg/kg	13SB12A	1/6	0.142 - 0.142	3.9E-01
118967	2,4,6-Trinitrotoluene	2.7E-01	4.3E-01	mg/kg	13SB11A	2/6	0.167 - 0.167	4.3E-01

Table 4-19
Detected Chemical Occurrence for SWMU 13 - Soil
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening
	Nitroglycerin/PETN (mg/kg)							
55630	Nitroglycerin	2.1E+00	8.5E+00	mg/kg	13SB12A	2/6	0.195 - 0.276	8.5E+00
	Cyanide (mg/kg)							
57125	Cyanide	7.0E-02	3.5E-01	mg/kg	13SB9A	6/6	0.0356 - 0.0356	3.5E-01
	Dioxins/Furans (mg/kg)*							
	Total 2,3,7,8-TCDD Equivalents							

Notes:
CAS = Chemical Abstracts Sevice
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
[1] = SVOCs analyzed by USEPA SW-846 8270 Method 8270C
[2] = PAHs analyzed by USEPA SW-846 Method8310
[3] = Explosives analyzed by USEPA SW-846 Method 8330
* = See Table 4-20 for dioxin/furans

Table 4-20
Conversion of Dioxin Detections in Soil to Equivalents of 2,3,7,8-TCDD for SWMU 13
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID Sample Date Dioxin/Furans Method 8290	TEF[1]	13SB9A 09/30/03 pg/g	Flags	2,3,7,8-TCDD Equivalents pg/g
1,2,3,4,6,7,8,9-OCDD	0.0001	1520	J	1.52E-01
1,2,3,4,6,7,8,9-OCDF	0.0001	11.2	J	1.12E-03
1,2,3,4,6,7,8-HpCDD	0.01	50		5.00E-01
1,2,3,4,6,7,8-HpCDF	0.01	5.11	J	5.11E-02
1,2,3,4,7,8,9-HpCDF	0.01	0.46	J	4.60E-03
1,2,3,4,7,8-HxCDD	0.1	0.735	J	7.35E-02
1,2,3,4,7,8-HxCDF	0.01	0.681	J	6.81E-03
1,2,3,6,7,8-HxCDD	0.1	2.24	J	2.24E-01
1,2,3,6,7,8-HxCDF	0.1	0.534	J	5.34E-02
1,2,3,7,8,9-HxCDD	0.1	2.33		2.33E-01
1,2,3,7,8-PeCDD	1	0.656	J	6.56E-01
1,2,3,7,8-PeCDF	0.05	0.45	J	2.25E-02
2,3,4,6,7,8-HxCDF	0.1	0.494	J	4.94E-02
2,3,4,7,8-PeCDF	0.5	0.574	J	2.87E-01
2,3,7,8-TCDF	0.1	0.784	A	7.84E-02
Total HpCDD		96.8		--
Total HpCDF		13		--
Total HxCDD		21.6		--
Total HxCDF		8.31		--
Total PeCDD		3.82	J	--
Total PeCDF		4.85	J	--
Total TCDD		1.08	J	--
Total TCDF		7.11		--
Total 2,3,7,8-TCDD Equivalents				2.39E+00

NOTES:
[1] = Developed by the World Health Organization [Van den Berg, et al. (1998). Toxic Equivalency Factors (TEFs) for PCBs, PCDDs, PCDFs for Humans and for Wildlife.
µg/kg = Microgram Per Kilogram

Table 4-21
Non-detected Chemicals for SWMU 13 (Soil)
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Parameter Name	Units	Number of Samples	Minimum MDL	Maximum MDL	TSV	Maximum Detection Limit Exceeds TSV
TAL Metals							
7440417	Beryllium	mg/kg	1	0.0391	0.0391	10	N
7440360	Antimony	mg/kg	1	0.0518	0.0518	5	**Y**
Pesticides/Herbicides							
72548	4,4'-DDD	ug/kg	1	0.309	0.309	--	NS
72559	4,4'-DDE	ug/kg	1	0.228	0.228	100	**Y**
50293	4,4'-DDT	ug/kg	1	0.234	0.234	100	N
309002	Aldrin	ug/kg	1	0.395	0.395	100	N
319846	alpha-BHC	ug/kg	1	0.394	0.394	100	N
5103719	alpha-Chlordane	ug/kg	1	0.564	0.564	100	N
319857	beta-BHC	ug/kg	1	1.47	1.47	100	N
319868	delta-BHC	ug/kg	1	1.06	1.06	100	N
60571	Dieldrin	ug/kg	1	0.402	0.402	100	N
959988	Endosulfan I	ug/kg	1	1.18	1.18	--	NS
33213659	Endosulfan II	ug/kg	1	0.278	0.278	--	NS
1031078	Endosulfan Sulfate	ug/kg	1	0.654	0.654	--	NS
72208	Endrin	ug/kg	1	0.387	0.387	100	N
7421934	Endrin aldehyde	ug/kg	1	1.44	1.44	--	NS
53494705	Endrin ketone	ug/kg	1	0.358	0.358	--	NS
58899	gamma-BHC (Lindane)	ug/kg	1	0.252	0.252	100	N
5103742	gamma-Chlordane	ug/kg	1	0.914	0.914	100	N
76448	Heptachlor	ug/kg	1	0.917	0.917	--	NS
1024573	Heptachlor epoxide	ug/kg	1	0.592	0.592	100	N
72435	Methoxychlor	ug/kg	1	0.364	0.364	100	N
8001352	Toxaphene	ug/kg	1	30.3	30.3	--	NS
93765	2,4,5-T	ug/kg	1	2.6	2.6	--	NS
93721	2,4,5-TP (Silvex)	ug/kg	1	5.2	5.2	--	NS
94757	2,4-D	ug/kg	1	20.8	20.8	--	NS
94826	2,4-DB	ug/kg	1	80.6	80.6	--	NS
75990	Dalapon	ug/kg	1	74.1	74.1	--	NS
1918009	Dicamba	ug/kg	1	2.6	2.6	--	NS
120365	Dichlorprop	ug/kg	1	22.1	22.1	--	NS
88857	Dinoseb	ug/kg	1	27.3	27.3	--	NS
94746	MCPA	ug/kg	1	1810	1810	--	NS
93652	MCPP	ug/kg	1	6570	6570	--	NS
PCBs							
12674112	Aroclor 1016	ug/kg	1	20.8	20.8	--	NS
11104282	Aroclor 1221	ug/kg	1	2.6	2.6	--	NS
11141165	Aroclor 1232	ug/kg	1	6.5	6.5	--	NS
53469219	Aroclor 1242	ug/kg	1	3.9	3.9	--	NS
12672296	Aroclor 1248	ug/kg	1	6.5	6.5	--	NS
11097691	Aroclor 1254	ug/kg	1	3.9	3.9	371	N
11096825	Aroclor 1260	ug/kg	1	9.1	9.1	371	N
VOCs							
71556	1,1,1-Trichloroethane	ug/kg	6	0.511	0.596	300	N
79345	1,1,2,2-Tetrachloroethane	ug/kg	6	0.784	0.914	300	N
76131	1,1,2-Trichloro-1,2,2-trifluoroethane	ug/kg	6	0.911	1.06	--	NS
79005	1,1,2-Trichloroethane	ug/kg	6	0.712	0.83	300	N
75343	1,1-Dichloroethane	ug/kg	6	0.869	1.01	300	N
75354	1,1-Dichloroethene	ug/kg	6	0.88	1.03	--	NS
87616	1,2,3-Trichlorobenzene	ug/kg	6	0.653	0.762	--	NS
120821	1,2,4-Trichlorobenzene	ug/kg	5	0.492	0.533	100	N
96128	1,2-Dibromo-3-chloropropane	ug/kg	6	2.5	2.91	--	NS
106934	1,2-Dibromoethane	ug/kg	6	0.822	0.959	--	NS
95501	1,2-Dichlorobenzene	ug/kg	6	0.581	0.678	100	N
107062	1,2-Dichloroethane	ug/kg	6	0.517	0.603	870,000	N

Table 4-21
Non-detected Chemicals for SWMU 13 (Soil)
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Parameter Name	Units	Number of Samples	Minimum MDL	Maximum MDL	TSV	Maximum Detection Limit Exceeds TSV
78875	1,2-Dichloropropane	ug/kg	6	0.703	0.82	700,000	N
541731	1,3-Dichlorobenzene	ug/kg	6	0.322	0.375	--	NS
106467	1,4-Dichlorobenzene	ug/kg	6	0.852	0.994	100	N
591786	2-Hexanone	ug/kg	6	2.71	3.16	--	NS
108101	4-Methyl-2-pentanone	ug/kg	6	1.75	2.04	--	NS
71432	Benzene	ug/kg	5	0.632	0.738	100	N
74975	Bromochloromethane	ug/kg	6	0.913	1.07	--	NS
75274	Bromodichloromethane	ug/kg	6	0.601	0.701	450,000	N
75252	Bromoform	ug/kg	6	0.694	0.809	--	NS
74839	Bromomethane	ug/kg	6	1.8	2.1	--	NS
75150	Carbon disulfide	ug/kg	6	1.74	2.03	--	NS
56235	Carbon tetrachloride	ug/kg	6	0.559	0.652	300	N
108907	Chlorobenzene	ug/kg	6	0.793	0.925	100	N
75003	Chloroethane	ug/kg	6	1.62	1.89	--	NS
67663	Chloroform	ug/kg	6	0.535	0.624	300	N
74873	Chloromethane	ug/kg	6	1	1.17	--	NS
156592	cis-1,2-Dichloroethene	ug/kg	6	0.852	0.994	300	N
10061015	cis-1,3-Dichloropropene	ug/kg	6	0.589	0.687	--	NS
110827	Cyclohexane	ug/kg	6	0.379	0.442	--	NS
124481	Dibromochloromethane	ug/kg	6	0.62	0.724	--	NS
75718	Dichlorodifluoromethane	ug/kg	6	0.802	0.935	--	NS
100414	Ethylbenzene	ug/kg	6	0.508	0.592	100	N
98828	Isopropylbenzene	ug/kg	6	0.655	0.764	--	NS
79209	Methyl acetate	ug/kg	6	4.16	4.86	--	NS
1634044	methyl tert-Butyl ether	ug/kg	6	0.769	0.897	--	NS
108872	Methylcyclohexane	ug/kg	6	1.01	1.18	--	NS
100425	Styrene	ug/kg	6	0.53	0.619	100	N
127184	Tetrachloroethene	ug/kg	6	0.736	0.858	300	N
108883	Toluene	ug/kg	1	0.557	0.557	100	N
156605	trans-1,2-Dichloroethene	ug/kg	6	0.844	0.984	300	N
10061026	trans-1,3-Dichloropropene	ug/kg	6	0.625	0.729	--	NS
79016	Trichloroethene	ug/kg	5	0.812	0.948	300	N
75694	Trichlorofluoromethane	ug/kg	6	0.892	1.04	--	NS
75014	Vinyl Chloride	ug/kg	6	0.444	0.518	300	N
1330207	Xylenes	ug/kg	6	0.505	0.589	100	N
SVOCs							
92524	1,1'-Biphenyl	ug/kg	6	2.95	3.44	--	NS
95943	1,2,4,5-Tetrachlorobenzene	ug/kg	6	34.4	40.2	--	NS
108601	2,2'-oxybis(1-Chloropropane)	ug/kg	6	1.58	1.85	--	NS
95954	2,4,5-Trichlorophenol	ug/kg	6	4.01	4.68	100	N
88062	2,4,6-Trichlorophenol	ug/kg	6	3.14	3.67	100	N
120832	2,4-Dichlorophenol	ug/kg	6	4.22	4.93	100	N
105679	2,4-Dimethylphenol	ug/kg	6	9.53	11.1	100	N
51285	2,4-Dinitrophenol	ug/kg	6	3.84	4.48	20,000	N
121142	2,4-Dinitrotoluene	ug/kg	3	3.78	4.41	--	NS
606202	2,6-Dinitrotoluene	ug/kg	5	33.2	38.8	--	NS
91587	2-Chloronaphthalene	ug/kg	6	2.76	3.22	--	NS
95578	2-Chlorophenol	ug/kg	6	2.41	2.81	100	N
91576	2-Methylnaphthalene	ug/kg	3	3.29	3.56	--	NS
95487	2-Methylphenol	ug/kg	6	5.81	6.78	100	N
88744	2-Nitroaniline	ug/kg	6	5.52	6.44	--	NS
88755	2-Nitrophenol	ug/kg	6	2.04	2.38	--	NS
91941	3,3'-Dichlorobenzidine	ug/kg	6	66.5	77.6	--	NS
99092	3-Nitroaniline	ug/kg	6	22	25.6	--	NS
534521	4,6-Dinitro-2-methylphenol	ug/kg	6	5.41	6.31	--	NS
101553	4-Bromophenyl-phenylether	ug/kg	6	4.06	4.73	--	NS

Table 4-21
Non-detected Chemicals for SWMU 13 (Soil)
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Parameter Name	Units	Number of Samples	Minimum MDL	Maximum MDL	TSV	Maximum Detection Limit Exceeds TSV
59507	4-Chloro-3-Methylphenol	ug/kg	1	6.77	6.77	--	NS
106478	4-Chloroaniline	ug/kg	6	1.51	1.76	--	NS
7005723	4-Chlorophenyl-phenylether	ug/kg	6	3.92	4.58	--	NS
106445	4-Methylphenol	ug/kg	6	7.64	8.92	100	N
100016	4-Nitroaniline	ug/kg	6	8.7	10.2	--	NS
100027	4-Nitrophenol	ug/kg	6	3.4	3.96	100	N
83329	Acenaphthene	ug/kg	2	2.06	2.24	100	N
208968	Acenaphthylene	ug/kg	2	1.8	1.95	100	N
98862	Acetophenone	ug/kg	6	2.28	2.66	--	NS
120127	Anthracene	ug/kg	2	5.54	6.01	100	N
1912249	Atrazine	ug/kg	6	8.26	9.63	--	NS
100527	Benzaldehyde	ug/kg	6	4.86	5.67	--	NS
56553	Benzo(a)anthracene	ug/kg	2	16	17.3	100	N
50328	Benzo(a)pyrene	ug/kg	1	7.42	7.42	100	N
191242	Benzo(g,h,i)perylene	ug/kg	1	11.3	11.3	100	N
207089	Benzo(k)fluoranthene	ug/kg	2	16.1	17.4	100	N
111911	Bis(2-chloroethoxy)methane	ug/kg	6	3.77	4.4	--	NS
111444	Bis(2-chloroethyl)ether	ug/kg	6	2.08	2.42	--	NS
85687	Butylbenzylphthalate	ug/kg	3	5.82	5.82	--	NS
105602	Caprolactam	ug/kg	6	7.66	8.93	--	NS
86748	Carbazole	ug/kg	6	7.32	8.54	--	NS
218019	Chrysene	ug/kg	1	13.3	13.3	100	N
53703	Dibenz(a,h)anthracene	ug/kg	4	7.08	8.26	100	N
132649	Dibenzofuran	ug/kg	4	3.79	4.11	--	NS
131113	Dimethylphthalate	ug/kg	4	3.97	4.3	200,000	N
117840	Di-n-octylphthalate	ug/kg	6	3.72	4.34	--	NS
86737	Fluorene	ug/kg	2	2.02	2.18	100	N
118741	Hexachlorobenzene	ug/kg	6	3.01	3.51	1,000,000	N
87683	Hexachlorobutadiene	ug/kg	6	4.64	5.42	--	NS
77474	Hexachlorocyclopentadiene	ug/kg	6	2.38	2.77	10,000	N
67721	Hexachloroethane	ug/kg	6	2.8	3.27	--	NS
193395	Indeno(1,2,3-cd)pyrene	ug/kg	1	5.1	5.1	100	N
78591	Isophorone	ug/kg	6	2.08	2.42	--	NS
91203	Naphthalene	ug/kg	4	3.3	3.85	100	N
98953	Nitrobenzene	ug/kg	6	3.84	4.48	40,000	N
621647	N-Nitrosodi-n-propylamine	ug/kg	6	3.95	4.61	--	NS
86306	N-Nitrosodiphenylamine	ug/kg	2	5.7	6.65	20,000	N
87865	Pentachlorophenol	ug/kg	6	5.27	6.15	100	N
108952	Phenol	ug/kg	6	4.75	5.54	100	N
Dioxin/Furans							
72918219	1,2,3,7,8,9-HxCDF	pg/g	1	0.554	0.554	--	NS
1746016	2,3,7,8-TCDD	pg/g	1	0.117	0.117	--	NS
PAHs							
83329	Acenaphthene	ug/kg	4	11.3	12.2	100	N
208968	Acenaphthylene	ug/kg	6	13.9	16.2	100	N
120127	Anthracene	ug/kg	2	0.84	0.91	100	N
50328	Benzo(a)pyrene	ug/kg	1	1.2	1.2	100	N
205992	Benzo(b)fluoranthene	ug/kg	1	1.56	1.56	100	N
191242	Benzo(g,h,i)perylene	ug/kg	2	15	16.3	100	N
207089	Benzo(k)fluoranthene	ug/kg	2	1.2	1.3	100	N
53703	Dibenz(a,h)anthracene	ug/kg	4	1.68	1.82	100	N
86737	Fluorene	ug/kg	4	1.56	1.69	100	N
193395	Indeno(1,2,3-cd)pyrene	ug/kg	1	0.84	0.84	100	N
91203	Naphthalene	ug/kg	6	9.48	11.1	100	N

Table 4-21
Non-detected Chemicals for SWMU 13 (Soil)
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Parameter Name	Units	Number of Samples	Minimum MDL	Maximum MDL	TSV	Maximum Detection Limit Exceeds TSV
Explosives							
99354	1,3,5-Trinitrobenzene	mg/kg	6	0.14	0.14	--	NS
99650	1,3-Dinitrobenzene	mg/kg	6	0.159	0.159	--	NS
118967	2,4,6-Trinitrotoluene	mg/kg	4	0.167	0.167	--	NS
121142	2,4-Dinitrotoluene	mg/kg	5	0.142	0.142	--	NS
606202	2,6-Dinitrotoluene	mg/kg	6	0.25	0.25	--	NS
35572782	2-Amino-4,6-dinitrotoluene	mg/kg	6	0.151	0.151	--	NS
88722	2-Nitrotoluene	mg/kg	6	0.266	0.266	--	NS
99081	3-Nitrotoluene	mg/kg	6	0.184	0.184	--	NS
1946510	4-Amino-2,6-dinitrotoluene	mg/kg	6	0.162	0.162	--	NS
99990	4-Nitrotoluene	mg/kg	6	0.251	0.251	--	NS
2691410	HMX (Octahydro-1,3,5,7-tetranitro-1,3,5,	mg/kg	6	0.229	0.229	--	NS
98953	Nitrobenzene	mg/kg	6	0.102	0.102	40,000	N
121824	RDX (Hexahydro-1,3,5-trinitro-1,3,5-tria	mg/kg	6	0.131	0.131	--	NS
Nitroglycerin/PETN							
628966	Nitroglycerin	mg/kg	4	0.195	0.276	--	NS
78115	PETN	mg/kg	6	0.269	0.381	--	NS

Notes:
CAS = Chemical Abstracts Service
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
NS = No screening value
TSV = Toxicity Screening Value
MDL = Method Detection Limit

Table 4-22
Detected Chemicals Occurrence for SWMU 13 - Sediment
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening
	TAL Metals (mg/kg)							
7429905	Aluminum	9,870	23,400	mg/kg	13SD3	2/2	1.83 - 5.1	23,400
7440360	Antimony	0.18	3.5	mg/kg	13SD3	2/2	0.0518 - 0.0518	3.50
7440382	Arsenic	3.3	3.4	mg/kg	13SD3	2/2	0.0232 - 0.0232	3.4
7440393	Barium	101	169	mg/kg	13SD3	2/2	0.106 - 0.106	169
7440417	Beryllium	0.83	1.3	mg/kg	13SD3	2/2	0.167 - 0.167	1.30
7440439	Cadmium	0.57	1	mg/kg	13SD3	2/2	0.182 - 0.182	1.00
7440702	Calcium	1,270	2,080	mg/kg	13SD3	2/2	16.6 - 16.6	2,080
18540299	Chromium	27	40	mg/kg	13SD3	2/2	0.912 - 0.912	40
7440484	Cobalt	9.9	13	mg/kg	13SD3	2/2	0.208 - 0.208	13
7440508	Copper	14	36	mg/kg	13SD3	2/2	0.368 - 0.368	36
7439896	Iron	34,600	37,100	mg/kg	13SD3	2/2	71.6 - 71.6	37,100
7439921	Lead	132	247	mg/kg	13SD3	2/2	0.545 - 1.09	247
7439954	Magnesium	2,130	3,870	mg/kg	13SD3	2/2	3.21 - 3.21	3,870
7439965	Manganese	544	720	mg/kg	13SD2	2/2	0.264 - 0.264	720
7439976	Mercury	0.03	0.13	mg/kg	13SD3	2/2	0.0077 - 0.0077	0.13
7440020	Nickel	12	19	mg/kg	13SD3	2/2	0.0356 - 0.0356	19
7440097	Potassium	1,020	1,950	mg/kg	13SD3	2/2	5 - 5	1,950
7782492	Selenium	0.9	1.2	mg/kg	13SD3	2/2	0.0502 - 0.0502	1.20
7440224	Silver	0.12	0.12	mg/kg	13SD2	2/2	0.0044 - 0.0044	0.12
7440235	Sodium	52	53	mg/kg	13SD2	2/2	8.92 - 8.92	53
7440280	Thallium	0.46	0.52	mg/kg	13SD3	2/2	0.027 - 0.027	0.52
7440622	Vanadium	19	44	mg/kg	13SD3	2/2	0.207 - 0.207	44
7440666	Zinc	442	541	mg/kg	13SD3	2/2	3.35 - 3.35	541
	TCL VOCs (µg/kg)							
78933	2-Butanone	31	42	µg/kg	13SD2	2/2	7.5 - 7.5	42
67641	Acetone	80	180	µg/kg	13SD2	2/2	7.5 - 7.5	180
156592	cis-1,2-Dichloroethene	11	11	µg/kg	13SD3	1/2	1.07 - 1.07	11.0
127184	Tetrachloroethene	5	5	µg/kg	13SD3	1/2	0.92 - 0.92	5.0
108883	Toluene	1	2	µg/kg	13SD3	2/2	0.696 - 0.696	1.8
79016	Trichloroethene	64	64	µg/kg	13SD3	1/2	1.02 - 1.02	64
	TCL SVOCs[1] (µg/kg)							
91576	2-Methylnaphthalene	7	12	µg/kg	13SD2	2/2	4.11 - 4.11	12
83329	Acenaphthene	5	5	µg/kg	13SD2	1/2	2.58 - 2.58	5
208968	Acenaphthylene	9	9	µg/kg	13SD3	1/2	2.25 - 2.25	9
117817	Bis(2-ethylhexyl)phthalate	28	41	µg/kg	13SD3	2/2	3.11 - 3.11	41
84662	Diethylphthalate	14	18	µg/kg	13SD3	2/2	2.85 - 2.85	18
131113	Dimethylphthalate	1400	1400	µg/kg	13SD3	1/2	4.97 - 4.97	1,400
84742	Di-n-butylphthalate	69	130	µg/kg	13SD3	2/2	5.73 - 5.73	130
86737	Fluorene	4	5	µg/kg	13SD2	2/2	2.52 - 2.52	5
91203	Naphthalene	5	5	µg/kg	13SD3	1/2	4.13 - 4.13	5.0
	PAHs[2] (µg/kg)							
120127	Anthracene	3.8	9.4	µg/kg	13SD3	2/2	1.05 - 1.05	9.4
56553	Benzo(a)anthracene	21	30	µg/kg	13SD3	2/2	1.2 - 1.2	30
50328	Benzo(a)pyrene	26	49	µg/kg	13SD3	2/2	1.5 - 1.5	49
205992	Benzo(b)fluoranthene	23	36	µg/kg	13SD3	2/2	1.95 - 1.95	36
191242	Benzo(g,h,i)perylene	40	88	µg/kg	13SD3	2/2	18.8 - 18.8	88
207089	Benzo(k)fluoranthene	12	24	µg/kg	13SD3	2/2	1.5 - 1.5	24
218019	Chrysene	19	84	µg/kg	13SD3	2/2	1.8 - 1.8	84

Table 4-22
Detected Chemicals Occurrence for SWMU 13 - Sediment
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening
53703	Dibenz(a,h)anthracene	6.2	6.2	µg/kg	13SD3	1/2	2.1 - 2.1	6.2
206440	Fluoranthene	19	48	µg/kg	13SD2	2/2	2.55 - 2.55	48
193395	Indeno(1,2,3-cd)pyrene	18	45	µg/kg	13SD3	2/2	1.05 - 1.05	45
85018	Phenanthrene	5.2	16	µg/kg	13SD2	2/2	0.9 - 0.9	16
129000	Pyrene	14	45	µg/kg	13SD2	2/2	1.35 - 1.35	45
	Cyanide (mg/kg)							
57125	Cyanide	0.1	0.2	mg/kg	13SD3	2/2	0.0356 - 0.0356	0.20

Notes:
CAS = Chemical Abstracts Sevice
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
[1] = SVOCs analyzed by USEPA SW-846 8270 Method 8270C
[2] = PAHs analyzed by USEPA SW-846 Method8310

Table 4-23
Non-detected Chemicals for SWMU 13 - Sediment
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Parameter Name	Units	Number of Samples	Minimum MDL	Maximum MDL	TSV	Maximum Detection Limit Exceeds TSV
VOCs							
71556	1,1,1-Trichloroethane	ug/kg	2	0.639	0.639	--	N
79345	1,1,2,2-Tetrachloroethane	ug/kg	2	0.98	0.98	--	N
76131	1,1,2-Trichloro-1,2,2-trifluoroethane	ug/kg	2	1.14	1.14	--	N
79005	1,1,2-Trichloroethane	ug/kg	2	0.89	0.89	--	N
75343	1,1-Dichloroethane	ug/kg	2	1.09	1.09	--	N
75354	1,1-Dichloroethene	ug/kg	2	1.1	1.1	--	N
87616	1,2,3-Trichlorobenzene	ug/kg	2	0.816	0.816	--	N
120821	1,2,4-Trichlorobenzene	ug/kg	2	0.615	0.615	--	N
96128	1,2-Dibromo-3-chloropropane	ug/kg	2	3.12	3.12	--	N
106934	1,2-Dibromoethane	ug/kg	2	1.03	1.03	--	N
95501	1,2-Dichlorobenzene	ug/kg	2	0.726	0.726	35	N
107062	1,2-Dichloroethane	ug/kg	2	0.647	0.647	--	N
78875	1,2-Dichloropropane	ug/kg	2	0.879	0.879	--	N
541731	1,3-Dichlorobenzene	ug/kg	2	0.402	0.402	--	N
106467	1,4-Dichlorobenzene	ug/kg	2	1.07	1.07	110	N
591786	2-Hexanone	ug/kg	2	3.39	3.39	--	N
108101	4-Methyl-2-pentanone	ug/kg	2	2.19	2.19	--	N
71432	Benzene	ug/kg	2	0.791	0.791	--	N
74975	Bromochloromethane	ug/kg	2	1.14	1.14	--	N
75274	Bromodichloromethane	ug/kg	2	0.752	0.752	--	N
75252	Bromoform	ug/kg	2	0.867	0.867	--	N
74839	Bromomethane	ug/kg	2	2.25	2.25	--	N
75150	Carbon disulfide	ug/kg	2	2.18	2.18	--	N
56235	Carbon tetrachloride	ug/kg	2	0.699	0.699	--	N
108907	Chlorobenzene	ug/kg	2	0.992	0.992	--	N
75003	Chloroethane	ug/kg	2	2.03	2.03	--	N
67663	Chloroform	ug/kg	2	0.669	0.669	--	N
74873	Chloromethane	ug/kg	2	1.25	1.25	--	N
156592	cis-1,2-Dichloroethene	ug/kg	1	1.07	1.07	--	N
10061015	cis-1,3-Dichloropropene	ug/kg	2	0.737	0.737	--	N
110827	Cyclohexane	ug/kg	2	0.474	0.474	--	N
124481	Dibromochloromethane	ug/kg	2	0.776	0.776	--	N
75718	Dichlorodifluoromethane	ug/kg	2	1	1	--	N
100414	Ethylbenzene	ug/kg	2	0.635	0.635	10	N
98828	Isopropylbenzene	ug/kg	2	0.819	0.819	--	N
79209	Methyl acetate	ug/kg	2	5.21	5.21	--	N
1634044	methyl tert-Butyl ether	ug/kg	2	0.962	0.962	--	N
108872	Methylcyclohexane	ug/kg	2	1.27	1.27	--	N
75092	Methylene chloride	ug/kg	2	4.22	4.22	--	N
100425	Styrene	ug/kg	2	0.663	0.663	--	N
127184	Tetrachloroethene	ug/kg	1	0.92	0.92	57	N
156605	trans-1,2-Dichloroethene	ug/kg	2	1.05	1.05	--	N
10061026	trans-1,3-Dichloropropene	ug/kg	2	0.782	0.782	--	N
79016	Trichloroethene	ug/kg	1	1.02	1.02	--	N
75694	Trichlorofluoromethane	ug/kg	2	1.11	1.11	--	N
75014	Vinyl Chloride	ug/kg	2	0.555	0.555	--	N
1330207	Xylenes	ug/kg	2	0.632	0.632	40	N
SVOCs							
92524	1,1'-Biphenyl	ug/kg	2	3.69	3.69	--	N
95943	1,2,4,5-Tetrachlorobenzene	ug/kg	2	43.1	43.1	--	N
108601	2,2'-oxybis(1-Chloropropane)	ug/kg	2	1.98	1.98	--	N
95954	2,4,5-Trichlorophenol	ug/kg	2	5.01	5.01	--	N
88062	2,4,6-Trichlorophenol	ug/kg	2	3.93	3.93	--	N
120832	2,4-Dichlorophenol	ug/kg	2	5.28	5.28	--	N

Table 4-23
Non-detected Chemicals for SWMU 13 - Sediment
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Parameter Name	Units	Number of Samples	Minimum MDL	Maximum MDL	TSV	Maximum Detection Limit Exceeds TSV
105679	2,4-Dimethylphenol	ug/kg	2	11.9	11.9	29	N
51285	2,4-Dinitrophenol	ug/kg	2	4.8	4.8	--	N
121142	2,4-Dinitrotoluene	ug/kg	2	4.73	4.73	--	N
606202	2,6-Dinitrotoluene	ug/kg	2	41.6	41.6	--	N
91587	2-Chloronaphthalene	ug/kg	2	3.45	3.45	--	N
95578	2-Chlorophenol	ug/kg	2	3.02	3.02	--	N
95487	2-Methylphenol	ug/kg	2	7.26	7.26	63	N
88744	2-Nitroaniline	ug/kg	2	6.9	6.9	--	N
88755	2-Nitrophenol	ug/kg	2	2.55	2.55	--	N
91941	3,3'-Dichlorobenzidine	ug/kg	2	83.1	83.1	--	N
99092	3-Nitroaniline	ug/kg	2	27.5	27.5	--	N
534521	4,6-Dinitro-2-methylphenol	ug/kg	2	6.77	6.77	--	N
101553	4-Bromophenyl-phenylether	ug/kg	2	5.07	5.07	--	N
59507	4-Chloro-3-Methylphenol	ug/kg	2	7.82	7.82	--	N
106478	4-Chloroaniline	ug/kg	2	1.89	1.89	--	N
7005723	4-Chlorophenyl-phenylether	ug/kg	2	4.91	4.91	--	N
106445	4-Methylphenol	ug/kg	2	9.56	9.56	670	N
100016	4-Nitroaniline	ug/kg	2	10.9	10.9	--	N
100027	4-Nitrophenol	ug/kg	2	4.25	4.25	--	N
83329	Acenaphthene	ug/kg	1	2.58	2.58	16	N
208968	Acenaphthylene	ug/kg	1	2.25	2.25	44	N
98862	Acetophenone	ug/kg	2	2.85	2.85	--	N
120127	Anthracene	ug/kg	1	6.93	6.93	85.3	N
1912249	Atrazine	ug/kg	2	10.3	10.3	--	N
100527	Benzaldehyde	ug/kg	2	6.08	6.08	--	N
111911	Bis(2-chloroethoxy)methane	ug/kg	2	4.71	4.71	--	N
111444	Bis(2-chloroethyl)ether	ug/kg	2	2.6	2.6	--	N
85687	Butylbenzylphthalate	ug/kg	2	6.72	6.72	63	N
105602	Caprolactam	ug/kg	2	9.57	9.57	--	N
86748	Carbazole	ug/kg	2	9.15	9.15	--	N
132649	Dibenzofuran	ug/kg	2	4.74	4.74	540	N
131113	Dimethylphthalate	ug/kg	1	4.97	4.97	71	N
117840	Di-n-octylphthalate	ug/kg	2	4.65	4.65	6,200	N
118741	Hexachlorobenzene	ug/kg	2	3.77	3.77	22	N
87683	Hexachlorobutadiene	ug/kg	2	5.81	5.81	11	N
77474	Hexachlorocyclopentadiene	ug/kg	2	2.97	2.97	--	N
67721	Hexachloroethane	ug/kg	2	3.5	3.5	--	N
78591	Isophorone	ug/kg	2	2.6	2.6	--	N
91203	Naphthalene	ug/kg	1	4.13	4.13	160	N
98953	Nitrobenzene	ug/kg	2	4.8	4.8	--	N
621647	N-Nitrosodi-n-propylamine	ug/kg	2	4.94	4.94	--	N
86306	N-Nitrosodiphenylamine	ug/kg	2	7.13	7.13	28	N
87865	Pentachlorophenol	ug/kg	2	6.59	6.59	360	N
108952	Phenol	ug/kg	2	5.94	5.94	--	N
PAHs							
83329	Acenaphthene	ug/kg	2	14.1	14.1	16	N
208968	Acenaphthylene	ug/kg	2	17.4	17.4	44	N
53703	Dibenz(a,h)anthracene	ug/kg	1	2.1	2.1	--	N
86737	Fluorene	ug/kg	2	1.95	1.95	19	N
91203	Naphthalene	ug/kg	2	11.9	11.9	160	N
Explosives							
99354	1,3,5-Trinitrobenzene	mg/kg	2	0.14	0.14	--	N
99650	1,3-Dinitrobenzene	mg/kg	2	0.159	0.159	--	N
118967	2,4,6-Trinitrotoluene	mg/kg	2	0.167	0.167	--	N
121142	2,4-Dinitrotoluene	mg/kg	2	0.142	0.142	--	N

Table 4-23
Non-detected Chemicals for SWMU 13 - Sediment
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Parameter Name	Units	Number of Samples	Minimum MDL	Maximum MDL	TSV	Maximum Detection Limit Exceeds TSV
606202	2,6-Dinitrotoluene	mg/kg	2	0.25	0.25	--	N
35572782	2-Amino-4,6-dinitrotoluene	mg/kg	2	0.151	0.151	--	N
88722	2-Nitrotoluene	mg/kg	2	0.266	0.266	--	N
99081	3-Nitrotoluene	mg/kg	2	0.184	0.184	--	N
1946510	4-Amino-2,6-dinitrotoluene	mg/kg	2	0.162	0.162	--	N
99990	4-Nitrotoluene	mg/kg	2	0.251	0.251	--	N
2691410	HMX (Octahydro-1,3,5,7-tetranitro-1,3,5,	mg/kg	2	0.229	0.229	--	N
98953	Nitrobenzene	mg/kg	2	0.102	0.102	--	N
121824	RDX (Hexahydro-1,3,5-trinitro-1,3,5-tria	mg/kg	2	0.131	0.131	--	N
Nitroglycerin/PETN							
628966	Nitroglycerin	mg/kg	2	0.239	0.245	--	N
78115	PETN	mg/kg	2	0.328	0.337	--	N

Notes:
CAS = Chemical Abstracts Service
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
NS = No screening value
TSV = Toxicity Screening Value
MDL = Method Detection Limit

Table 4-24
Detected Chemicals Occurrence for SWMU 13 - Surface Water
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening
	TAL Metals (ug/L)							
7429905	Aluminum	66	74	ug/l	13SW2	2/2	18.7 - 18.7	74
7440360	Antimony	0.7	0.7	ug/l	13SW3	1/2	0.552 - 0.552	0.7
7440360	Antimony, Dissolved	0.8	0.8	ug/l	13SW3	1/2	0.552 - 0.552	0.8
7440393	Barium	21	22	ug/l	13SW2	2/2	1.82 - 1.82	22
7440393	Barium, Dissolved	18	18	ug/l	13SW2	2/2	1.82 - 1.82	18
7440702	Calcium	13,000	13,000	ug/l	13SW2	2/2	170 - 170	13,000
7440702	Calcium, Dissolved	13,000	13,000	ug/l	13SW2	2/2	170 - 170	13,000
18540299	Chromium	0.8	0.8	ug/l	13SW2	2/2	0.554 - 0.554	0.8
18540299	Chromium, Dissolved	0.6	0.6	ug/l	13SW3	1/2	0.554 - 0.554	0.6
7439896	Iron	180	190	ug/l	13SW2	2/2	2.95 - 2.95	190
7439896	Iron, Dissolved	37	38	ug/l	13SW3	2/2	2.95 - 2.95	38
7439921	Lead	0.6	0.9	ug/l	13SW3	2/2	0.281 - 0.281	0.9
7439954	Magnesium	5,400	5,700	ug/l	13SW2	2/2	57.4 - 57.4	5,700
7439954	Magnesium, Dissolved	5,500	5,600	ug/l	13SW2	2/2	57.4 - 57.4	5,600
7439965	Manganese	27	30	ug/l	13SW3	2/2	3.16 - 3.16	30
7439965	Manganese, Dissolved	7.9	10	ug/l	13SW2	2/2	3.16 - 3.16	10
7440020	Nickel	0.8	0.96	ug/l	13SW2	2/2	0.41 - 0.41	1
7440020	Nickel, Dissolved	1.0	1.1	ug/l	13SW2	2/2	0.41 - 0.41	1.1
7440097	Potassium	1,800	1,900	ug/l	13SW3	2/2	59.7 - 59.7	1,900
7440097	Potassium, Dissolved	1,600	1,600	ug/l	13SW2	2/2	59.7 - 59.7	1,600
7440235	Sodium	5,100	5,100	ug/l	13SW2	2/2	76.9 - 76.9	5,100
7440235	Sodium, Dissolved	5,100	5,100	ug/l	13SW2	2/2	76.9 - 76.9	5,100
7440280	Thallium	0.30	0.30	ug/l	13SW3	1/2	0.208 - 0.208	0.3
7440666	Zinc	5.5	5.5	ug/l	13SW2	1/2	4.55 - 4.55	5.5
	TCL SVOCs (µg/L)							
117817	Bis(2-ethylhexyl)phthalate	0.3	0.3	ug/l	13SW2	2/2	0.149 - 0.149	0.3
85687	Butylbenzylphthalate	0.1	0.1	ug/l	13SW2	2/2	0.015 - 0.015	0.1
84662	Diethylphthalate	0.1	0.1	ug/l	13SW2	1/2	0.074 - 0.074	0.1

Notes:
CAS = Chemical Abstracts Sevice
TAL = Target Analyte List
TCL = Target Compound List
SVOC = Semivolatile Organic Compound
µg/L = Microgram Per Liter

Table 4-25
Non-detected Chemicals for SWMU 13 - Surface Water
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Parameter Name	Units	Number of Samples	Minimum MDL	Maximum MDL	BTAG Screening Value	Maximum MDL exceeds Screening Value
Inorganics						
Aluminum, Dissolved	ug/l	2	18.7	18.7	25	N
Antimony	ug/l	1	0.552	0.552	30	N
Antimony, Dissolved	ug/l	1	0.552	0.552	30	N
Arsenic	ug/l	2	0.429	0.429	874	N
Arsenic, Dissolved	ug/l	2	0.429	0.429	874	N
Beryllium	ug/l	2	0.295	0.295	5.3	N
Beryllium, Dissolved	ug/l	2	0.295	0.295	5.3	N
Cadmium	ug/l	2	0.135	0.135	0.53	N
Cadmium, Dissolved	ug/l	2	0.135	0.135	0.53	N
Chromium, Dissolved	ug/l	1	0.554	0.554	2	N
Cobalt	ug/l	2	3.91	3.91	35,000	N
Cobalt, Dissolved	ug/l	2	3.91	3.91	35,000	N
Copper	ug/l	2	5.36	5.36	6.5	N
Copper, Dissolved	ug/l	2	5.36	5.36	6.5	N
Cyanide	ug/l	2	3.4	3.4	5.2	N
Lead, Dissolved	ug/l	2	0.281	0.281	3.2	N
Mercury	ug/l	2	0.0584	0.0584	0.012	**Y**
Mercury, Dissolved	ug/l	2	0.0584	0.0584	0.012	**Y**
Selenium	ug/l	2	0.933	0.933	5	N
Selenium, Dissolved	ug/l	2	0.933	0.933	5	N
Silver	ug/l	2	0.0765	0.0765	0.0001	**Y**
Silver, Dissolved	ug/l	2	0.0765	0.0765	0.0001	**Y**
Thallium	ug/l	1	0.208	0.208	40	N
Thallium, Dissolved	ug/l	2	0.208	0.208	40	N
Vanadium	ug/l	2	2.89	2.89	10,000	N
Vanadium, Dissolved	ug/l	2	2.89	2.89	10,000	N
Zinc	ug/l	1	4.55	4.55	30	N
Zinc, Dissolved	ug/l	2	4.55	4.55	30	N
VOCs						
1,1,1-Trichloroethane	ug/l	2	0.142	0.142	--	N
1,1,2,2-Tetrachloroethane	ug/l	2	0.148	0.148	--	N
1,1,2-Trichloro-1,2,2-trifluoroethane	ug/l	2	0.179	0.179	--	N
1,1,2-Trichloroethane	ug/l	2	0.142	0.142	--	N
1,1-Dichloroethane	ug/l	2	0.057	0.057	160,000	N
1,1-Dichloroethene	ug/l	2	0.133	0.133	11,600	N
1,2,3-Trichlorobenzene	ug/l	2	0.228	0.228	--	N
1,2,4-Trichlorobenzene	ug/l	2	0.189	0.189	--	N
1,2-Dibromo-3-chloropropane	ug/l	2	0.27	0.27	--	N
1,2-Dibromoethane	ug/l	2	0.171	0.171	18,000	N
1,2-Dichlorobenzene	ug/l	2	0.164	0.164	763	N
1,2-Dichloroethane	ug/l	2	0.111	0.111	20,000	N
1,2-Dichloropropane	ug/l	2	0.255	0.255	--	N
1,3-Dichlorobenzene	ug/l	2	0.16	0.16	763	N
1,4-Dichlorobenzene	ug/l	2	0.124	0.124	763	N
2-Butanone	ug/l	2	0.417	0.417	--	N
2-Hexanone	ug/l	2	0.455	0.455	428,000	N
4-Methyl-2-pentanone	ug/l	2	0.364	0.364	--	N
Acetone	ug/l	2	1.07	1.07	9,000,000	N
Benzene	ug/l	2	0.022	0.022	5,300	N
Bromochloromethane	ug/l	2	0.076	0.076	11,000	N
Bromodichloromethane	ug/l	2	0.431	0.431	11,000	N
Bromoform	ug/l	2	0.11	0.11	--	N
Bromomethane	ug/l	2	0.267	0.267	--	N
Carbon disulfide	ug/l	2	0.059	0.059	2	N
Carbon tetrachloride	ug/l	2	0.115	0.115	35,200	N
Chlorobenzene	ug/l	2	0.157	0.157	50	N
Chloroethane	ug/l	2	0.18	0.18	--	N
Chloroform	ug/l	2	0.101	0.101	1,240	N
Chloromethane	ug/l	2	0.103	0.103	--	N
cis-1,2-Dichloroethene	ug/l	2	0.139	0.139	11,600	N
cis-1,3-Dichloropropene	ug/l	2	0.189	0.189	--	N

Table 4-25
Non-detected Chemicals for SWMU 13 - Surface Water
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Parameter Name	Units	Number of Samples	Minimum MDL	Maximum MDL	BTAG Screening Value	Maximum MDL exceeds Screening Value
Cyclohexane	ug/l	2	0.215	0.215	--	N
Dibromochloromethane	ug/l	2	0.108	0.108	11,000	N
Dichlorodifluoromethane	ug/l	2	0.12	0.12	11,000	N
Ethylbenzene	ug/l	2	0.195	0.195	32,000	N
Isopropylbenzene	ug/l	2	0.09	0.09	--	N
Methyl acetate	ug/l	2	0.231	0.231	--	N
methyl tert-Butyl ether	ug/l	2	0.077	0.077	--	N
Methylcyclohexane	ug/l	2	0.168	0.168	--	N
Methylene chloride	ug/l	2	0.117	0.117	11,000	N
Styrene	ug/l	2	0.137	0.137	--	N
Tetrachloroethene	ug/l	2	0.193	0.193	840	N
Toluene	ug/l	2	0.214	0.214	17,000	N
trans-1,2-Dichloroethene	ug/l	2	0.143	0.143	11,600	N
trans-1,3-Dichloropropene	ug/l	2	0.117	0.117	--	N
Trichloroethene	ug/l	2	0.211	0.211	21,900	N
Trichlorofluoromethane	ug/l	2	0.051	0.051	11,000	N
Vinyl Chloride	ug/l	2	0.119	0.119	11,600	N
Xylenes	ug/l	2	0.16	0.16	6,000	N
SVOCs						
1,1'-Biphenyl	ug/l	2	0.013	0.013	--	N
1,2,4,5-Tetrachlorobenzene	ug/l	2	0.775	0.775	--	N
2,2'-oxybis(1-Chloropropane)	ug/l	2	0.014	0.014	--	N
2,4,5-Trichlorophenol	ug/l	2	0.014	0.014	63	N
2,4,6-Trichlorophenol	ug/l	2	0.015	0.015	970	N
2,4-Dichlorophenol	ug/l	2	0.018	0.018	365	N
2,4-Dimethylphenol	ug/l	2	0.198	0.198	2,120	N
2,4-Dinitrophenol	ug/l	2	1.24	1.24	--	N
2-Chloronaphthalene	ug/l	2	0.005	0.005	--	N
2-Chlorophenol	ug/l	2	0.011	0.011	970	N
2-Methylnaphthalene	ug/l	2	0.084	0.084	--	N
2-Methylphenol	ug/l	2	0.007	0.007	--	N
2-Nitroaniline	ug/l	2	0.01	0.01	--	N
2-Nitrophenol	ug/l	2	0.011	0.011	--	N
3,3'-Dichlorobenzidine	ug/l	2	0.058	0.058	--	N
3-Nitroaniline	ug/l	2	0.032	0.032	--	N
4,6-Dinitro-2-methylphenol	ug/l	2	0.054	0.054	--	N
4-Bromophenyl-phenylether	ug/l	2	0.019	0.019	--	N
4-Chloro-3-Methylphenol	ug/l	2	0.018	0.018	--	N
4-Chloroaniline	ug/l	2	0.011	0.011	--	N
4-Chlorophenyl-phenylether	ug/l	2	0.015	0.015	--	N
4-Methylphenol	ug/l	2	0.014	0.014	--	N
4-Nitroaniline	ug/l	2	0.07	0.07	--	N
4-Nitrophenol	ug/l	2	0.134	0.134	150	N
Acetophenone	ug/l	2	0.011	0.011	--	N
Atrazine	ug/l	2	0.018	0.018	--	N
Benzaldehyde	ug/l	2	0.616	0.616	--	N
Bis(2-chloroethoxy)methane	ug/l	2	0.013	0.013	--	N
Bis(2-chloroethyl)ether	ug/l	2	0.012	0.012	--	N
Caprolactam	ug/l	2	0.024	0.024	--	N
Carbazole	ug/l	2	0.015	0.015	--	N
Dibenzofuran	ug/l	2	0.014	0.014	--	N
Diethylphthalate	ug/l	1	0.074	0.074	3	N
Dimethylphthalate	ug/l	2	0.013	0.013	3	N
Di-n-butylphthalate	ug/l	2	1.6	1.6	0.3	N
Di-n-octylphthalate	ug/l	2	0.162	0.162	0.3	N
Hexachlorobenzene	ug/l	2	0.011	0.011	3.68	N
Hexachlorobutadiene	ug/l	2	0.019	0.019	9.3	N
Hexachlorocyclopentadiene	ug/l	2	0.016	0.016	5.2	N
Hexachloroethane	ug/l	2	0.023	0.023	540	N
Isophorone	ug/l	2	0.017	0.017	117,000	N
N-Nitrosodi-n-propylamine	ug/l	2	0.017	0.017	--	N
N-Nitrosodiphenylamine	ug/l	2	0.019	0.019	5,850	N

Table 4-25
Non-detected Chemicals for SWMU 13 - Surface Water
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Parameter Name	Units	Number of Samples	Minimum MDL	Maximum MDL	BTAG Screening Value	Maximum MDL exceeds Screening Value
Pentachlorophenol	ug/l	2	0.075	0.075	13	N
Phenol	ug/l	2	0.006	0.006	79	N
PAHs						
Acenaphthene	ug/l	2	0.0279	0.0307	520	N
Acenaphthylene	ug/l	2	0.0525	0.0578	--	N
Anthracene	ug/l	2	0.0024	0.00264	0.1	N
Benzo(a)anthracene	ug/l	2	0.0026	0.00286	6.3	N
Benzo(a)pyrene	ug/l	2	0.0069	0.00759	--	N
Benzo(b)fluoranthene	ug/l	2	0.0138	0.0152	--	N
Benzo(g,h,i)perylene	ug/l	2	0.0539	0.0593	--	N
Benzo(k)fluoranthene	ug/l	2	0.0043	0.00473	--	N
Chrysene	ug/l	2	0.0034	0.00374	--	N
Dibenz(a,h)anthracene	ug/l	2	0.0416	0.0458	--	N
Fluoranthene	ug/l	2	0.0074	0.00814	--	N
Fluorene	ug/l	2	0.0096	0.0106	430	N
Indeno(1,2,3-cd)pyrene	ug/l	2	0.005	0.0055	--	N
Naphthalene	ug/l	2	0.0422	0.0464	100	N
Phenanthrene	ug/l	2	0.0032	0.00352	6.3	N
Pyrene	ug/l	2	0.0194	0.0213	--	N
Explosives						
1,3,5-Trinitrobenzene	ug/l	2	0.15	0.15	--	N
1,3-Dinitrobenzene	ug/l	2	0.121	0.121	--	N
2,4,6-Trinitrotoluene	ug/l	2	0.102	0.102	--	N
2,4-Dinitrotoluene	ug/l	2	0.114	0.114	230	N
2,6-Dinitrotoluene	ug/l	2	0.217	0.217	--	N
2-Amino-4,6-dinitrotoluene	ug/l	2	0.245	0.245	--	N
2-Nitrotoluene	ug/l	2	0.175	0.175	--	N
3-Nitrotoluene	ug/l	2	0.413	0.413	--	N
4-Amino-2,6-dinitrotoluene	ug/l	2	0.239	0.239	--	N
4-Nitrotoluene	ug/l	2	0.488	0.488	--	N
HMX (Octahydro-1,3,5,7-tetranitro-1,3,5,	ug/l	2	0.277	0.277	--	N
Nitrobenzene	ug/l	2	0.0825	0.0825	27,000	N
RDX (Hexahydro-1,3,5-trinitro-1,3,5-tria	ug/l	2	0.109	0.109	--	N
Tetryl (Methyl-2,4,6-trinitrophenylnitra	ug/l	2	0.0931	0.0931	--	N
Nitroglycerin/PETN						
Nitroglycerin	ug/l	2	0.213	0.213	--	N
PETN	ug/l	2	0.311	0.311	--	N
Perchlorate						
Perchlorate	ug/l	2	1	1	--	N

Notes:
CAS = Chemical Abstracts Service
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
NS = No screening value
TSV = Toxicity Screening Value
MDL = Method Detection Limit

Table 4-26
Preliminary Invertebrate Risk Characterization for SWMU 13 - Soil
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Measured Analytes	CAS #	MDC for Surface Soil	Screening Level	Screening Level Source	HQ
TAL Metals (mg/kg)					
Aluminum	7429-90-5	19,800	1	BTAG 1995	**19,800**
Antimony	7440-36-0	1.1	78.0	ECO SSL 2005	<1
Arsenic	7440-38-2	2.55	328	BTAG 1995	<1
Barium	7440-39-3	177	330	ECO SSL 2005	<1
Beryllium	7440-41-7	1.15	40.00	ECO SSL 2005	<1
Cadmium	7440-43-9	2.3	140.00	ECO SSL 2005	<1
Chromium	7440-47-3	38	0.0075	BTAG 1995	**5,067**
Cobalt	7440-48-4	13	200	BTAG 1995	<1
Copper	7440-50-8	45	50	ORNL 1997a	<1
Iron	7439-89-6	36,200	12	BTAG 1995	**3,017**
Lead	7439-92-1	8,620	1,700	ECO SSL 2005	**5**
Manganese	7439-96-5	1,315	330	BTAG 1995	**4**
Mercury	7439-97-6	0.052	0.06	BTAG 1995	<1
Nickel	7440-02-0	18	100	ORNL 1997a	<1
Selenium	7782-49-2	0.89	1.80	BTAG 1995	<1
Silver	7440-22-4	0.14	20.00	CCME 2004	<1
Thallium	7440-28-0	0.87	1.00	CCME 2004	<1
Vanadium	7440-62-2	36	58	BTAG 1995	<1
Zinc	7440-66-6	990	100	ORNL 1997a	**10**
TCL VOCs (µg/kg)					
1,2,4-Trichlorobenzene	120-82-1	9.6E-01	1.0E+02	BTAG 1995	<1
2-Butanone	78-93-3	4.5E+01	NV	--	NC
Acetone	67-64-1	3.2E+02	NV	--	NC
Benzene	71-43-2	9.1E-01	1.0E+02	BTAG 1995	<1
Methylene chloride	75-09-2	1.1E+01	3.0E+02	BTAG 1995	<1
Toluene	108-88-3	3.5E+00	1.0E+02	BTAG 1995	<1
Trichloroethene	79-01-6	9.6E+00	3.0E+02	BTAG 1995	<1
TCL SVOCs (µg/kg)					
2-Methylnaphthalene	91-57-6	2.2E+01	NV	--	NC
2,6-Dinitrotoluene	606-20-2	2.1E+02	NV	--	NC
4-Chloro-3-Methylphenol	59-50-7	1.9E+01	NV	--	NC
Acenaphthylene	208-96-8	5.0E+00	1.0E+02	BTAG 1995	<1
Bis(2-ethylhexyl)phthalate	117-81-7	4.5E+02	NV	--	NC
Butylbenzylphthalate	85-68-7	3.8E+01	NV	--	NC
Dibenzofuran	132-64-9	1.3E+01	NV	--	NC
Diethylphthalate	84-66-2	9.5E+02	NV	--	NC
Dimethylphthalate	131-11-3	1.4E+02	NV	--	NC
Di-n-butylphthalate	84-74-2	6.8E+02	NV	--	NC
Naphthalene	91-20-3	1.0E+01	1.0E+02	BTAG 1995	<1
N-Nitrosodiphenylamine	86-30-6	6.3E+02	NV	--	NC
PAHs (µg/kg)					
Acenaphthene	83-32-9	1.9E+01	1.0E+02	BTAG 1995	<1
Anthracene	120-12-7	3.7E+01	1.0E+02	BTAG 1995	<1
Benzo(a)anthracene	56-55-3	1.7E+02	1.0E+02	BTAG 1995	**2**
Benzo(a)pyrene	50-32-8	1.3E+02	1.0E+02	BTAG 1995	**1.3**
Benzo(b)fluoranthene	205-99-2	2.1E+02	1.0E+02	BTAG 1995	**2**
Benzo(g,h,i)perylene	191-24-2	7.2E+01	1.0E+02	BTAG 1995	<1
Benzo(k)fluoranthene	207-08-9	8.9E+01	1.0E+02	BTAG 1995	<1
Chrysene	218-01-9	1.9E+02	1.0E+02	BTAG 1995	**2**
Dibenz(a,h)anthracene	53-70-3	1.8E+01	1.0E+02	BTAG 1995	<1
Fluoranthene	206-44-0	3.7E+02	1.0E+02	BTAG 1995	**4**
Fluorene	86-73-7	2.0E+01	1.0E+02	BTAG 1995	<1
Indeno(1,2,3-cd)pyrene	193-39-5	7.3E+01	1.0E+02	BTAG 1995	<1
Phenanthrene	85-01-8	1.7E+02	1.0E+02	BTAG 1995	**2**
Pyrene	129-00-0	2.6E+02	1.0E+02	BTAG 1995	**3**

Table 4-26
Preliminary Invertebrate Risk Characterization for SWMU 13 - Soil
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Measured Analytes	CAS #	MDC for Surface Soil	Screening Level	Screening Level Source	HQ
Explosives (mg/kg)					
2,4-Dinitrotoluene	121-14-2	7.1E+02	NV	--	NC
2,4,6-Trinitrotoluene	118-96-7	3.5E+02	NV	--	NC
Nitroglycerin/PETN (mg/kg)					
Nitroglycerin	55-63-0	8.5E+00	NV	--	NC
Cyanide (mg/kg)					
Cyanide	57-12-5	3.1E-01	5.0E-03	BTAG 1995	**61**
Dioxins/Furans (mg/kg)*					
Total 2,3,7,8-TCDD Equivalents					

Notes:

CAS = Chemical Abstracts Service
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
MDC = Maximum Detected Concentration
TRV = Toxicity Reference Value
* = See Table 4-20 for dioxin/furans

NV = No Value
HQ = Hazard Quotient
NC = Not Calculated no TRV available
BTAG = Biological Technical Assistance Group Screening Level, Draft 1995

Screening Level Source:
Region III BTAG (USEPA 1995)
Oak Ridge National Laboratory (Efroymson et al. 1997a)
USEPA Ecological SSL (ECO-SSL 2005)
Canadian Environmental Quality Guidelines (CCME 2004)

Table 4-27
Inorganic COPEC/Background Comparison for SWMU 13
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Measured Analytes	CAS-Number	MDC for Surface Soil	Background Point Estimate [A]	Maximum Concentration Exceeds Background Point Estimate
TAL METALS (mg/kg)				
ALUMINUM	7429-90-5	19,800	40,041	N
CHROMIUM	7440-47-3	38	65	N
IRON	7439-89-6	36,200	50,962	N
LEAD	7439-92-1	8,620	27	**Y**
MANGANESE	7439-96-5	1,315	2,543	N
ZINC	7440-66-6	990	202	**Y**

Notes:
CAS = Chemical Abstracts Service
mg/kg = Milligram Per Kilogram
MDC = Maximum Detected Concentration
[A] = Facility-Wide Background Point Estimate as Reported in the Facility-Wide Background Study Report (IT 2001a)

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Table 4-28
Preliminary Wildlife Risk Characterization - Soil
Screening Level Ecological Risk Assessment
SSP Report - SWMU 13
Radford Army Ammunition Plant, Radford, Virginia

Parameter	Maximum Soil Concentration (mg/kg)	Wildlife TRV-Based Soil Concentrations																			
		American Robin				Red-tailed Hawk				Meadow Vole				Red Fox				Short-tailed Shrew			
		NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ
Metals																					
ARSENIC	3	1.39E+01	<1	3.46E+01	<1	3.89E+02	<1	9.71E+02	<1	8.99E+00	<1	8.99E+01	<1	1.34E+00	2.2	1.34E+01	<1	3.02E-01	9.9	3.02E+00	<1
CADMIUM	2.2	6.75E-01	3.3	9.31E+00	<1	3.91E+02	<1	5.40E+03	<1	1.50E+01	<1	1.50E+02	<1	1.48E+01	<1	1.48E+02	<1	1.16E+00	1.9	1.16E+01	<1
CHROMIUM	38	5.27E+00	7.2	2.64E+01	1.4	2.70E+01	1.4	1.35E+02	<1	8.65E+05	<1	8.65E+06	<1	2.38E+04	<1	2.38E+05	<1	1.78E+04	<1	1.78E+05	<1
COPPER	45	1.38E+02	<1	1.82E+02	<1	7.11E+02	<1	9.33E+02	<1	8.34E+02	<1	1.10E+03	<1	7.43E+01	<1	9.78E+01	<1	9.57E+01	<1	1.26E+02	<1
LEAD	8,620	5.18E+00	1662.9	5.18E+01	166.3	5.69E+02	15.1	5.69E+03	1.5	1.05E+03	8.2	1.05E+04	<1	4.97E+02	17.3	4.97E+03	1.7	5.45E+01	158.3	5.45E+02	15.8
MERCURY	0.05	6.08E-01	<1	1.22E+00	<1	2.62E-01	<1	5.23E-01	<1	4.27E-01	<1	1.74E+00	<1	3.93E-03	12.7	1.60E-02	3.1	8.31E-02	<1	3.39E-01	<1
NICKEL	19	3.86E+02	<1	5.33E+02	<1	1.95E+03	<1	2.70E+03	<1	5.54E+03	<1	1.11E+04	<1	3.23E+02	<1	6.46E+02	<1	2.86E+02	<1	5.71E+02	<1
SELENIUM	0.93	3.13E-01	3.0	6.27E-01	1.5	4.03E+00	<1	8.06E+00	<1	2.73E+00	<1	4.50E+00	<1	6.09E-01	1.5	1.00E+00	<1	5.27E-01	1.8	8.70E-01	1.1
SILVER	0.14	2.31E+01	<1	1.73E+02	<1	8.34E+02	<1	6.26E+03	<1	1.72E+03	<1	1.72E+04	<1	2.89E+02	<1	2.89E+03	<1	5.85E+01	<1	5.85E+02	<1
ZINC	1,010	1.40E+01	72.2	1.26E+02	8.0	2.19E+01	46.1	1.98E+02	5.1	3.38E+03	<1	6.75E+03	<1	8.28E+01	12.2	1.66E+02	6.1	4.22E+02	2.4	8.44E+02	1.2
SVOCs/PAHs																					
ACENAPHTHYLENE	0.007	NC		NC		NC		NC		1.38E+04	<1	6.90E+04	<1	9.71E+03	<1	4.85E+04	<1	9.32E+02	<1	4.66E+03	<1
ACENAPHTHENE	0.017	5.84E+00	<1	2.92E+01	<1	3.05E+03	<1	1.52E+04	<1	1.16E+03	<1	5.78E+03	<1	8.83E+02	<1	4.41E+03	<1	7.82E+01	<1	3.91E+02	<1
ANTHRACENE	0.038	NC		NC		NC		NC		5.23E+04	<1	5.23E+05	<1	2.14E+04	<1	2.14E+05	<1	2.20E+03	<1	2.20E+04	<1
BENZO(A)ANTHRACENE	0.14	NC		NC		NC		NC		4.78E+01	<1	4.78E+02	<1	2.55E+00	<1	2.55E+01	<1	1.43E+00	<1	1.43E+01	<1
BENZO(A)PYRENE	0.19	3.56E+00	<1	1.78E+01	<1	9.73E+00	<1	4.87E+01	<1	1.66E+02	<1	1.66E+03	<1	3.48E+00	<1	3.48E+01	<1	4.23E+00	<1	4.23E+01	<1
BENZO(B)FLUORANTHENE	0.14	NC		NC		NC		NC		1.68E+02	<1	1.68E+03	<1	2.87E+00	<1	2.87E+01	<1	5.12E+00	<1	5.12E+01	<1
BENZO(G,H,I)PERYLENE	0.54	NC		NC		NC		NC		8.86E+01	<1	4.43E+02	<1	1.87E-01	2.9	9.34E-01	<1	2.84E+00	<1	1.42E+01	<1
BENZO(K)FLUORANTHENE	0.08	NC		NC		NC		NC		1.85E+03	<1	1.85E+04	<1	3.16E+01	<1	3.16E+02	<1	5.65E+01	<1	5.65E+02	<1
CHRYSENE	0.15	NC		NC		NC		NC		2.37E+03	<1	2.37E+04	<1	1.24E+02	<1	1.24E+03	<1	5.65E+01	<1	5.65E+02	<1
DIBENZO(A,H)ANTHRACENE	0.0052	NC		NC		NC		NC		3.55E+02	<1	3.55E+03	<1	1.94E+00	<1	1.94E+01	<1	7.18E+00	<1	7.18E+01	<1
FLUORANTHENE	0.47	NC		NC		NC		NC		4.11E+03	<1	2.05E+04	<1	7.02E+02	<1	3.51E+03	<1	1.24E+02	<1	6.22E+02	<1
FLUORENE	0.017	6.55E+00	<1	3.28E+01	<1	1.56E+03	<1	7.81E+03	<1	4.15E+01	<1	2.07E+02	<1	2.48E+01	<1	1.24E+02	<1	2.27E+00	<1	1.13E+01	<1
INDENO(1,2,3-CD)PYRENE	0.13	NC		NC		NC		NC		1.92E+03	<1	1.92E+04	<1	1.15E+01	<1	1.15E+02	<1	4.26E+01	<1	4.26E+02	<1
PHENANTHRENE	0.21	8.17E+00	<1	4.08E+01	<1	7.63E+02	<1	3.81E+03	<1	7.32E+02	<1	3.66E+03	<1	2.98E+02	<1	1.49E+03	<1	3.22E+01	<1	1.61E+02	<1
PYRENE	0.32	NC		NC		NC		NC		1.07E+03	<1	5.35E+03	<1	1.85E+02	<1	9.25E+02	<1	3.17E+01	<1	1.58E+02	<1

Notes:
NC = Not Calculated no TRV available
TRV = Toxicity Reference Value
HQ = Hazard Quotient
LOAEL = Lowest observable adverse effects level
NOAEL = No observable adverse effects level
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
PCB = Polychlorinated Biphenyls
SVOC = Semi-Volatile Organic Compound
PAH = Poly-Aromatic Hydrocarbon

= Indicate HQs greater than 1.0

Refer to Appendix I for detailed description of model parameters and results

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Table 4-29
$TEQ_{2,3,7,8\text{-}TCDD}$ Preliminary Risk Characterization for SWMU 13 - Soil
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

SWMU 13					
Receptor	**$TEQ_{2,3,7,8\text{-}TCDD}$ (pg/kg bw-day)**	**NOAEL (pg/kg bw-day)**	**HQ**	**LOAEL (pg/kg bw-day)**	**HQ**
American robin	24.82	14	1.8	140	<1
Red-tailed hawk	2.25	14	<1	140	<1
Meadow vole	0.01	22.72	<1	227.17	<1
Red fox	1.28	7.14	<1	71.44	<1
Short-tailed shrew	8.62	15.19	<1	151.92	<1

Notes:
$TEQ_{2,3,7,8\ TCDD\ =}$ Toxicity Equivalents of 2,3,7,8 TCDD
pg/kg = Picogram per Kilogram-Body Weight-Day
HQ = Hazard Quotient
LOAEL = Low observable adverse effects level
NOAEL = No observable adverse effects level

= HQs greater than 1.0

Table 4-30
Preliminary Invertebrate Risk Characterization for SWMU 13 - Sediment
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Chemicals	CAS-Number	Maximum Concentration	Sediment Screening Values[1]	HQ
TAL Metals (mg/kg)				
Aluminum	7429905	23,400	NV	NC
Antimony	7440360	3.5	2	**2**
Arsenic	7440382	3.4	10	<1
Barium	7440393	169	NV	NC
Beryllium	7440417	1.3	NV	NC
Cadmium	7440439	1	1	**1.0**
Calcium	7440702	2,080	NV	NC
Chromium	7440484	40	50	<1
Cobalt	7440484	13	50	<1
Copper	7440508	36	32	**1.1**
Iron	7439896	37,100	20,000	**2**
Lead	7439921	247	36	**7**
Magnesium	7439954	3,870	NV	NC
Manganese	7439965	720	460	**2**
Mercury	7439976	0.13	0.18	<1
Nickel	7440020	19	23	<1
Potassium	7440097	1,950	NV	NC
Selenium	7782492	1.2	2	<1
Silver	7440224	0.12	1	<1
Sodium	7440235	53	NV	NC
Thallium	7440280	0.52	NV	NC
Vanadium	7440622	44	NV	NC
Zinc	7440666	541	121	**4**
TCL VOCs (µg/kg)				
2-Butanone	78933	42	NV	NC
Acetone	67641	180	NV	NC
cis-1,2-Dichloroethene	156592	11	NV	NC
Tetrachloroethene	127184	5	468	<1
Toluene	108883	2	NV	NC
Trichloroethene	79016	64	96.9	<1
TCL SVOCs (µg/kg)				
2-Methylnaphthalene	91576	12	20	<1
Acenaphthene	83329	5	7	<1
Acenaphthylene	208968	9	6	**2**
Bis(2-ethylhexyl)phthalate	117817	41	180	<1
Diethylphthalate	84662	18	603	<1
Dimethylphthalate	131113	1,400	NV	NC
Di-n-butylphthalate	84742	130	6,470	<1
Fluorene	86737	5	77	<1
Naphthalene	91203	5	176	<1

Table 4-30
Preliminary Invertebrate Risk Characterization for SWMU 13 - Sediment
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Chemicals	CAS-Number	Maximum Concentration	Sediment Screening Values[1]	HQ
PAHs (µg/kg)				
Anthracene	120127	9.4	57	<1
Benzo(a)anthracene	56553	30	108	<1
Benzo(a)pyrene	50328	49	150	<1
Benzo(b)fluoranthene	205992	36	NV	NC
Benzo(g,h,i)perylene	191242	88	170	<1
Benzo(k)fluoranthene	207089	24	240	<1
Chrysene	218019	84	166	<1
Dibenz(a,h)anthracene	53703	6.2	33	<1
Fluoranthene	206440	48	423	<1
Indeno(1,2,3-cd)pyrene	193395	45	17	**3**
Phenanthrene	85018	16	204	<1
Pyrene	129000	45	195	<1
Cyanide (mg/kg)				
Cyanide	57125	0.2	0.1	**2**

Notes:
CAS = Chemical Abstracts Service
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
MDC = Maximum Detected Concentration
NV = No Value
HQ = Hazard Quotient
NC = Not Calculated No Screening Value Available
[1] Sediment Screening Values taken from Region III Biological Technical Assistance Group Sediment Screening Levels, 2004

Table 4-31
Preliminary Invertebrate Risk Characterization for SWMU 13 - Surface Water
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Chemicals	CAS #	Maximum Detected Concentration	Freshwater Screening Values[1]	HQ
TAL Metals (ug/L)				
Aluminum	7429905	74	87	<1
Antimony	7440360	0.7	30	<1
Antimony, Dissolved	7440360	0.8	30	<1
Barium	7440393	22	4	**6**
Barium, Dissolved	7440393	18	4	**5**
Chromium	18540299	0.8	11	<1
Chromium, Dissolved	18540299	0.6	11	<1
Iron	7439896	190	300	<1
Iron, Dissolved	7439896	38	300	<1
Lead	7439921	0.9	2.5	<1
Manganese	7439965	30	120	<1
Manganese, Dissolved	7439965	10	120	<1
Nickel	7440020	1	52	<1
Nickel, Dissolved	7440020	1.1	52	<1
Thallium	7,440,280	0.3	0.8	<1
Zinc	7,440,666	5.5	120	<1
TCL SVOCs (µg/L)				
Bis(2-ethylhexyl)phthalate	117817	0.3	16	<1
Butylbenzylphthalate	85687	0.1	19	<1
Diethylphthalate	84662	0.1	210	<1

Notes:
CAS = Chemical Abstracts Sevice
TAL = Target Analyte List
TCL = Target Compound List
SVOC = Semivolatile Organic Compound
µg/L = Microgram Per Liter
[1] Freshwater Screening Values taken from Region III Biological Technical Assistance Group Freshwater Screening Levels, 2004

Table 4-32
Preliminary Wildlife Risk Characterization - Sediment
Screening Level Ecological Risk Assessment
SSP Report - SWMU 13
Radford Army Ammunition Plant, Radford, Virginia

Parameter	Maximum Sediment Concentration (mg/kg)	Wildlife TRV-Based Soil Concentrations											
		Mallard				Kingfisher				Raccoon			
		NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ
Metals													
ARSENIC	3.4	8.56E+02	<1	2.14E+03	<1	6.68E+01	<1	1.67E+02	<1	2.73E+00	1.2	2.73E+01	<1
CADMIUM	1	5.94E+01	<1	8.19E+02	<1	7.84E+01	<1	1.08E+03	<1	2.33E+01	<1	2.33E+02	<1
CHROMIUM	40	1.89E+02	<1	9.46E+02	<1	2.22E+02	<1	1.11E+03	<1	1.13E+05	<1	1.13E+06	<1
COPPER	36	7.40E+02	<1	9.72E+02	<1	1.88E+03	<1	2.47E+03	<1	1.88E+02	<1	2.48E+02	<1
LEAD	247	3.06E+02	<1	3.06E+03	<1	9.52E+00	26.0	9.52E+01	2.6	3.52E+02	<1	3.52E+03	<1
MERCURY	0.13	1.07E+01	<1	2.14E+01	<1	8.33E-01	<1	1.67E+00	<1	3.25E-01	<1	1.33E+00	<1
NICKEL	19	2.41E+03	<1	3.33E+03	<1	9.68E+03	<1	1.34E+04	<1	7.94E+02	<1	1.59E+03	<1
SELENIUM	1.2	4.48E+00	<1	8.95E+00	<1	3.78E-01	3.2	7.56E-01	1.6	1.89E+00	<1	3.12E+00	<1
SILVER	0.12	5.15E+02	<1	3.86E+03	<1	4.21E+01	<1	3.15E+02	<1	4.41E+02	<1	4.41E+03	<1
ZINC	541	1.62E+02	3.3	1.47E+03	<1	1.34E+02	4.0	1.21E+03	<1	1.51E+03	<1	3.02E+03	<1
SVOCs/PAHs													
ACENAPHTHYLENE	0.009	NC		NC		NC		NC		4.06E+03	<1	2.03E+04	<1
ACENAPHTHENE	0.005	1.80E+02	<1	8.98E+02	<1	1.10E+01	<1	5.48E+01	<1	3.85E+02	<1	1.92E+03	<1
ANTHRACENE	0.0094	NC		NC		NC		NC		1.11E+04	<1	1.11E+05	<1
BENZO(A)ANTHRACENE	0.03	NC		NC		NC		NC		6.74E+00	<1	6.74E+01	<1
BENZO(A)PYRENE	0.049	8.89E+01	<1	4.45E+02	<1	5.43E+00	<1	2.71E+01	<1	2.20E+01	<1	2.20E+02	<1
BENZO(B)FLUORANTHENE	0.036	NC		NC		NC		NC		2.20E+01	<1	2.20E+02	<1
BENZO(G,H,I)PERYLENE	0.088	NC		NC		NC		NC		1.10E+01	<1	5.50E+01	<1
BENZO(K)FLUORANTHENE	0.024	NC		NC		NC		NC		2.42E+02	<1	2.42E+03	<1
CHRYSENE	0.084	NC		NC		NC		NC		3.33E+02	<1	3.33E+03	<1
DIBENZO(A,H)ANTHRACENE	0.0062	NC		NC		NC		NC		4.49E+01	<1	4.49E+02	<1
FLUORANTHENE	0.048	NC		NC		NC		NC		6.74E+02	<1	3.37E+03	<1
FLUORENE	0.005	1.80E+02	<1	8.98E+02	<1	1.10E+01	<1	5.48E+01	<1	1.10E+01	<1	5.50E+01	<1
INDENO(1,2,3-CD)PYRENE	0.045	NC		NC		NC		NC		2.42E+02	<1	2.42E+03	<1
PHENANTHRENE	0.016	2.01E+02	<1	1.00E+03	<1	1.23E+01	<1	6.14E+01	<1	1.54E+02	<1	7.70E+02	<1
PYRENE	0.045	NC		NC		NC		NC		NC		NC	

Notes:
NC = Not Calculated no TRV available
TRV = Toxicity Reference Value
HQ = Hazard Quotient
LOAEL = Lowest observable adverse effects level
NOAEL = No observable adverse effects level
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
PCB = Polychlorinated Biphenyls
SVOC = Semi-Volatile Organic Compound
PAH = Poly-Aromatic Hydrocarbon

= Indicate HQs greater than 1.0

Refer to Appendix I for detailed description of model parameters and results

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5.0 SWMU 37, SWMU 38, AND AOC Q – $CASO_4$ DRYING BEDS, TREATMENT AND DISPOSAL AREA

5.1 SITE BACKGROUND – ENVIRONMENTAL SETTING

Physiography

SWMU 37 and SWMU 38 ($CaSO_4$ Drying Beds), and AOC Q ($CaSO_4$ Treatment and Disposal Area) are located along the New River in the northwestern section of the MMA. The elevation at these units is approximately 1,710 ft msl (Figure 5-1). A gravel road is located to the east of the sites. Dense woods surround the area to the north, south, and west where the topography slopes downward towards the New River (Figure 5-1).



SWMU 38 – August 2002 – Looking Southwest

Each unit is unlined and excavated into natural grade. SWMU 37 is a densely vegetated area comprising approximately 0.62 acres (27,004 ft^2). It is located immediately southwest of, and adjacent to, the SWMU 9 $CaSO_4$ Settling Lagoons. SWMU 38 (see photograph inset) is a smaller densely vegetated area comprising approximately 0.229 acres (9,994 ft^2). It is located immediately north-northeast of, and adjacent to, SWMU 9. AOC Q is a densely wooded depression comprising approximately 0.076 acres (3,291 ft^2). It is located immediately to the west and adjacent to the northwestern corner of SWMU 38. Each unit is surrounded by an earthen berm and has an approximate depth of 4 to 8 ft.

Tanks and Structures

In addition to SWMU 9, other tanks and structures near the sites include a control house for the settling lagoons and other associated piping and appurtenances. Other tanks or structures are not located in or near the site area.

Surface Water

Based on topography, each of the sites has internal drainage (i.e., surface runoff does not flow out of the immediate site areas). A well-defined drainage ditch is located approximately 100 ft down slope of SWMU 9 and another is located approximately 50 ft to the west of SWMU 37. Other surface water bodies, drainage ditches, manholes, catch basins, or other flow paths are not present in the immediate area. The New River is located approximately 300 to 400 ft northwest of the sites (Figure 5-1) and flows toward the northeast.

Soil and Geology

The sites are underlain by Unison-Urban land complex soil, which has moderate permeability and medium-to-strong acidity (IT 2001a). SSP borings indicate that the sites are underlain by 20+ ft of unconsolidated soil (alluvial deposits) overlying carbonate bedrock of the Elbrook Formation. These deposits generally consist of 15 to 20 ft of silty sand (SM) with occasional sandy clay (CL) overlying silty gravel (GM) and/or gravel with silt (GP). $CaSO_4$ sludge is present within SWMU 37 (2 ft thick) and AOC Q (0.5 ft thick). Sludge was not encountered within SWMU 38 at the locations samples although it was reported present during the 1992 VI.

Physical testing of two representative subsurface soil samples at each site indicates neutral to slightly acidic soil, with soil classifications of CL (for clay interbedded soil), SM, and GM. Organic content of CL and SM soil types ranged from 1.1 to 1.8%, with a lower percentage for the GP soil sample (0.6%).

Vertical hydraulic conductivity values ranged from 1.2E-07 for the CL sample to 2.0E-03 for an SM sample (Table 3-1).

Groundwater

An unconfined aquifer occurs within unconsolidated soil and in underlying bedrock. Groundwater was encountered in SSP borings at depths ranging from 20 to 25 ft bgs. Monitoring well data from the SWMU 9 area indicate that groundwater flow in the site area is northwest toward the New River.

5.2 SITE BACKGROUND - HISTORY

SWMU 37 and SWMU 38 are inactive units previously used for the drying of sludge removed from SWMU 9 (USEPA 1987). SWMU 9 consists of two below-grade unlined earthen lagoons listed in the RFAAP VPDES permit. These lagoons formerly received neutralized wastewater from the Acidic Wastewater Treatment Plant and now receive stormwater. The wastewater containing the $CaSO_4$ was gravity-fed into SWMU 9 via an underground process sewer pipe (Dames and Moore 1992b). $CaSO_4$ precipitated and settled in the lagoons was removed and placed in SWMU 37, SWMU 38, and AOC Q.

AOC Q is an abandoned lagoon. It was reportedly used as a sludge drying bed when SWMU 38 was full. Sludge was pumped from SWMU 38 to AOC Q via pipes that ran through a depression in the berm surrounding the drying bed (Dames and Moore 1992b).

5.3 PREVIOUS INVESTIGATIONS

5.3.1 Verification Investigation – 1992

In 1992, as part of a VI, Dames and Moore collected and analyzed three samples of waste (sludge) from SWMU 37, SWMU 38, and AOC Q to "evaluate whether hazardous chemical concentrations exceed[ed] the [then current] health based numbers (HBNs) in the [Facility] permit" (Dames and Moore 1992b). One sample (38SL1) was collected from the top one foot of sludge present in SWMU 38. Because the $CaSO_4$ drying beds at SWMU 37 and SWMU Q were dry at the time of sampling, a 5-ft hand-auger composite hole was advanced in the central part of each bed (Figure 5-2). One sample was composited from each 5-ft hole (samples 38SL1 and QSL1) to ensure a representative sample of numerous sludge-drying episodes (Dames and Moore 1992b). Waste characterization samples were analyzed for VOCs, SVOCs, and Toxicity Characteristic Leaching Procedure (TCLP) metals.

Chemical concentrations detected in samples 37SL1, 38SL1, and QSL1 were below adjusted RBCs and BTAG screening levels (Table 5-1).

5.3.2 Installation Assessment (Air Photo Interpretation)

Activity at SWMU 37, SWMU 38, and AOC Q was first noted on a 1962 photograph. SWMU 37 and 38 consisted of one "lagoon" each, although the lagoons did not appear to contain liquid (USEPA 1992). USEPA noted that both lagoons were present on the 1986 photograph; SWMU 37 contained "a small amount of reddish liquid" and SWMU 38 appeared empty. The 1962 photograph depicts a lagoon containing "possible liquid" at AOC Q. The 1971 photograph depicts AOC Q as re-vegetated.

5.4 WORK PLAN DATA GAP ANALYSIS

The data gap analysis presented in Section 1.2.5 of WPA 016 indicated that limited soil sampling and analyses had occurred at SWMU 37, SWMU 38, and AOC Q (URS 2003b). The following data gaps were identified:

- TCL VOCs - surface and subsurface soil;
- TCL SVOCs/PAHs - surface and subsurface soil;

- TCL PCBs and pesticides- surface soil;
- Explosives - surface and subsurface soil;
- TAL inorganics - surface and subsurface soil; and
- Site-specific physical soil testing data.

5.5 SSP FIELD ACTIVITIES

Nine borings were advanced in and around the sites to evaluate for the presence or absence of chemicals in soil potentially associated with sludge deposition (Figure 5-1). Two borings were advanced within each unit and one outside the perimeter of each unit. Borings were advanced to refusal or the depth of groundwater using a tractor-mounted, direct-push Geoprobe® unit, except for borings 38SB1 and 38SB3, which were advanced with a hand auger. Discrete samples were collected from surface, intermediate, and terminal intervals for the borings as summarized below.

SWMU 37, SWMU 38, and AOC Q SSP Samples and Boring Information

Boring ID	Total Depth of Boring (ft bgs)	Surface Sample ID	Sample Depth (ft)	Intermediate Sample ID	Sample Depth (ft)	Terminal Sample ID	Sample Depth (ft)
37SB1	24.0	37SB1A	0.0 - 1.0	37SB1B	14.0 –16.0	37SB1C	18.0 – 20.0
37SB2	22.9	37SB2A	0.0 - 1.0	37SB2B	10.0 – 12.0	37SB2C	18.0 – 20.0
37SB3	28.0	37SB3A	0.0 - 1.0	37SB3B	10.0 – 12.0	37SB3C	22.0 – 24.0
38SB1	7.5	38SB1A	0.0 - 1.0	38SB1B	3.5	38SB1C	7.0 – 7.5
38SB2	22.0	38SB2A	0.0 - 1.0	38SB2B	10.0 – 12.0	38SB2C	18.0 – 20.0
38SB3	6.0	38SB3A	0.0 - 1.0	38SB3B	4.0	38SB3C	6.0
QSB1	20.6	QSB1A	0.0 - 1.0	QSB1B	10.0 – 12.0	QSB1C	17.0 – 19.0
QSB2	28.0	QSB2A	0.0 - 1.0	QSB2B	10.0 – 12.0	QSB2C	18.0 – 20.0
QSB3	20.0	QSB3A	0.0 - 1.0	QSB3B	10.0 – 12.0	QSB3C	17.0 – 19.0

Soil samples were analyzed for TCL VOCs, TCL SVOCs, PAHs, explosives (including nitroglycerin and PETN), and TAL inorganics. Surface soil samples 37SB1A, 38SB1A, QSB1A were also analyzed for TCL pesticides, TCL PCBs, and TCL herbicides. SSP analytical results (detected chemicals) are summarized in Tables 5-2 through 5-4 for SWMU 37, SWMU 38, and AOC Q, respectively.

Two samples (from each site) were collected for physical testing as summarized below.

SSP Physical Soil Samples – SWMU 37, SWMU 38, and AOC Q

Boring ID	Depth Sample Collected (ft bgs)	Boring ID	Depth Sample Collected (ft bgs)	Boring ID	Depth Sample Collected (ft bgs)
37SB1	6 –6.5	38SB1	7	QSB1	9.5 – 10.0
37SB2	15.5 - 16	38SB2	15.5	QSB2	24

Physical testing for each sample included: percent moisture, grain size, pH, TOC, specific gravity, and bulk density. Additional testing on selected samples was conducted for Atterberg limits and/or hydraulic conductivity. Analytical results for these samples are summarized in Table 3-1 and the complete results are provided in Appendix E.

Deviations to the SSP field program outlined in WPA 016 (URS 2003a) were required to adjust to field conditions encountered at SWMU 38. The steep bank of the berm surrounding SWMU 38 prevented the Geoprobe unit from accessing boring locations 38SB1 and 38SB3 in the interior of the drying bed, and therefore, these borings were advanced using hand augers. The use of hand augers resulted in shallower than anticipated refusal depths on gravelly soil.

5.6 HUMAN HEALTH RISK SCREENING

5.6.1 Identification of COPCs

5.6.1.1 SWMU 37 COPCs

Tables 5-5 and 5-6 present the results of the COPC evaluations for surface soil and total soil, respectively. COPCs identified for surface soil and total soil included:

- *TAL metals:* aluminum (NSV), arsenic, chromium, cobalt (NSV), iron, manganese, and vanadium;
- *TCL PCBs:* Aroclor 1254;
- *TCL VOCs:* methylcyclohexane (NSV) for total soil;
- *VOC TICs:* 8 compounds (NSVs);
- *TCL SVOCs:* DNT Mix, 4-chloro-3-methylphenol (NSV), dimethylphthalate (NSV), and di-n-octylphthalate (NSV); and
- *SVOC TICs:* 6 compounds (NSVs) for surface soil and 14 compounds (NSVs) for total soil.

5.6.1.2 SWMU 38 COPCs

Tables 5-7 and 5-8 present the results of the COPC evaluations for surface soil and total soil, respectively. COPCs identified for surface soil and total soil included:

- *TAL metals:* aluminum (NSV), arsenic, chromium, cobalt (NSV), iron, manganese, and vanadium;
- *TCL PCBs:* Aroclor 1254;
- *VOC TICs:* 4 compounds (NSVs);
- *TCL SVOCs:* 4-chloro-3-methylphenol (NSV); and
- *SVOC TICs:* 12 compounds (NSVs) for surface soil and 15 compounds (NSVs) for total soil.

5.6.1.3 AOC Q COPCs

Tables 5-9 and 5-10 present the results of the COPC evaluations for surface soil and total soil, respectively. COPCs identified for surface soil and total soil included:

- *TAL metals:* aluminum (NSV), arsenic, cobalt (NSV), iron, manganese, vanadium;
- *TCL VOCs:* cyclohexane (NSV) and methylcyclohexane (NSV);
- *VOC TICs:* 7 compounds (NSVs);
- *TCL SVOCs:* 4-chloro-3-methylphenol (NSV); and
- *SVOC TICs:* 18 compounds (NSVs) for surface soil and 34 compounds (NSVs) for total soil.

5.6.2 Cumulative Risk Screen

5.6.2.1 SWMU 37 Cumulative Risk Screen

Tables 5-11 presents the results of the cumulative risk screening for surface soil. Tables 5-12 and 5-13 present the results of the cumulative risk screening for total soil. A summary of the screening results for SWMU 37 is presented below.

Cumulative Human Health Risk Screening for SWMU 37

	Surface Soil			**Total Soil**		
Residential Excess Cancer Risk	Fail	1.E-05	As, Aroclor 1254, DNT Mix	Fail	1.E-05	As, Aroclor 1254, DNT Mix
Industrial Excess Cancer Risk	Pass	3.E-06	--	Pass	2.E-06	--
Residential Noncarcinogenic	Fail	2	As, Cr, Fe, Mn, V, Aroclor 1254, 2,4-DNT	Fail	2	As, Cr, Fe, Mn, V, Aroclor 1254, 2,4-DNT
Industrial Noncarcinogenic	Pass	0.2	--	Pass	0.2	--

The residential cumulative human health risk screens failed for surface soil (carcinogenic and noncarcinogenic) and total soil (carcinogenic and noncarcinogenic). Cumulative risk screenings passed for industrial scenarios.

Noncarcinogenic residential cumulative risk screenings for surface soil and total soil resulted in HIs of 2, which exceeded the EPA target HI of 1. Due to multiple chemicals contributing to an HI greater than 1, the HIs have been segregated based on the primary target organs for chronic exposure. The following tables present the results of the HI segregation using data obtained from Oak Ridge National Laboratory's RAIS, which includes data from various sources such as USEPA and the ATSDR.

HI Segregation for Target Organs – SWMU 37 - Surface Soil

Target Organ	As	Cr	Fe	Mn	V	Aroclor 1254	2,4-DNT	Total HI
Skin	0.2	--	--	--	--	0.1	--	0.3
CNS	0.2	--	--	0.3	--	--	0.01	***0.0.5***
CV	0.2	--	0.8	--	--	--	--	***1***
Blood	--	--	--	--	0.3	--	0.01	0.3
Liver	--	--	0.8	--	--	0.1	0.01	***0.9***
Kidney	--	--	0.8	--	0.3	--	--	***1***
GI	--	0.5	--	--	0.3	--	--	***0.8***
Reproductive	--	--	--	0.3	--	--	--	0.3

HI segregation for surface soil resulted in values equal to or higher than the cumulative SSP HI threshold of 0.5 for a target organs including: the CNS, CV, liver, kidney, and GI.

HI Segregation for Target Organs – SWMU 37 - Total Soil

Target Organ	As	Cr	Fe	Mn	V	Aroclor 1254	2,4-DNT	Total HI
Skin	0.2	--	--	--	--	0.1	--	0.3
CNS	0.2	--	--	0.3	--	--	0.01	***0.5***
CV	0.2	--	1	--	--	--	--	***1***
Blood	--	--	--	--	0.4	--	0.01	0.4
Liver	--	--	1	--	--	0.1	0.01	***1***
Kidney	--	--	1	--	0.4	--	--	***1***
GI	--	0.2	--	--	0.4	--	--	***0.6***
Reproductive	--	--	--	0.3	--	--	--	0.3

HI segregation for total soil resulted in values equal to or higher than the cumulative SSP HI threshold of 0.5 for a target organs including: the CNS, CV, liver, kidney, and GI.

5.6.2.2 SWMU 38 Cumulative Risk Screen

Tables 5-14 presents the results of the cumulative risk screening for surface soil. Tables 5-15 and 5-16 present the results of the cumulative risk screening for total soil. A summary of the screening results for SWMU 38 is presented below.

Cumulative Human Health Risk Screening for SWMU 38

	Surface Soil			Total Soil		
Residential Excess Cancer Risk	Fail	1.E-05	Arsenic, Aroclor 1254	Pass	9.E-06	--
Industrial Excess Cancer Risk	Pass	3.E-06	--	Pass	2.E-06	--
Residential Noncarcinogenic	Fail	3	As, Cr, Fe, Mn, V, Aroclor 1254	Fail	3	As, Cr, Fe, Mn, V, Aroclor 1254
Industrial Noncarcinogenic	Pass	0.2	--	Pass	0.2	--

The residential cumulative human health risk screens failed for surface soil (carcinogenic and noncarcinogenic) and total soil (noncarcinogenic). Cumulative risk screenings for industrial scenarios passed.

Noncarcinogenic residential cumulative risk screenings for surface soil and total soil resulted in HIs of 3, which exceeded the EPA target HI of 1. Due to multiple chemicals contributing to an HI greater than 1, the HIs have been segregated based on the primary target organs for chronic exposure. The following tables present the results of the HI segregation using data obtained from Oak Ridge National Laboratory's RAIS, which includes data from various sources such as USEPA and the ATSDR.

HI Segregation for Target Organs – SWMU 38 - Surface Soil

Target Organ	As	Cr	Fe	Mn	V	Aroclor 1254	Total HI
Skin	0.2	--	--	--	--	0.4	***0.6***
CNS	0.2	--	--	0.3	--	--	***0.5***
CV	0.2	--	1	--	--	--	***1***
Blood	--	--	--	--	0.5	--	***0.5***
Liver	--	--	1	--	--	0.4	***1***
Kidney	--	--	1	--	0.5	--	***2***
GI	--	0.4	--	--	0.5	--	***0.9***
Reproductive	--	--	--	0.3	--	--	0.3

HI segregation for surface soil resulted in values equal to or higher than the cumulative SSP HI threshold of 0.5 for a target organs including: the skin, CNS, CV, blood, liver, kidney, and GI.

HI Segregation for Target Organs – SWMU 38 - Total Soil

Target Organ	As	Cr	Fe	Mn	V	Aroclor 1254	Total HI
Skin	0.1	--	--	--	--	0.4	0.5
CNS	0.1	--	--	0.3	--	--	***0.4***
CV	0.1	--	1	--	--	--	***1***
Blood	--	--	--	--	0.6	--	***0.6***
Liver	--	--	1	--	--	0.4	***1***
Kidney	--	--	1	--	0.6	--	***2***
GI	--	0.2	--	--	0.6	--	***0.8***
Reproductive	--	--	--	0.3	--	--	0.3

HI segregation for total soil resulted in values equal to or higher than the cumulative SSP HI threshold of 0.5 for a target organs including: the CV, blood, liver, kidney, and GI.

5.6.2.3 AOC Q Cumulative Risk Screen

Tables 5-17 presents the results of the cumulative risk screening for surface soil. Tables 5-18 and 5-19 present the results of the cumulative risk screening for total soil. A summary of the screening results for AOC Q is presented below.

Cumulative Human Health Risk Screening for AOC Q

	Surface Soil			Total Soil		
Residential Excess Cancer Risk	Pass	3.E-06	--	Pass	3.E-06	--
Industrial Excess Cancer Risk	Pass	7.E-07	--	Pass	6.E-07	--
Residential Noncarcinogenic	Fail	2	As, Fe, Mn, V	Fail	1	As, Fe, Mn, V
Industrial Noncarcinogenic	Pass	0.1	--	Pass	0.1	--

The cumulative human health risk screens passed with the exception of residential noncarcinogenic scenarios for surface soil and total soil.

Noncarcinogenic residential cumulative risk screenings for surface soil and total soil resulted in HIs of 2, which exceeded the EPA target HI of 1. Due to multiple chemical contributing to an HI greater than 1, the HIs have been segregated based on the primary target organs for chronic exposure. The following tables present the results of the HI segregation using data obtained from Oak Ridge National Laboratory's RAIS, which includes data from various sources such as USEPA and the ATSDR.

HI Segregation for Target Organs – AOC Q -Surface Soil

Target Organ	As	Fe	Mn	V	Total HI
Skin	0.06	--	--	--	0.06
CNS	0.06	--	0.3	--	***0.4***
CV	0.06	0.9	--	--	***0.9***
Blood	--	--	--	0.4	0.4
Liver	--	0.9	--	--	***0.9***
Kidney	--	0.9	--	0.4	***1***
GI	--	--	--	0.4	0.4
Reproductive	--	--	0.3	--	0.3

HI segregation for surface soil resulted in values equal to or higher than the cumulative SSP HI threshold of 0.5 for a target organs including: the CV, liver, and kidney.

HI Segregation for Target Organs – AOC Q - Total Soil

Target Organ	As	Fe	Mn	V	Total HI
Skin	0.05	--	--	--	0.05
CNS	0.05	--	0.3	--	***0.4***
CV	0.05	0.8	--	--	***0.8***
Blood	--	--	--	0.3	0.3
Liver	--	0.8	--	--	***0.8***
Kidney	--	0.8	--	0.3	***1***
GI	--	--	--	0.3	0.3
Reproductive	--	--	0.3	--	0.3

HI segregation for total soil resulted in values equal to or higher than the cumulative SSP HI threshold of 0.5 for a target organs including: the CV, liver, and kidney.

5.6.3 Lead and Iron Screening

5.6.3.1 SWMU 37

The MDC for lead at the site (277 mg/kg) was below the lead screening level of 400 mg/kg, and therefore, further characterization for lead was not required.

Iron concentrations at the site for surface soil and total soil resulted in HQs greater than the iron SSP threshold HQ of 0.5 for the residential scenario, and therefore, the site required further characterization for iron through a margin of exposure evaluation. Appendix H presents the margin of exposure evaluation for surface soil and total soil. A summary of the results for SWMU 37 is presented below.

Iron Margin of Exposure Evaluation – Future Child Resident

	Surface Soil			Total Soil		
		Estimated Site Intake	Exposure Screening Level		Estimated Site Intake	Exposure Screening Level
RDA Screen (mg/day)	Pass	3.7	10	Pass	4.7	10
Provisional Reference Dose (RfD) Screen (mg/kg-day)	Pass	0.25	0.66	Pass	0.31	0.66

The site passed the margin of exposure evaluation for iron in soil. In addition, the MDCs for iron in surface soil and total soil were below the background point estimate.

5.6.3.2 SWMU 38

The MDC for lead at the site (52 mg/kg) was below the lead screening level of 400 mg/kg, and therefore, further characterization for lead was not required.

Iron concentrations at the site for surface soil and total soil resulted in HQs greater than the iron SSP threshold HQ of 0.5 for the residential scenario, and therefore, the site required further characterization for iron through a margin of exposure evaluation. Appendix H presents the margin of exposure evaluation for surface soil and total soil. A summary of the results for SWMU 38 is presented below.

Iron Margin of Exposure Evaluation – Future Child Resident

	Surface Soil			Total Soil		
		Estimated Site Intake	Exposure Screening Level		Estimated Site Intake	Exposure Screening Level
RDA Screen (mg/day)	Pass	5.9	10	Pass	5.8	10
Provisional Reference Dose (RfD) Screen (mg/kg-day)	Pass	0.39	0.66	Pass	0.39	0.66

The site passed the margin of exposure evaluation for iron in soil. In addition, the MDCs for iron in surface soil and total soil were below the background point estimate.

5.6.3.3 AOC Q

The MDC for lead at the site (24 mg/kg) was below the lead screening level of 400 mg/kg, and therefore, further characterization for lead was not required.

Iron concentrations at the site for surface soil and total soil resulted in HQs greater than the iron SSP threshold HQ of 0.5 for the residential scenario, and therefore, the site required further characterization

for iron through a margin of exposure evaluation. Appendix H presents the margin of exposure evaluation for surface soil and total soil. A summary of the results for AOC Q is presented below.

Iron Margin of Exposure Evaluation – Future Child Resident

	Surface Soil			Total Soil		
		Estimated Site Intake	Exposure Screening Level		Estimated Site Intake	Exposure Screening Level
RDA Screen (mg/day)	Pass	4.0	10	Pass	3.5	10
Provisional Reference Dose (RfD) Screen (mg/kg-day)	Pass	0.27	0.66	Pass	0.23	0.66

The site passed the margin of exposure evaluation for iron in soil. In addition, the MDCs for iron in surface soil and total soil were below the background point estimate.

5.6.4 Comparison to Generic SSLs

5.6.4.1 SWMU 37

MDC comparisons for subsurface soil to generic SSLs (DAF 20) for detected chemicals indicated that arsenic, dieldrin, and TCE exceeded their SSLs (Table 5-20).

5.6.4.2 SWMU 38

MDC comparisons for subsurface soil to generic SSLs (DAF 20) for detected chemicals indicated that arsenic exceeded its SSL (Table 5-21).

5.6.4.3 AOC Q

MDC comparisons for subsurface soil to generic SSLs (DAF 20) for detected chemicals indicated that arsenic exceeded its SSL (Table 5-22).

5.6.5 Comparison to Site-Specific SSLs

The MDC for dieldrin at SWMU 37 was below the calculated site-specific SSL of 28 µg/kg using the average TOC value from the two physical samples collected from SWMU 37 during the SSP (Appendix F). The MDC of TCE (63 µg/kg) is above the site-specific SSL of 1.5 µg/kg calculated using the T-RBC as a target leachate concentration (Region III RBC Table); therefore, TCE is a chemical of potential concern for the soil-to-groundwater migration pathway.

5.6.6 COPC Comparison to Background

MDCs for metals COPCs in surface soil and total soil were below their background point estimates with the exception of chromium at SWMU 37 and SWMU 38 (Tables 5-23 through 5-25).

5.6.7 Human Health Risk Screening Summary

5.6.7.1 SWMU 37

COPCs with available screening values were limited to metals, Aroclor 1254, and DNT Mix. The residential cumulative human health risk screens failed for surface soil (carcinogenic and noncarcinogenic) and total soil (carcinogenic and noncarcinogenic). Cumulative risk screenings passed for industrial scenarios.

Carcinogenic residential risk screening failed for surface soil due to arsenic concentrations below the background point estimate. This screening result is not a concern given that: 1) the risk associated with background levels of arsenic contributes 80% of the cumulative risk of 1E-05, and 2) the other COPCs for the site, Aroclor 1254 and DNT Mix, contribute negligible risk (3.E-06) at concentrations below their unadjusted R-RBCs.

Noncarcinogenic residential risk screening failed for surface soil primarily due to metals concentrations below background point estimates. This screening result is not a concern given that the elevated HI (>1) is due to background levels of metals in soil (HI of 1.8) rather than the single metal COPC detected above background (chromium) and Aroclor 1254, which result in a site-related HI of 0.6. In addition, the MDCs for chromium and Aroclor 1254 are below their unadjusted R-RBCs.

Carcinogenic residential risk screening failed for total soil due to arsenic concentrations below the background point estimate. This screening result is not a concern given that: 1) the risk associated with background levels of arsenic contributes 75% of the cumulative risk of 1E-05, and 2) the other COPCs for the site, Aroclor 1254 and DNT Mix, contribute negligible risk (3.E-06) at concentrations below their unadjusted R-RBCs.

Noncarcinogenic residential risk screening failed for total soil primarily due to metals concentrations below background point estimates. This screening result is not a concern given that the elevated HI (>1) is due to background levels of metals in soil (HI of 2.1) rather than the single metal COPC detected above background (chromium) and Aroclor 1254, which result in a site-related HI of 0.3. In addition, the MDCs for chromium and Aroclor 1254 are below their unadjusted R-RBCs.

The site passed the lead screening for soil. Iron concentrations in surface soil and total soil required a margin of exposure evaluation. Surface soil and total soil passed the margin of exposure evaluation for iron.

Generic SSL exceedances were limited to arsenic, dieldrin, and TCE. The arsenic MDC is below its background point estimate and the dieldrin concentration detected in soil is below the calculated site-specific SSL, and therefore, these chemicals are not of concern at the site. The MDC of TCE (63 µg/kg) is above the site-specific SSL of 1.5 µg/kg calculated using the Region III T-RBC as a target leachate concentration; therefore, TCE is a chemical of potential concern in groundwater at the site.

5.6.7.2 SWMU 38

COPCs with available screening values were limited to metals and Aroclor 1254. The residential cumulative human health risk screens failed for surface soil (carcinogenic and noncarcinogenic) and total soil (carcinogenic and noncarcinogenic). Cumulative risk screenings passed for industrial scenarios.

Failure of the residential carcinogenic cumulative risk screening for surface soil is due to the concentrations of arsenic and Aroclor 1254 in the soil. The arsenic MDC is below its background point estimate, and therefore, it is not a concern at the site. The concentration of Aroclor 1254 in the surface sample analyzed for PCBs was above its unadjusted R-RBC.

Noncarcinogenic residential risk screening failed for surface soil primarily due to metals concentrations below background point estimates. This screening result is not a concern given that the elevated HI (>1)

is due to background levels of metals in soil (HI of 2.7) rather than the single metal COPC detected above background (chromium) and Aroclor 1254, which result in a site-related HI of 0.7. In addition, the MDCs for chromium and Aroclor 1254 are below their unadjusted R-RBCs.

Noncarcinogenic residential risk screening failed for total soil primarily due to metals concentrations below background point estimates. This screening result is not a concern given that the elevated HI (>1) is due to background levels of metals in soil (HI of 2.6) rather than the single metal COPC detected above background (chromium) and Aroclor 1254, which result in a site-related HI of 0.6. In addition, the MDCs for chromium and Aroclor 1254 are below their unadjusted R-RBCs.

The site passed the lead screening for soil. Iron concentrations in surface soil and total soil required a margin of exposure evaluation. Surface soil and total soil passed the margin of exposure evaluation for iron.

Generic SSL exceedances are limited to arsenic. The arsenic MDC is below its background point estimate, and therefore, it is not of concern at the site.

5.6.7.3 AOC Q

COPCs with available screening value were limited to metals. Cumulative risk screening passed for carcinogenic residential scenarios and industrial scenarios. Cumulative human health risk screening failed for noncarcinogenic residential scenarios.

Noncarcinogenic residential risk screening failed for surface soil and total soil due to metals concentrations below background point estimates. These screening results are not a concern given that the elevated HI (>1) is due to background levels in soil (HI of 1.8 for surface soil and HI of 1.4 for total soil) rather than metal COPCs detected above background (none above background).

The site passed the lead screening for soil. Iron concentrations in surface soil and total soil required a margin of exposure evaluation. Surface soil and total soil passed the margin of exposure evaluation for iron.

Generic SSL exceedances are limited to arsenic. The arsenic MDC is below its background point estimate, and therefore, it is not of concern at the site.

5.7 ECOLOGICAL RISK SCREENING

5.7.1 Problem Formulation

5.7.1.1 Ecological Site Characterization

An overview of the site physiography, water resources, soil, and geology for SWMU 37, SWMU 38, and AOC Q is presented in Section 5.1.

The sites are located along the New River in the northwestern part of the MMA adjacent to a pine plantation of loblolly pine (*Pinus taeda*), white pine (*Pinus strobus*), and shortleaf pine (*Pinus echinata*).

Observations made during the site reconnaissance indicate that a healthy and vigorous plant community occurs in the three areas (photograph on page 5-1). Vegetation within each site was largely herbaceous including foxtail (*Setaria sp.*), broomsedge (*Andropogon virginicus*), and wingstem (*Verbesinia sp.*) present on the outer margins. Signs of vegetative stress were not observed and the vegetation was generally dense within each site.

The sites likely provide some habitat value to small mammals and passerine birds. Adjacent habitats, particularly the pine plantation, may provide cover to larger mammals including white tailed deer (*Odocoileus virginianus*), which were observed in adjacent habitats during the site reconnaissance.

Threatened, rare, or endangered species were not observed during the site reconnaissance. Threatened, rare, and endangered species information for RFAAP is discussed in Section 3.3.3.

5.7.2 Ecological Conceptual Site Model

The ECSM for SWMU 37, SWMU 38, and AOC Q (and other terrestrial sites for the SSP) is presented on Figure 3-1. These areas are exclusively upland habitat lacking wetlands or aquatic habitat. Hence, surface soil is the potential exposure medium of concern. Based on the site characterization and data, the following complete exposure pathway exists: terrestrial receptor exposure to surface soil.

Detected chemical occurrence and distribution tables are presented in Table 5-26, 5-28, and 5-30 for SWMU 37, SWMU 38, and AOC Q, respectively. In addition, Tables 5-27, 5-29, and 5-31 summarize the nondetected chemicals for SMWU 37, SWMU 38, AOC Q, respectively. Potential ecological receptors may be exposed to COPECs in soil through the following exposure routes:

- Direct contact/absorption from soil;
- Direct ingestion of soil;
- Incidental ingestion of soil; and
- Direct ingestion of biota with accumulated COPECs.

Receptors of concern selected for SWMU 37, SWMU 38, and AOC Q include:

- Plants;
- Soil invertebrate/microbial community;
- Omnivorous birds (American Robin; *Turdus migratorius*);
- Carnivorous birds (Red-Tailed Hawk; *Buteo jamaicensis*);
- Herbivorous mammals (Meadow Vole; *Microtus pennsylvanicus*;);
- Omnivorous mammals (Red Fox; *Vulpes vulpes*); and
- Carnivorous mammals (Short-Tailed Shrew; *Blarina brevicauda*).

Relevant assessment and measurement endpoints for the identified terrestrial receptors are presented in Section 3.3.6.1.

5.7.3 Preliminary Exposure Estimate and Risk Characterization

The preliminary exposure estimate and ecological effects evaluation considers the most conservative risk scenario. Highly conservative assumptions were used to estimate COPEC exposure to terrestrial receptors for pathways to be quantitatively evaluated, and conservative TRVs were used to evaluate the ecological effects of exposure using the two approaches discussed below.

5.7.3.1 Preliminary Exposure Estimate and Ecological Effects Evaluation

Direct Contact Approach

The MDCs for detected chemicals in soil were used as the preliminary exposure estimate concentrations to develop a conservative risk scenario for the direct contact pathway to soil invertebrates. Tables 5-32 through 5-34 present the preliminary exposure estimates for the direct contact approach.

Dose Rate Modeling Approach

In the dose rate modeling approach, MDCs for detected bioaccumulative chemicals were used in the conservative risk scenario as the preliminary exposure estimate for soil COPECs and compared to the calculated TRVs. MDCs used in the preliminary exposure estimate for detected chemicals are presented in Tables 5-26, 5-28, and 5-30 for SWMU 37, SWMU 38, and AOC Q, respectively.

5.7.3.2 Background Concentrations of Metals

The results of the background comparison for the site are provided in Table 5-35 through 5-37 and discussed in the ecological risk summary. Although essential nutrients, including magnesium, potassium, and sodium were not considered COPECs in the risk screening in accordance with the Site Screening Process (USEPA 2001a) and the MWP (URS 2003b). Calcium was evaluated qualitatively due to the nature of the disposal material at the sites (Calcium Sulfate).

5.7.3.3 Preliminary Risk Characterization

Terrestrial Plants

Qualitative characterization of vegetative communities common to grassed areas at RFAAP is provided in Section 3.3.7.4. Stressed or dead vegetation was not observed during the reconnaissance of the sites, which could be attributed to chemical stress. Reduced plant density is likely due to poor physical substrate quality and not a response to COPEC concentrations in surface soil.

Soil Invertebrates and Microbial Communities

Direct contact HQs calculated for soil invertebrates and microbial communities for the three areas are presented in Tables 5-32 through 5-34. Other potentially complete exposure pathways to soil invertebrate and microbial communities include direct ingestion of soil and biota. However, there is insufficient information to quantify these pathways, and while these pathways exist, they are likely secondary to the direct contact/absorption pathway and should not substantially alter the risk characterization.

SWMU 37: of the detected chemicals for which ecological screening values were available, the concentrations of aluminum, chromium, copper, iron, manganese, mercury, zinc and cyanide resulted in HQ values that were greater than 1 (Table 5-32). However, MDCs for aluminum, iron, manganese, nickel, and zinc were below their background point estimates (Table 5-35).

SWMU 38: of the detected chemicals for which ecological screening values were available, the concentrations of aluminum, chromium, copper, iron, manganese, mercury, Aroclor 1254, flouranthene, and cyanide resulted in HQ values that were greater than 1 (Table 5-33). However, MDCs for aluminum, iron, and manganese were below their background point estimates (Table 5-36).

AOC Q: of the detected chemicals for which ecological screening values were available the concentrations of aluminum, chromium, iron, manganese, and cyanide resulted in HQ values that were greater than 1 (Table 5-34). However, MDCs for aluminum, chromium, iron, and manganese were below their background point estimates (Table 5-37).

Terrestrial Wildlife

Quantitative risk characterization for terrestrial wildlife is limited to direct ingestion of biota and incidental ingestion of soil. The ECSM identifies a potentially complete direct contact exposure pathway to herbivorous and omnivorous mammals; however, there is insufficient information to quantify this pathway. This pathway is likely secondary to direct ingestion pathway and it therefore should not substantially alter the risk characterization.

The risk to each potential wildlife receptor in SWMU 37, SWMU 38 and AOC Q is presented in Tables 5-38 through 5-40, respectively, and summarized as follows:

SWMU 37*:*

Receptor	NOAEL Only Exceedances	NOAEL and LOAEL Exceedances
American Robin	cadmium, selenium	chromium, copper, lead, zinc, Aroclor 1254
Red-tailed Hawk	chromium, zinc	mercury
Meadow Vole	mercury	none
Red Fox	arsenic, zinc, Aroclor 1254	copper, mercury
Short-tailed Shrew	cadmium, lead	arsenic, copper, mercury, Aroclor 1254

SWMU 38:

Receptor	NOAEL Only Exceedances	NOAEL and LOAEL Exceedances
American Robin	cadmium, zinc	chromium, lead, selenium, Aroclor 1254
Red-tailed Hawk	chromium, zinc	none
Meadow Vole	none	none
Red Fox	arsenic, copper, selenium, zinc	mercury, Aroclor 1254
Short-tailed Shrew	cadmium, mercury, selenium	arsenic, Aroclor 1254

AOC Q:

Receptor	NOAEL Only Exceedances	NOAEL and LOAEL Exceedances
American Robin	cadmium, chromium, lead, zinc, Aroclor 1254	selenium
Red-tailed Hawk	zinc	none
Meadow Vole	none	none
Red Fox	arsenic, selenium	mercury
Short-tailed Shrew	arsenic, cadmium, selenium	Aroclor 1254

5.7.3.4 Refined Exposure Estimate, Ecological Effects Evaluation and Risk Characterization

5.7.3.5 Refined Exposure Estimate and Ecological Effects Evaluation - Dose Modeling

The conservative assumptions used in the preliminary exposure estimate and ecological effects evaluation were replaced with more environmentally realistic assumptions resulting in a more realistic estimate of potential risk.

Refined exposure estimates and ecological effects were not developed for soil invertebrates and microbial communities because an appropriate 95% UCL could not be calculated using the surface soil data.

The refined exposure estimates and ecological effects were developed for wildlife receptors having complete exposure pathways to be quantitatively evaluated (i.e., omnivorous birds and mammals,

carnivorous birds and mammals and herbivorous mammals). In the refined model, a realistic area use factor ($AF_{refined}$) was calculated as the ratio of the sum of the site areas to the average home range of the receptor (Appendix I, Table I-16).

5.7.3.6 Refined Risk Characterization - Terrestrial Wildlife

SWMU 37

The refined risk characterization for SWMU 37 is presented in Table 5-38 and is summarized as follows:

Receptor	NOAEL Only Exceedances	NOAEL and LOAEL Exceedances	COPECs Below Background Point Est.
American Robin	cadmium (1.3) zinc (4.2) Aroclor 1254 (9.2)	chromium (10.8/2.2)* lead (26.2/2.6)	zinc
Red-tailed Hawk	none	none	n/a
Meadow Vole	none	none	n/a
Red Fox	none	none	n/a
Short-tailed Shrew	arsenic (10.0) copper (1.2) lead (3.1)	mercury (4.3/1.1) Aroclor 1254 (30.7/3.1)	arsenic

*Note: (10.8/2.2) = NOAEL-based HQ/LOAEL-based HQ

SWMU 38

The refined risk characterization for SWMU 38 is presented in Table 5-39 and is summarized as follows:

Receptor	NOAEL Only Exceedances	NOAEL and LOAEL Exceedances	COPECs Below Background Point Est.
American Robin	cadmium (1.3) lead (4.9) zinc (3.3)	chromium (7.7/1.5)* Aroclor 1254 (29.3/2.9)	zinc
Red-tailed Hawk	none	none	n/a
Meadow Vole	none	none	n/a
Red Fox	none	none	n/a
Short-tailed Shrew	arsenic (9.2) mercury (1.2)	Aroclor 1254 (97.1/9.7)	arsenic

*Note: (7.7/1.5) = NOAEL-based HQ/LOAEL-based HQ

AOC Q

The refined risk characterization for AOC Q is presented in Table 5-40 and is summarized as follows:

Receptor	NOAEL Only Exceedances	NOAEL and LOAEL Exceedances	COPECs Below Background Point Est.
American Robin	cadmium (1.1)* chromium (2.0) lead (2.0) zinc (2.2) Aroclor 1254 (2.7)	none	chromium lead zinc
Red-tailed Hawk	none	none	n/a
Meadow Vole	none	none	n/a
Red Fox	none	none	n/a
Short-tailed Shrew	arsenic (2.8) Aroclor 1254 (9.0)	none	arsenic

*Note: (1.1) = NOAEL-based HQ

5.7.3.7 Exposure and Risk Uncertainty Analysis

A discussion of potential risk and exposure uncertainty is provided in Section 3.3.9. Based on this assessment, while factors such as lack of TSV and wildlife profile assumptions may create limited uncertainty, the overall result of the conservative nature of the process has produced a conservative assessment of potential ecological risks associated with SWMU 37, SWMU 38, and AOC Q.

5.7.4 Ecological Risk Screening Summary

Based in the refined ecological risk screening, the information collected and presented indicates that a more thorough assessment is warranted for metals, PCB, and pesticides. Upon further investigation of the sites, a toxicity assessment due to the elevated levels of calcium in SWMU 37 may be conducted.

5.8 CONCEPTUAL SITE MODEL

A refined CSM for SWMU 37, SWMU 38, and AOC Q is presented on Figure 5-3. The sites are located in a relatively flat area approximately 300 to 400 ft from the New River. Subsurface geology consists of alluvial deposits overlying limestone/dolomite bedrock of the Elbrook Formation. Groundwater is present within the lower portion of the alluvium (20 to 25 ft bgs) and in the underlying bedrock. Monitoring well data from the SWMU 9 area indicate that groundwater flow in the site area is northwest toward the New River.

Each of the sites consists of 4 to 8 ft deep depressed area surrounded by an earthen berm where precipitation and overland flow infiltrate into subsurface soil. Surface water and sediment are not present within or adjacent to the sites and therefore, potentially affected media include surface soil, subsurface soil, and groundwater. COPCs identified in soil with screening values included metals and Aroclor 1254 at SWMUs 37 and 38.

Although current and likely future land-use scenarios are limited to industrial operations, both residential and industrial scenarios are evaluated. The sites are enclosed by the Installation perimeter fence; therefore, potential receptors are limited to site workers (more conservative than trespasser scenario), future construction workers, and terrestrial biota. Direct deposition via former surface deposition of sludge is considered a potential release mechanism to surface soil. Site workers, construction workers, and terrestrial biota could contact surface soil. Leaching of chemicals is considered a potential release mechanism to subsurface soil that may be contacted by future construction workers. Leaching of chemicals is considered a potential release mechanism to groundwater at SWMU 37 due the site specific

SSL exceedance for TCE. The lack of SSL exceedances above background point estimates in soil at SWMU 38 and AOC Q indicates that leaching of chemicals to groundwater at levels of concern is unlikely at these sites.

5.9 RECOMMENDATION FOR FUTURE ACTION

A focused RFI for soil and groundwater media is recommended for the sites based on the site-specific SSL exceedance for TCE at SWMU 37, the lack of groundwater data for the sites, and the results of the human health and ecological risk screening. The RFI will focus on metals, explosives (in sludge at SWMU 37), PCBs, pesticides, and VOCs.

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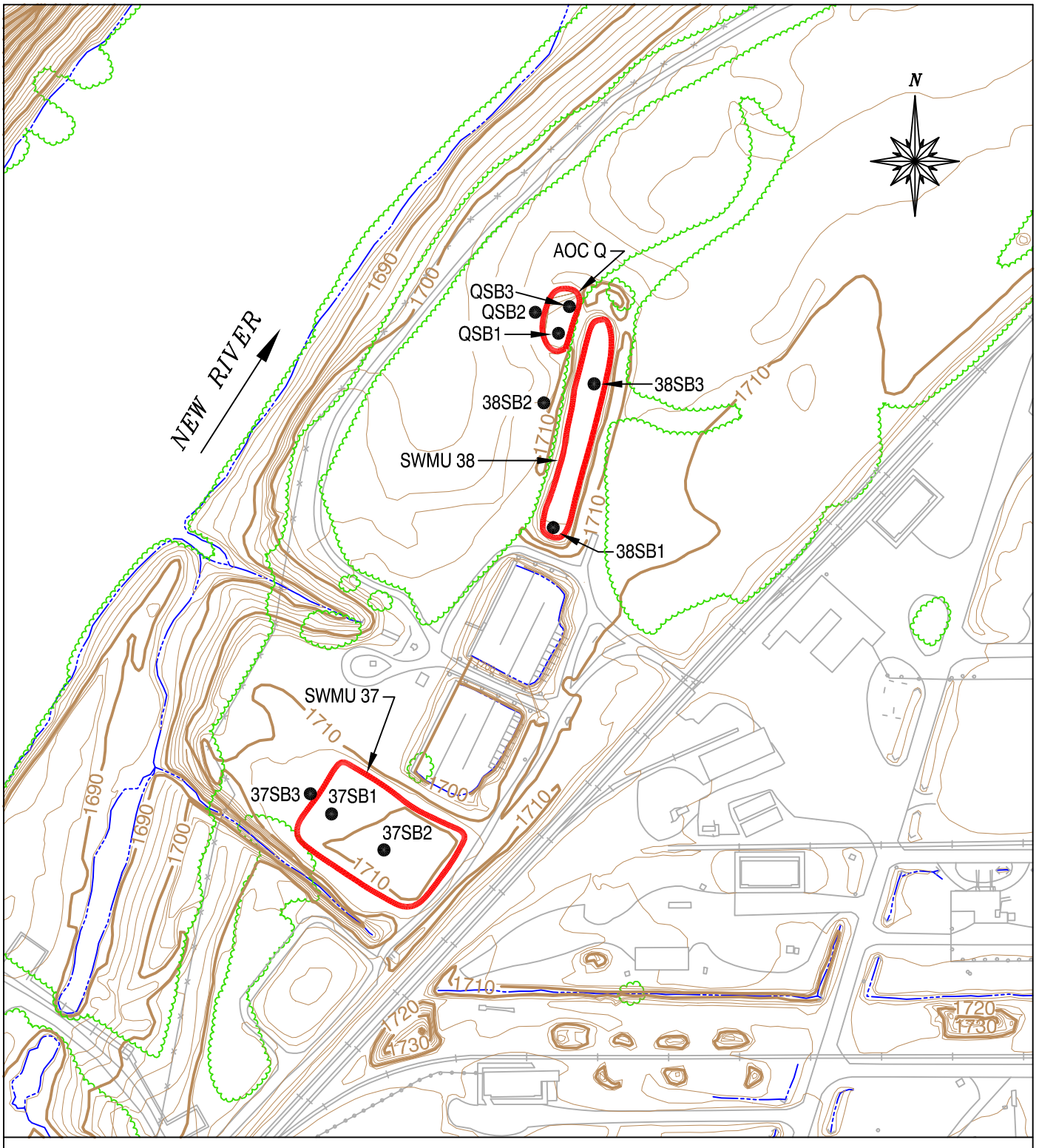


(SOURCE: MODIFIED FROM HERCULES, INC., 1992)

0 200'

1 inch = 200 feet

Legend

- Soil Sampling Location
- SWMUs 37, 38, and AOC Q Approximate Boundaries
- Aboveground Piping
- Vegetation
- Water

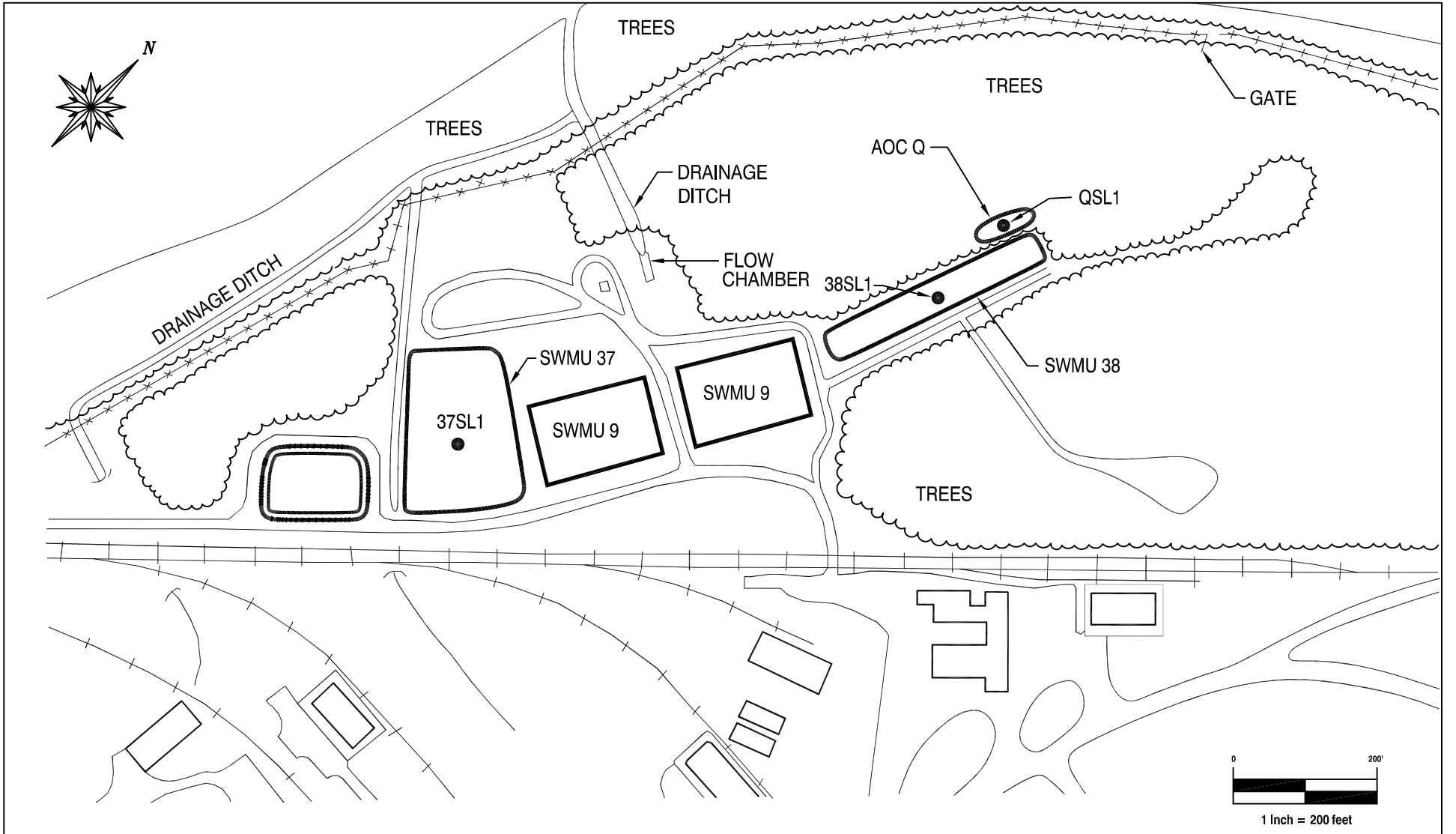
RFAAP

SSP REPORT

Date:	Prepared By:
June 2004	KDC/TDH
Scale:	**File Name:**
1"=200'	15900619

FIGURE 5-1

SSP SAMPLING LOCATION MAP SWMUs 37, 38, AND AOC Q



Legend

- Soil Sampling Location
- SWMUs 37, 38, and AOC Q Boundary

(SOURCE: MODIFIED FROM DAMES AND MOORE, 1992a)

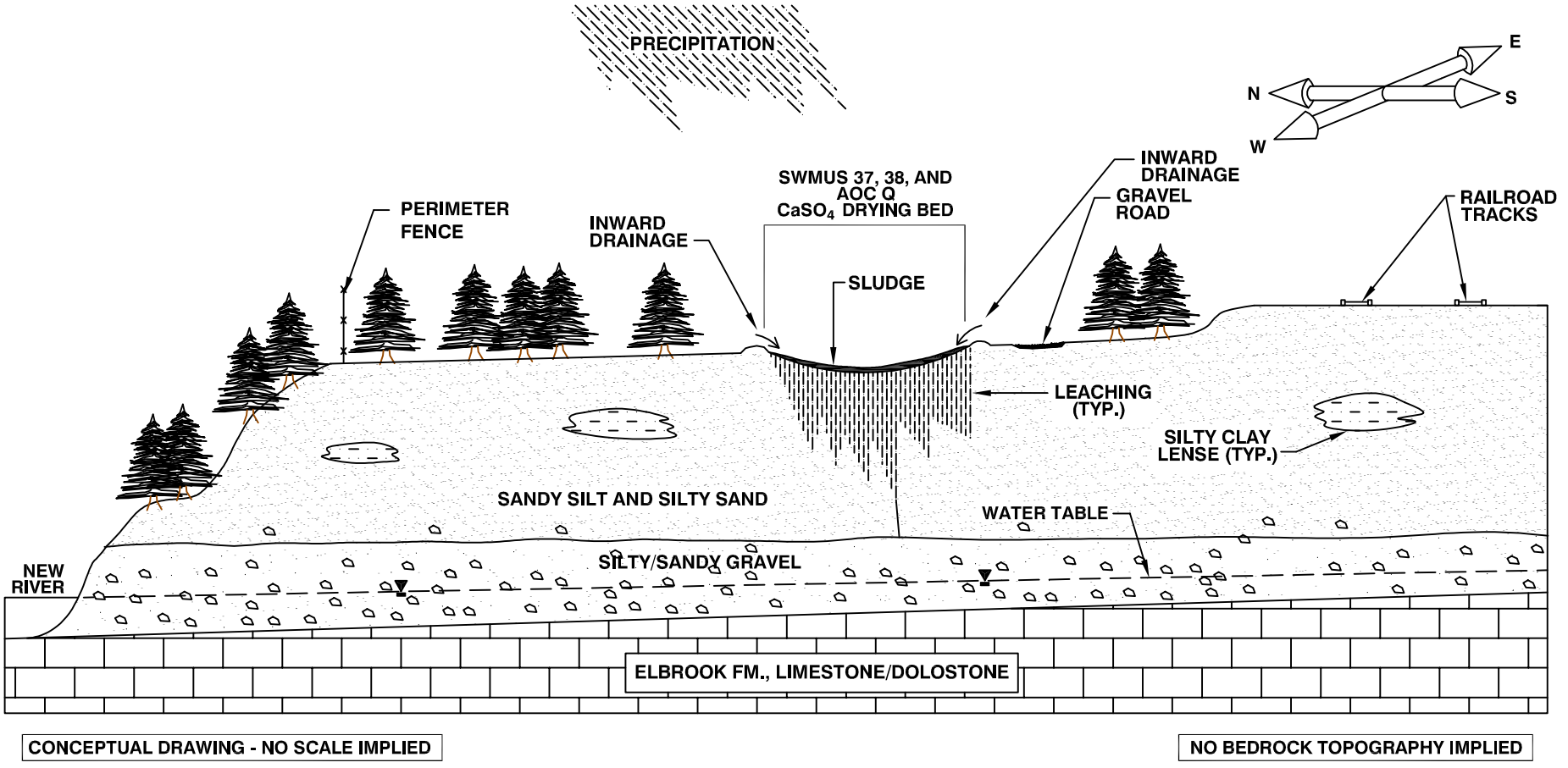
RFAAP

SSP REPORT

Date:	Prepared By:
June 2004	*KDC/TDH*
Scale:	**File Name:**
1"=200'	*15900619*

FIGURE 5-2

PREVIOUS INVESTIGATION SAMPLING LOCATIONS SWMUs 37, 38, AND AOC Q



RFAAP

SSP REPORT

Date:	Prepared By:
June 2004	*KDC/TDH*
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Not to Scale	*15900619*

FIGURE 5-3

CONCEPTUAL SITE MODEL SWMUs 37, 38, AND AOC Q

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Table 5-1
Summary of Analytical Data For Sediment/Sludge Samples
Collected At SWMU 37, SWMU 38, and AOC Q
Modified from Dames and Moore Verification Investigation Report
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

SITE ID FIELD ID SAMPLE DATE DEPTH (ft bgs) MATRIX UNITS	PQLs mg/kg	37SL1 RVFS*34 15-Jan-92 5.0 CSE mg/kg	38SL1 RVFS*35 15-Jan-92 5.0 CSE mg/kg	QSL1 RVFS*87 15-Jan-92 5.0 CSE mg/kg	Adjusted Soil Industrial RBC mg/kg	Adjusted Soil Residential RBC mg/kg	Draft BTAG Screening Level mg/kg
Volatiles							
1,1,1- Trichloroethane	0.005	< 0.004	< 0.004	< 0.004	28,616	2,190	0.3
Acetone	0.1	< 0.017	< 0.017	< 0.017	9,198	704	--
Chloroform	0.005	< 0.001	< 0.001	<0.001	1,022	78	0.3
Semivolatiles							
2-Methylnaphthalene	0.3	< 0.245	< 0.049	< 0.049	2,044	156	--
Di-N-Butyl-Phthalate	0.3	41.5	1.48	3.01	10,220	782	--
N-Nitrosodiphenylamine	0.3	5.71	0.702	<0.19	584	130	--
Naphthalene	0.3	< 0.185	< 0.037	<0.037	2,044	156	0.1
Phenanthrene(1)	0.5	< 0.165	< 0.033	<0.033	3,066	235	0.1

Notes:

BTAG = USEPA Region III Draft, Biological Technical Assistance Group Screening Level

CSE = Chemical Sediment

ft bgs = Feet below ground surface

mg/kg = Milligrams per kilogram

PQL = Practical quantitation limit; the lowest concentration that can be reliably detected at a defined level of precision for a given analytical method

RBC = Risk-Based Concentration

USEPA = United States Environmental Protection Agency

USEPA Region III Risk-Based Concentration (RBC) values from the April 14, 2004, RBC Table

Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens

(1) = RBC value for pyrene used for phenanthrene

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Table 5-2
Detected Analytes for SWMU 37
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL DAF 20	Draft BTAG Screening Level	37SB1A 10/1/2003 0-1		MDL	RL	37SB1B 10/1/2003 14-16		MDL	RL	37SB1C 10/1/2003 18-20		MDL	RL	37SB2A 10/2/2003 0-1		MDL	RL	37SB2B 10/2/2003 10-12		MDL	RL
								Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
TAL Metals (mg/kg)																											
Aluminum	7429-90-5	--	40,041	--	--	--	1	13,100		92	500	14,100		92	500	13,800		92	500	17,000		92	500	17,500		92	500
Antimony	7440-36-0	N	--	3.13	40.9	13.2	0.48	0.52	,B,p	0.0518	0.5	0.19	J,B,p	0.0518	0.5	0.24	J,B,p	0.0518	0.5	1.2		0.0518	0.5	0.23	J,B,p	0.0518	0.5
Arsenic	7440-38-2	C	15.8	0.43	1.9	0.026	328	***3.8***		0.0232	0.4	***1***		0.0232	0.4	***1.7***		0.0232	0.4	***5***		0.0232	0.4	***1.3***		0.0232	0.4
Barium	7440-39-3	N	209	1,564	20,440	6,015	440	51		0.106	1	132		0.53	5	85		0.106	1	50		0.106	1	103		5.3	5
Beryllium	7440-41-7	N	1.02	15.64	204.4	1,154	0.02	0.64	J	0.0391	1	0.71	J	0.0391	1	0.52	J	0.0391	1	0.72	J	0.0391	1	0.61	J	0.0391	1
Cadmium	7440-43-9	N	0.69	3.91	51.1	27.4	2.5	1.9		0.182	1	0.79	J,B,p	0.182	1	0.59	J,B,p	0.182	1	1.6		0.182	1	1.6	,B,p	0.182	1
Calcium	7440-70-2	--	--	--	--	--	--	35,700	L,m	830	2,500	1,990	,L,m	17	250	1,700		17	250	106,000		4,150	12,500	2,610		17	250
Chromium [1]	7440-47-3	N	65.3	23.46	306.6	42	0.0075	72	J,s	0.912	5	18	,J,s	0.912	5	18		0.912	5	***114***	,J,s	4.56	25	20		0.912	5
Cobalt	7440-48-4	--	72.3	--	--	--	100	2.8	J,s	0.208	1	8.4	,J,s	0.208	1	8.1		0.208	1	3.1		0.208	1	11		0.208	1
Copper	7440-50-8	N	53.5	312.86	4,088	10,518	15	78		0.368	1	8		0.368	1	10		0.368	1	193		1.84	5	11		0.368	1
Iron	7439-89-6	N	50,962	2,346	30,660	--	12	14,300	J,s	106	500	20,200	,J,s	106	500	27,700		212	1,000	19,500		212	1,000	28,200		212	1,000
Lead [2]	7439-92-1	--	26.8	400	750	--	0.01	80		0.218	10	8.4		0.0218	1	7.6		0.0218	1	277		1.09	50	7.8		0.0218	1
Magnesium	7439-95-4	--	--	--	--	--	4,400	3,270		16	250	3,630		16	250	3,230	K,m	16	250	3,780	K,m	16	250	4,790	K,m	32	500
Manganese	7439-96-5	N	2,543	156.43	2,044	951.9	330	147		1.32	5	479		2.64	10	503		2.64	10	164		1.32	5	419		2.64	10
Mercury [3]	7439-97-6	--	0.13	2.35	30.66	--	0.06	0.41		0.0077	0.1	<0.1	U	0.0077	0.1	<0.1	U	0.0077	0.1	0.6	J,m	0.0077	0.1	<0.1	U	0.0077	0.1
Nickel	7440-02-0	N	62.8	156.43	2,044	--	2	30	J,s	0.0356	0.5	12	,J,s	0.0356	0.5	12		0.0356	0.5	50		0.356	5	14		0.0356	0.5
Potassium	7440-09-7	--	--	--	--	--	--	860	J,s	5	20	2,000	,J,s	25	100	1,600		25	100	677		5	20	2,140		25	100
Selenium	7782-49-2	N	--	39.11	511	18.98	1.8	0.47	J	0.0502	1	0.6	J	0.0502	1	0.58	J	0.0502	1	0.43	J	0.0502	1	0.53	J	0.0502	1
Silver	7440-22-4	N	--	39.11	511	31.03	0.0000098	0.14	J	0.0044	3	0.063	J	0.0044	3	0.047	J	0.0044	3	0.24	J	0.0044	3	0.051	J	0.0044	3
Sodium	7440-23-5	--	--	--	--	--	--	70	J,B,x	8.92	100	67	J,B,p	8.92	100	93	J,B,p	8.92	100	87	J,B,p	8.92	100	80	J,B,p	8.92	100
Thallium	7440-28-0	N	2.11	0.55	7.2	3.6	0.001	0.069	J	0.027	0.5	0.16	J	0.027	0.5	0.15	J	0.027	0.5	0.064	J	0.027	0.5	0.19	J	0.027	0.5
Vanadium	7440-62-2	N	108	7.82	102.2	730.1	0.5	16		0.207	1	27		0.207	1	33		0.207	1	19		0.207	1	43		0.207	1
Zinc	7440-66-6	N	202	2,346	30,660	13,622	10	67		0.517	4	55		0.517	4	45		0.517	4	129		2.585	20	65		0.517	4
TCL Pesticides/PCBs (µg/kg)																											
Dieldrin	60-57-1	C	--	4.0E+01	1.8E+02	2.2E+00	100	***11***	J,J,g	0.494	33	NT		--		NT		--		NT		--		NT		--	
Aroclor 1254 [4]	11097-69-1	C	--	1.6E+02	1.4E+03	1.1E+03	--	180		4.8	54	NT		--		NT		--		NT		--		NT		--	
TCL VOCs (µg/kg)																											
2-Butanone	78-93-3	N	--	4.7E+06	6.1E+07	2.9E+04	--	<32	U	8.2	32	24		6	24	<24	U	5.9	24	<32	U	7.95	32	18	J	5.9	24
Acetone	67-64-1	N	--	7.0E+06	9.2E+07	2.2E+04	--	110	J,c	8.2	32	48	B,z	6	24	24	B,z	5.9	24	37	J,B,z	7.95	32	25	B,z	5.9	24
cis-1,2-Dichloroethene	156-59-2	N	--	7.8E+04	1.0E+06	--	300	<8.2	U	1.16	8.2	<6	U	0.852	6	<5.9	U	0.838	5.9	<7.9	U	1.13	7.9	1.3	J	0.838	5.9
Methylcyclohexane	108-87-2	--	--	--	--	--	--	<16	U	1.39	16	<12	U	1.01	12	<12	U	0.997	12	<16	U	1.34	16	<12	U	0.997	12
Methylene chloride	75-09-2	C	--	8.5E+04	3.8E+05	1.9E+01	300	<32	U,UJ,c	4.61	32	4.6	J	3.37	24	5	J,J,c	3.32	24	10	J,J,c	4.47	32	5.3	J,J,c	3.32	24
Toluene	108-88-3	N	--	6.3E+05	8.2E+06	2.7E+04	100	<8.2	U	0.761	8.2	<6	U	0.557	6	<5.9	U	0.548	5.9	<7.9	UJ,UJ,m	0.738	7.9	1	J	0.548	5.9
Trichloroethene	79-01-6	C	--	1.6E+03	7.2E+03	2.6E-01	--	<8.2	U	1.11	8.2	<6	U	0.812	6	<5.9	U	0.799	5.9	<7.9	U	1.08	7.9	***6.8***		0.799	5.9
Xylenes	1330-20-7	N	--	1.6E+06	2.0E+07	3.0E+03	100	<8.2	U	0.69	8.2	<6	U	0.505	6	0.78	J	0.497	5.9	<7.9	UJ,UJ,m	0.669	7.9	<5.9	U	0.497	5.9
VOC TICs (µg/kg)																											
1,2,4-Trimethylbenzene	95-63-6	--	--	--	--	--	--	NI				NI				NI				NI				NI			
1,3-Dimethyl-,trans-cyclohexane	352-20-7	--	--	--	--	--	--	NI				NI				NI				NI				NI			
1,3,5-Trimethylbenzene	108-67-8	--	--	--	--	--	--	NI				NI				NI				NI				NI			
2-Methyl-1-Propene	115-11-7	--	--	--	--	--	--	NI				NI				NI				NI				NI			
Ethyl-cyclohexane	1678-91-7	--	--	--	--	--	--	NI				NI				NI				NI				NI			
Heptane, 2-methyl-	592-27-8	--	--	--	--	--	--	NI				NI				NI				NI				NI			
Nonane	111-84-2	--	--	--	--	--	--	NI				NI				NI				NI				NI			
Octane	111-65-9	--	--	--	--	--	--	NI				NI				NI				NI				NI			
TCL SVOCs (µg/kg)																											
2,4-Dinitrotoluene	121-14-2	N	--	1.6E+04	2.0E+05	5.7E+02	--	260	J	50.4	2,800	<200	U	3.15	200	<170	U	3.78	170	***1,800***	J,J,m	75.6	4,000	<200	U	3.78	200
Dinitrotoluene Mix	--	--	--	9.4E+02	4.2E+03	--	--	260				ND				ND				1,800				ND			
4-Chloro-3-Methylphenol	59-50-7	--	--	--	--	--	--	<2,800	U	83.4	2,800	24	J	5.21	200	21	J	6.25	170	<4,000	U,UJ,s	125	4,000	<200	U	6.25	200
Bis(2-ethylhexyl)phthalate	117-81-7	C	--	4.6E+04	2.0E+05	2.9E+06	--	890	J,B,x	33.1	2,800	46	J,B,x	2.07	200	45	J	2.48	170	1,000	J,J,c	49.7	4,000	44	J	2.48	200
Diethylphthalate	84-66-2	N	--	6.3E+06	8.2E+07	4.5E+05	--	<2,800	U	30.4	2,800	<200	U	1.9	200	26	J	2.28	170	120	J,J,l	45.6	4,000	20	J,B,z	2.28	200
Dimethylphthalate	131-11-3	--	--	--	--	--	--	<2,800	U	53	2,800	30	J	3.31	200	<170	U	3.97	170	<4,000	U	79.4	4,000	<200	U	3.97	200
Di-n-butylphthalate	84-74-2	N	--	7.8E+05	1.0E+07	5.0E+06	--	14,000		61.1	2,800	33	J	3.82	200	30	J	4.58	170	26,000	,J,m	91.7	4,000	18	J	4.58	200
Di-n-octylphthalate	117-84-0	--	--	--	--	--	--	<2,800	U	49.6	2,800	<200	U	3.1	200	<170	U	3.72	170	<4,000	U,UJ,c	74.4	4,000	<200	U	3.72	200
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	100	120	J	37.6	2,800	<200	U	2.35	200	<170	U	2.82	170	190	J,J,m	56.4	4,000	<200	U	2.82	200
N-Nitrosodiphenylamine	86-30-6	C	--	1.3E+05	5.8E+05	7.6E+02	--	450	J	76	2,800	<200	U	4.75	200	<170	U	5.7	170	300	J,J,m	114	4,000	<200	U	5.7	200
Phenanthrene [5]	85-01-8	N	--	2.3E+05	3.1E+06	--	100	40	J	36.8	2,800	<200	U	2.3	200	<170	U	2.76	170	<4,000	U	55.2	4,000	<200	U	2.76	200
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	100	110	J	23.7	2,800	<200	U	1.48	200	<170	U	1.78	170	110	J	35.5	4,000	<200	U	1.78	200
SVOC TICs (µg/kg)																											
(Z)-9-Octadecenamide	301-02-0	--	--	--	--	--	--	NI				110	E,B,x	0	100	52	E,B,x	0	100	NI				45	E,B,x	0	100
1,2-Benzenedicarboxylicacid, bis(2-methy	84-69-5	--	--	--	--	--	--	NI				45	E,B,x	0	100	39	E,B,x	0	100	NI				24	E,B,x	0	100
1,2-Benzenedicarboxylic acid, butyl 2-me	17851-53-5	--	--	--	--	--	--	NI				NI				NI				NI				NI			
1,2-Benzenedicarboxylic acid, butyl 8-me	89189	--	--	--	--	--	--	280	E,NJ,t	0	50	NI				NI				NI				NI			
1,2-Benzenedicarboxylic acid, butyl cycl	84-64-0	--	--	--	--	--	--	NI				NI				NI				NI				NI			
2 (5H)-Furanone	497234	--	--	--	--	--	--	320	E,NJ,t	0	50	NI				NI				NI				NI			
2-Ethyl-1-Hexanol	104-76-7	--	--	--	--	--	--	NI				NI				25	E,NJ,t	0	1,700	NI				NI			
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	--	--	--	--	--	--	NI				100	E,B,x	0	100	86	E,B,x	0	100	NI				67	E,B,x	0	100
3-Hexene-2,5-dione	4436753	--	--	--	--	--	--	NI				NI				200	E,NJ,t	0	10	400	E,NJ,t	0	10	NI			
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,	10001-439-24	--	--	--	--	--	--	NI				NI				39	E,NJ,t	0	1	NI				25	E,NJ,t	0	1
Erucylamide	112-84-5	--	--	--	--	--	--	NI				NI				220	E,NJ,t	0	10	NI				150	E,NJ,t	0	10
Hexadecanoic acid, butylester	111-06-8	--	--	--	--	--	--	NI				NI				28	E,NJ,t	0	10	NI				NI			
Octadecanoic acid, 2-methylpropyl ester	646-13-9	--	--	--	--	--	--	NI				NI				30	E,NJ,t	0	1	NI				NI			
Tetratetracontane	7098-22-8	--	--	--	--	--	--	NI				NI				NI				NI				NI			

Table 5-2
Detected Analytes for SWMU 37
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL DAF 20	Draft BTAG Screening Level	37SB1A 10/1/2003 0-1		MDL	RL	37SB1B 10/1/2003 14-16		MDL	RL	37SB1C 10/1/2003 18-20		MDL	RL	37SB2A 10/2/2003 0-1		MDL	RL	37SB2B 10/2/2003 10-12		MDL	RL
								Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
PAHs (µg/kg)																											
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	100	<34	U	1.15	34	<25	U	0.84	25	<24	U	0.84	24	2.4	J,J,s	1.12	33	<25	U	0.84	25
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	100	<34	U	2.13	34	<25	U	1.56	25	<24	U	1.56	24	7.6	J,J,d	2.08	33	<25	U	1.56	25
Benzo(k)fluoranthene	207-08-9	C	--	2.2E+03	3.9E+04	1.5E+04	100	<34	U	1.64	34	<25	U	1.2	25	<24	U	1.2	24	5.5	J,J,d	1.6	33	<25	U	1.2	25
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	100	<34	U	1.97	34	<25	U	1.44	25	<24	U	1.44	24	12	J,J,s	1.92	33	<25	U	1.44	25
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	100	73		2.79	34	<25	U	2.04	25	<24	U	2.04	24	70	,J,m	2.72	33	<25	U,UJ,l	2.04	25
Indeno(1,2,3-cd)pyrene	193-39-5	C	--	2.2E+02	3.9E+03	4.2E+03	100	<34	U	1.15	34	<25	U	0.84	25	<24	U	0.84	24	8.1	J,J,s	1.12	33	<25	U	0.84	25
Phenanthrene [S]	85-01-8	N	--	2.3E+05	3.1E+06	--	100	15	J	0.984	34	<25	U	0.72	25	<24	U	0.72	24	18	J,J,s	0.96	33	<25	U	0.72	25
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	100	58		1.48	34	<25	U	1.08	25	<24	U,UJ,l	1.08	24	59	,J,m	1.44	33	<25	U	1.08	25
Explosives (mg/kg)			--																								
2,4-Dinitrotoluene	121-14-2	N	--	1.6E+01	2.0E+02	5.7E-01	--	0.27	J	0.142	0.5	<0.5	U	0.142	0.5	<0.5	U	0.142	0.5	***0.63***	,J,m	0.142	0.5	<0.5	U	0.142	0.5
Dinitrotoluene Mix	--	C	--	9.4E-01	4.2E+00	--	--	0.27				ND				ND				0.63				ND			
Cyanide (mg/kg)			--																								
Cyanide	57-12-5	N	--	1.6E+02	2.0E+03	1.5E+02	0.005	0.8		0.0356	0.5	0.11	J	0.0356	0.5	0.09	J	0.0356	0.5	0.5		0.0356	0.5	0.04	J	0.0356	0.5
Percent Solids (%)			--																								
Percent Solids	--		--		--	--	--	61		0.1	0.1	83		0.1	0.1	85		0.1	0.1	63		0.1	0.1	85		0.1	0.1

Table 5-2
Detected Analytes for SWMU 37
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL DAF 20	Draft BTAG Screening Level	37SB2C 10/2/2003 18-20		MDL	RL	37SB3A 10/2/2003 0-1		MDL	RL	37SB3B 10/2/2003 10-12		MDL	RL	37SB3C 10/2/2003 22-24		MDL	RL
								Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
TAL Metals (mg/kg)																							
Aluminum	7429-90-5	--	40,041	--	--	--	1	12,700		92	500	10,600		92	500	15,300		92	500	12,400		92	500
Antimony	7440-36-0	N	--	3.13	40.9	13.2	0.48	0.22	J,B,p	0.0518	0.5	0.18	J,B,p	0.0518	0.5	0.17	J,B,p	0.0518	0.5	0.26	J,B,p	0.0518	0.5
Arsenic	7440-38-2	C	15.8	0.43	1.9	0.026	328	***1.6***		0.0232	0.4	***1***		0.0232	0.4	***1***		0.0232	0.4	***2.1***		0.0232	0.4
Barium	7440-39-3	N	209	1,564	20,440	6,015	440	73		0.106	1	103		0.53	5	98		0.53	5	113		0.53	5
Beryllium	7440-41-7	N	1.02	15.64	204.4	1,154	0.02	0.36	J	0.0391	1	0.48	J	0.0391	1	0.46	J	0.0391	1	0.34	J	0.0391	1
Cadmium	7440-43-9	N	0.69	3.91	51.1	27.4	2.5	0.75	J,B,p	0.182	1	1.1	B,p	0.182	1	1.3	B,p	0.182	1	0.82	J,B,p	0.182	1
Calcium	7440-70-2	--	--	--	--	--	--	2,040		17	250	1,480		17	250	1,030		17	250	1,590		17	250
Chromium [1]	7440-47-3	N	65.3	23.46	306.6	42	0.0075	18		0.912	5	15		0.912	5	18		0.912	5	18		0.912	5
Cobalt	7440-48-4	--	72.3	--	--	--	100	6.9		0.208	1	5.6		0.208	1	7.4		0.208	1	9		0.208	1
Copper	7440-50-8	N	53.5	312.86	4,088	10,518	15	10		0.368	1	6.9		0.368	1	9.6		0.368	1	7.7		0.368	1
Iron	7439-89-6	N	50,962	2,346	30,660	--	12	17,500		106	500	15,900		106	500	22,900		212	1,000	26000		212	1,000
Lead [2]	7439-92-1	--	26.8	400	750	--	0.01	7.9		0.0218	1	15		0.0218	1	7.4		0.0218	1	9.2		0.0218	1
Magnesium	7439-95-4	--	--	--	--	--	4,400	3,430	K,m	16	250	2,600	K,m	16	250	3,550	K,m	16	250	3,170	K,m	16	250
Manganese	7439-96-5	N	2,543	156.43	2,044	951.9	330	252		1.32	5	403		2.64	10	267		1.32	5	381		2.64	10
Mercury [3]	7439-97-6	--	0.13	2.35	30.66	--	0.06	<0.1	U	0.0077	0.1	0.013	J	0.0077	0.1	<0.1	U	0.0077	0.1	<0.1	U	0.0077	0.1
Nickel	7440-02-0	N	62.8	156.43	2,044	--	2	12		0.0356	0.5	8.4		0.0356	0.5	11		0.0356	0.5	11		0.0356	0.5
Potassium	7440-09-7	--	--	--	--	--	--	1,650		25	100	1,290		25	100	1,820		25	100	1,480		25	100
Selenium	7782-49-2	N	--	39.11	511	18.98	1.8	0.45	J	0.0502	1	0.42	J	0.0502	1	0.42	J	0.0502	1	0.5	J	0.0502	1
Silver	7440-22-4	N	--	39.11	511	31.03	0.0000098	0.042	J	0.0044	3	0.045	J	0.0044	3	0.037	J	0.0044	3	0.06	J	0.0044	3
Sodium	7440-23-5	--	--	--	--	--	--	72	J,B,p	8.92	100	83	J,B,p	8.92	100	69	J,B,p	8.92	100	67	J,B,p	8.92	100
Thallium	7440-28-0	N	2.11	0.55	7.2	3.6	0.001	0.16	J	0.027	0.5	0.12	J	0.027	0.5	0.15	J	0.027	0.5	0.13	J	0.027	0.5
Vanadium	7440-62-2	N	108	7.82	102.2	730.1	0.5	27		0.207	1	21		0.207	1	33		0.207	1	27		0.207	1
Zinc	7440-66-6	N	202	2,346	30,660	13,622	10	38		0.517	4	77		0.517	4	55		0.517	4	56		0.517	4
TCL Pesticides/PCBs (µg/kg)																							
Dieldrin	60-57-1	C	--	4.0E+01	1.8E+02	2.2E+00	100	NT				NT				NT				NT			
Aroclor 1254 [4]	11097-69-1	C	--	1.6E+02	1.4E+03	1.1E+03	--	NT				NT				NT				NT			
TCL VOCs (µg/kg)																							
2-Butanone	78-93-3	N	--	4.7E+06	6.1E+07	2.9E+04	--	<24	U	5.8	24	24		5.7	22	<24	U	5.95	24	<22	U	5.4	22
Acetone	67-64-1	N	--	7.0E+06	9.2E+07	2.2E+04	--	19	J,B,z	5.8	24	66	B,z	5.7	22	31	J,B,z	5.95	24	16	J,B,z	5.4	22
cis-1,2-Dichloroethene	156-59-2	N	--	7.8E+04	1.0E+06	--	300	<5.8	U	0.824	5.8	<5.7	U	0.809	5.7	<6	U	0.845	6	<5.4	U	0.767	5.4
Methylcyclohexane	108-87-2	--	--	--	--	--	--	<12	U	0.98	12	<11	U	0.963	11	3	J	1.01	12	<11	U	0.913	11
Methylene chloride	75-09-2	C	--	8.5E+04	3.8E+05	1.9E+01	300	5.2	J,J,c	3.26	24	4.5	J,J,c	3.2	22	5	J,J,c	3.34	24	4.7	J,J,c	3.03	22
Toluene	108-88-3	N	--	6.3E+05	8.2E+06	2.7E+04	100	<5.8	U	0.538	5.8	<5.7	U	0.529	5.7	<6	U	0.552	6	<5.4	U	0.501	5.4
Trichloroethene	79-01-6	C	--	1.6E+03	7.2E+03	2.6E-01	--	***63***		0.785	5.8	<5.7	U	0.772	5.7	<6	U	0.806	6	<5.4	U	0.731	5.4
Xylenes	1330-20-7	N	--	1.6E+06	2.0E+07	3.0E+03	100	<5.8	U	0.488	5.8	<5.7	U	0.48	5.7	2	J	0.501	6	<5.4	U	0.455	5.4
VOC TICs (µg/kg)																							
1,2,4-Trimethylbenzene	95-63-6	--	--	--	--	--	--	NI				NI				3.6	Q,NJ,t	0	10	NI			
1,3-Dimethyl-,trans-cyclohexane	352-20-7	--	--	--	--	--	--	NI				NI				5.7	E,NJ,t	0	100	NI			
1,3,5-Trimethylbenzene	108-67-8	--	--	--	--	--	--	NI				NI				1.8	Q,NJ,t	0	10	NI			
2-Methyl-1-Propene	115-11-7	--	--	--	--	--	--	8.4	E,NJ,t	0	1	NI				NI				NI			
Ethyl-cyclohexane	1678-91-7	--	--	--	--	--	--	NI				NI				6.4	E,NJ,t	0	100	NI			
Heptane, 2-methyl-	592-27-8	--	--	--	--	--	--	NI				NI				6.5	E,NJ,t	0	100	NI			
Nonane	111-84-2	--	--	--	--	--	--	NI				NI				5.1	E,NJ,t	0	1000	NI			
Octane	111-65-9	--	--	--	--	--	--	NI				NI				8.3	E,NJ,t	0	100	NI			
TCL SVOCs (µg/kg)																							
2,4-Dinitrotoluene	121-14-2	N	--	1.6E+04	2.0E+05	5.7E+02	--	<200	U	3.78	200	<190	U	3.47	190	<200	U	3.78	200	<180	U	3.47	180
Dinitrotoluene Mix	--	--	--	9.4E+02	4.2E+03	--	--	ND				ND				ND				ND			
4-Chloro-3-Methylphenol	59-50-7	--	--	--	--	--	--	15	J	6.25	200	12	J	5.73	190	14	J	6.25	200	18	J	5.73	180
Bis(2-ethylhexyl)phthalate	117-81-7	C	--	4.6E+04	2.0E+05	2.9E+06	--	41	J	2.48	200	46	J	2.28	190	47	J	2.48	200	44	J	2.28	180
Diethylphthalate	84-66-2	N	--	6.3E+06	8.2E+07	4.5E+05	--	18	J,B,z	2.28	200	18	J,B,z	2.09	190	11	J	2.28	200	17	J,B,z	2.09	180
Dimethylphthalate	131-11-3	--	--	--	--	--	--	<200	U	3.97	200	<190	U	3.64	190	<200	U	3.97	200	<180	U	3.64	180
Di-n-butylphthalate	84-74-2	N	--	7.8E+05	1.0E+07	5.0E+06	--	25	J	4.58	200	59	J	4.2	190	23	J,J,m	4.58	200	20	J	4.2	180
Di-n-octylphthalate	117-84-0	--	--	--	--	--	--	<200	U	3.72	200	<190	U	3.41	190	38	J	3.72	200	<180	U	3.41	180
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	100	<200	U	2.82	200	<190	U	2.59	190	<200	U	2.82	200	<180	U	2.59	180
N-Nitrosodiphenylamine	86-30-6	C	--	1.3E+05	5.8E+05	7.6E+02	--	<200	U	5.7	200	<190	U	5.23	190	<200	U	5.7	200	<180	U	5.23	180
Phenanthrene [5]	85-01-8	N	--	2.3E+05	3.1E+06	--	100	<200	U	2.76	200	<190	U	2.53	190	<200	U	2.76	200	<180	U	2.53	180
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	100	<200	U	1.78	200	<190	U	1.63	190	<200	U	1.78	200	<180	U	1.63	180
SVOC TICs (µg/kg)																							
(Z)-9-Octadecenamide	301-02-0	--	--	--	--	--	--	62	E,B,x	0	100	46	E,B,x	0	100	120	E,B,x	0	100	110	E,B,x	0	100
1,2-Benzenedicarboxylicacid, bis(2-methy	84-69-5	--	--	--	--	--	--	24	E,B,x	0	100	NI				NI				26	E,B,x	0	100
1,2-Benzenedicarboxylic acid, butyl 2-me	17851-53-5	--	--	--	--	--	--	NI				21	E,NJ,t	0	10	NI				NI			
1,2-Benzenedicarboxylic acid, butyl 8-me	89189	--	--	--	--	--	--	NI				NI				NI				NI			
1,2-Benzenedicarboxylic acid, butyl cycl	84-64-0	--	--	--	--	--	--	NI				NI				26	E,NJ,t	0	1	NI			
2 (5H)-Furanone	497234	--	--	--	--	--	--	NI				NI				NI				NI			
2-Ethyl-1-Hexanol	104-76-7	--	--	--	--	--	--	NI				NI				NI				NI			
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	--	--	--	--	--	--	NI				NI				NI				72	E,B,x	0	100
3-Hexene-2,5-dione	4436753	--	--	--	--	--	--	NI				NI				NI				NI			
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,	10001-439-24	--	--	--	--	--	--	30	E,NJ,t	0	1	NI				26	E,NJ,t	0	1	NI			
Erucylamide	112-84-5	--	--	--	--	--	--	NI				NI				NI				450	E,NJ,t	0	10
Hexadecanoic acid, butylester	111-06-8	--	--	--	--	--	--	NI				NI				NI				NI			
Octadecanoic acid, 2-methylpropyl ester	646-13-9	--	--	--	--	--	--	NI				NI				NI				NI			
Tetratetracontane	7098-22-8	--	--	--	--	--	--	NI				27	E,NJ,t	0	10	NI				NI			

Table 5-2
Detected Analytes for SWMU 37
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL DAF 20	Draft BTAG Screening Level	37SB2C 10/2/2003 18-20		MDL	RL	37SB3A 10/2/2003 0-1		MDL	RL	37SB3B 10/2/2003 10-12		MDL	RL	37SB3C 10/2/2003 22-24		MDL	RL
								Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
PAHs (µg/kg)																							
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	100	<24	U	0.84	24	<24	U	0.77	24	<25	U	0.84	25	<23	U,UJ,s	0.77	23
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	100	<24	U	1.56	24	<24	U	1.43	24	<25	U	1.56	25	<23	U,UJ,s	1.43	23
Benzo(k)fluoranthene	207-08-9	C	--	2.2E+03	3.9E+04	1.5E+04	100	<24	U	1.2	24	<24	U	1.1	24	<25	U	1.2	25	<23	U,UJ,s	1.1	23
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	100	<24	U	1.44	24	<24	U	1.32	24	<25	U	1.44	25	<23	U,UJ,s	1.32	23
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	100	<24	U,UJ,l	2.04	24	2.2	J,J,l	1.87	24	<25	U	2.04	25	<23	U,UJ,l	1.87	23
Indeno(1,2,3-cd)pyrene	193-39-5	C	--	2.2E+02	3.9E+03	4.2E+03	100	<24	U	0.84	24	<24	U	0.77	24	<25	U	0.84	25	<23	U,UJ,s	0.77	23
Phenanthrene [5]	85-01-8	N	--	2.3E+05	3.1E+06	--	100	<24	U	0.72	24	<24	U	0.66	24	<25	U	0.72	25	<23	U,UJ,s	0.66	23
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	100	<24	U	1.08	24	1.8	J	0.99	24	<21	U	1.08	21	1.2	J,J,s	0.99	23
Explosives (mg/kg)			--																				
2,4-Dinitrotoluene	121-14-2	N	--	1.6E+01	2.0E+02	5.7E-01	--	<0.5	U	0.142	0.5	<0.5	U	0.142	0.5	<0.5	U	0.142	0.5	<0.5	U	0.142	0.5
Dinitrotoluene Mix	--	C	--	9.4E-01	4.2E+00	--	--	ND				ND				ND				ND			
Cyanide (mg/kg)			--																				
Cyanide	57-12-5	N	--	1.6E+02	2.0E+03	1.5E+02	0.005	<0.5	U	0.0356	0.5	<0.5	U	0.0356	0.5	<0.5	U	0.0356	0.5	<0.5	U	0.0356	0.5
Percent Solids (%)			--																				
Percent Solids	--		--		--	--	--	86		0.1	0.1	88		0.1	0.1	84		0.1	0.1	93		0.1	0.1

Notes:

CAS = Chemical Abstracts Service
ft bgs = Feet Below Ground Surface
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyl
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon
TIC = Tentatively Identified Compound
NA = Not Applicable
MDL = Method Detection Limit
RL = Reporting Limit
NT = Not Tested
NI = Not Identified
LQ = Laboratory Qualifier
VQ = Validation Qualifier
r = Reason Code

[1] = Chromium VI RBC value was used
[2] = Lead criteria are Action Levels; see USEPA Region III guidance
[3] = Mercuric chloride soil RBC value used
[4] = Noncarcinogenic Residential RBC value for Aroclor 1254 was used for screening
[5] = RBC value for pyrene was used for these compounds
[A] = Facility-Wide Background Point Estimate as Reported in the Facility-Wide Background Study Report (IT 2001a)
RBC = USEPA Region III Risk-Based Concentration (RBC) values from the October 31, 2006, RBC Table and October 10, 2006, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
C = Carcinogenic per EPA RBC Table (October 2006)
N = Noncarcinogenic per EPA RBC Table (October 2006)
SSL DAF20 = Soil Screening Levels at a Dilution Attenuation Factor of 20
BTAG = Biological Technical Assistance Group Screening Level, Draft 1995

= Concentration Exceeds Adjusted Soil Residential RBC
= Concentration Exceeds Adjusted Soil Industrial RBC
underline = Concentration Exceeds Site Background Values
bold italic = Concentration Exceeds SSL DAF20
= Concentration Exceeds BTAG Screening Level

Laboratory Qualifiers

U	The compound was analyzed for but not detected. The reporting limit will be adjusted to reflect any dilution, and for soil, the percent moisture.
J	Estimated value.
N	Presumptive evidence of a compound.
B	Analyte found in associated blank as well as in the sample.
E	Concentration exceeded the upper level of the calibration range of the instrument for that specific analysis. For TICs, compound not present in calibration standard, calculated using total peak areas ion chromatographs and response factor of 1.
Q	Not estimated. TIC detected in sample, quantified using a response factor from the initial calibration.

Validation Qualifiers

U	Not detected. The associated number indicates the approximate sample concentration necessary to be detected.
B	Not detected substantially above the level reported in laboratory or field blanks.
N	Tentative Identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.
J	Analyte present. Reported value may not be accurate or precise.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.

Reason Codes

GC/MS Organics

c	Calibration failure; poor (RRF) or unstable (%D) response
d	MS/MSD or LCS/LCSD RPD imprecision
l	MS/MSD recovery failure
m	Internal standard failure
s	Surrogate failure
t	Tentatively identified Compound
x	Field and/or equipment blank contamination
z	Method blank and/or storage blank contamination

GC and HPLC Organics

c	Calibration failure; poor or unstable (%D) response
d	MS/MSD or LCS/LCSD RPD imprecision
l	MS/MSD recovery failure
m	Air bubble (> 6 mm or ¼ inch) in VOC vials
s	No confirmation column
x	Trip blank contamination
z	Method blank and/or storage blank contamination

Inorganics and Conventionals

m	MS/MSD recovery failure
p	Preparation blank contamination
q	Concentration exceeded the linear range

Table 5-3
Detected Analytes for SWMU 38
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	Draft BTAG Screening Level	38SB1A 10/3/2003 0-1		MDL	RL	38SB1B 10/3/2003 3.5		MDL	RL	38SB1C 10/3/2003 7-7.5		MDL	RL	38SB2A 10/3/2003 0-1		MDL	RL	38SB2B 10/3/2003 10-12		MDL	RL
								Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
TAL Metals (mg/kg)																											
Aluminum	7429-90-5	--	40,041	--	--	--	1	22,000		2	50	21,800		2	50	19,900		2	50	11,100		2	50	18,500		2	50
Antimony	7440-36-0	N	--	3.13	40.9	13.2	0.48	0.31	J	0.0518	0.5	<0.5	U	0.0518	0.5	<0.5	U	0.0518	0.5	<0.5	U	0.0518	0.5	<0.5	U	0.0518	0.5
Arsenic	7440-38-2	C	15.8	0.43	1.91	0.026	328	***3.4***		0.0232	0.4	***1.6***		0.0232	0.4	***1.7***		0.0232	0.4	***0.8***		0.0232	0.4	***1.4***		0.0232	0.4
Barium	7440-39-3	N	209	1,564	20,440	6,015	440	94	L,m	0.106	5	128	L,m	0.106	5	117	L,m	0.106	5	107	L,m	0.106	5	119	L,m	0.106	5
Beryllium	7440-41-7	N	1.02	15.64	204.4	1,153.7	0.02	0.67	J	0.0391	1	0.75	J	0.0391	1	0.53	J	0.0391	1	0.6	J	0.0391	1	0.55	J	0.0391	1
Cadmium	7440-43-9	N	0.69	3.91	51.1	27.4	2.5	1.8		0.182	1	1.8		0.182	1	1.9		0.182	1	1.4		0.182	1	1.8		0.182	1
Calcium	7440-70-2	--	--	--	--	--	--	27,600	K,m	17	1,250	2,690	K,m	17	250	3,010	K,m	17	250	1,150	K,m	17	250	1,590	K,m	17	250
Chromium [1]	7440-47-3	N	65.3	23.46	306.6	42.05	0.0075	***75***		0.912	5	24		0.912	5	26		0.912	5	17		0.912	5	22		0.912	5
Cobalt	7440-48-4	--	72.3	--	--	--	100	7.9	J,s	0.208	1	13	J,s	0.208	1	9.1	J,s	0.208	1	7.9	J,s	0.208	1	12	J,s	0.208	1
Copper	7440-50-8	N	53.5	312.86	4,088	10,518	15	57		0.368	1	15		0.368	1	12		0.368	1	7.2		0.368	1	13		0.368	1
Iron	7439-89-6	N	50,962	2,346	30,660	--	12	24,600		21	500	32,200		21	500	25,300		21	500	16,600		11	250	28,500		21	500
Lead [2]	7439-92-1	--	26.8	400	750	--	0.01	52		0.218	10	12		0.0218	1	9.9		0.0218	1	9.6		0.0218	1	12		0.0218	1
Magnesium	7439-95-4	--	--	--	--	--	4,400	4,550		3	250	5,130		3	250	8,240		3	250	2,840		3	250	5,040		3	250
Manganese	7439-96-5	N	2,543	156.43	2,044	951.9	330	400		0.264	5	397		0.264	5	377		0.264	5	414		0.264	5	471		0.264	5
Mercury [3]	7439-97-6	--	0.13	2.35	30.66	--	0.06	0.16		0.0077	0.1	0.015	J	0.0077	0.1	0.011	J	0.0077	0.1	0.01	J	0.0077	0.1	0.013	J	0.0077	0.1
Nickel	7440-02-0	N	62.8	156.43	2,044	--	2	33		0.0356	0.5	18		0.0356	0.5	15		0.0356	0.5	11		0.0356	0.5	16		0.0356	0.5
Potassium	7440-09-7	--	--	--	--	--	--	1,670		5	100	2,150		5	100	2,210		5	100	1,600		5	100	1,700		5	100
Selenium	7782-49-2	N	--	39.11	511	18.98	1.8	0.59	J	0.0502	1	0.67	J	0.0502	1	0.54	J	0.0502	1	0.55	J	0.0502	1	0.56	J	0.0502	1
Silver	7440-22-4	N	--	39.11	511	31.03	0.0000098	0.13	J	0.0044	3	0.063	J	0.0044	3	0.075	J	0.0044	3	0.064	J	0.0044	3	0.047	J,B,p	0.0044	3
Sodium	7440-23-5	--	--	--	--	--	--	55	J	8.92	100	49	J	8.92	100	52	J	8.92	100	38	J	8.92	100	46	J	8.92	100
Thallium	7440-28-0	N	2.11	0.55	7.2	3.64	0.001	0.17	J	0.027	0.5	0.25	J	0.027	0.5	0.22	J	0.027	0.5	0.15	J	0.027	0.5	0.22	J	0.027	0.5
Vanadium	7440-62-2	N	108	7.82	102.2	730.1	0.5	35		0.207	1	50		0.207	1	41		0.207	1	24		0.207	1	43		0.207	1
Zinc	7440-66-6	N	202	2,346	30,660	13,622	10	90	B,x	0.517	4	72	B,x	0.517	4	55	B,x	0.517	4	55	B,x	0.517	4	65	B,x	0.517	4
TCL Pesticides/PCBs (µg/kg)																											
Aroclor 1254 [4]	11097-69-1	C	--	1.6E+02	1.4E+03	1.1E+03	--	570		4.2	47	NT		--		NT		--		NT		--		NT		--	
TCL VOCs (µg/kg)																											
2-Butanone	78-93-3	N	--	4.7E+06	6.1E+07	2.9E+04	--	<28	U	7.15	28	23	J	6.1	24	20	J	6.4	26	26		5.8	24	<24	U	5.9	24
Acetone	67-64-1	N	--	7.0E+06	9.2E+07	2.2E+04	--	100	B,z	7.15	28	96	B,z	6.1	24	59	B,z	6.4	26	200	J,c	5.8	24	34	B,z	5.9	24
cis-1,2-Dichloroethene	156-59-2	N	--	7.8E+04	1.0E+06	--	100	<7.1	U	1.02	7.1	<6.1	U	0.866	6.1	<6.4	U	0.909	6.4	<5.8	U	0.824	5.8	<5.9	U	0.838	5.9
Toluene	108-88-3	N	--	6.3E+05	8.2E+06	2.7E+04	100	<7.1	U	0.664	7.1	<6.1	U	0.566	6.1	<6.4	U	0.594	6.4	3	J	0.538	5.8	<5.9	U	0.548	5.9
VOC TICs (µg/kg)																											
4-Isopropyltoluene	99-87-6	--	--	--	--	--	--	NI				NI				NI				4.4	Q,NJ,t	0	10	NI			
7,7-Dimethyl-2-methylene-bicyclo[2.2.1]h	471-84-1	--	--	--	--	--	--	NI				NI				NI				11	E,NJ,t	0	1	NI			
Camphene	79-92-5	--	--	--	--	--	--	10	E,NJ,t	0	100	NI				NI				13	E,NJ,t	0	100	NI			
Hexanal	66-25-1	--	--	--	--	--	--	8.8	E,NJ,t	0	1	NI				NI				NI				NI			
TCL SVOCs (µg/kg)																											
2,4-Dinitrotoluene	121-14-2	N	--	1.6E+04	2.0E+05	5.7E+02	--	120	J	44.1	2,400	<210	U	3.78	210	<220	U	4.1	220	<200	U	3.78	220	<200	U	3.78	200
Dinitrotoluene Mix	--	C	--	9.4E+02	4.2E+03	--	--	120				ND				ND				ND				ND			
4-Chloro-3-Methylphenol	59-50-7	--	--	--	--	--	--	<2,400	U,UL,s	72.9	2,400	18	J,B,x	6.25	210	14	J,B,x	6.77	220	25	J,B,x	6.25	200	17	J,B,x	6.25	200
Bis(2-ethylhexyl)phthalate	117-81-7	C	--	4.6E+04	2.0E+05	2.9E+06	--	1,100	J,J,c	29	2,400	49	J,J,c	2.48	210	53	J,J,c	2.69	220	46	J	2.48	200	50	J	2.48	200
Butylbenzylphthalate	85-68-7	N	--	1.6E+06	2.0E+07	1.7E+07	--	<2,400	U	62.7	2,400	<210	U	5.38	210	<220	U	5.82	220	52	J,B,x	5.38	200	<200	U	5.38	200
Caprolactam	105-60-2	N	--	3.9E+06	5.1E+07	--	--	<4,700	U	89.3	4,700	<400	U	7.66	400	<420	U	8.29	420	<380	U	7.66	380	<390	U	7.66	390
Diethylphthalate	84-66-2	N	--	6.3E+06	8.2E+07	4.5E+05	--	<2,400	U	26.6	2,400	6	J,B,x	2.28	210	4	J,B,x	2.47	220	4	J,B,z	2.28	200	4	J,B,z	2.28	200
Di-n-butylphthalate	84-74-2	N	--	7.8E+05	1.0E+07	5.0E+06	--	14,000		53.5	2,400	100	J	4.58	210	140	J	4.97	220	42	J	4.58	200	23	J	4.58	200
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	100	80	J	32.9	2,400	<210	U	2.82	210	<220	U	3.06	220	<200	U	2.82	200	<200	U	2.82	200
N-Nitrosodiphenylamine	86-30-6	C	--	1.3E+05	5.8E+05	7.6E+02	--	150	J	66.5	2,400	<210	U	5.7	210	<220	U	6.18	220	<200	U	5.7	200	<200	U	5.7	200
Phenanthrene [5]	85-01-8	N	--	2.3E+05	3.1E+06	--	100	40	J	32.2	2,400	<210	U	2.76	210	<220	U	2.99	220	<200	U	2.76	200	<200	U	2.76	200
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	100	50	J	20.7	2,400	<210	U	1.78	210	<220	U	1.92	220	<200	U	1.78	200	<200	U	1.78	200
SVOC TICs (µg/kg)																											
(M) 1-Eicosanol	629-96-9	--	--	--	--	--	--	NI				NI				NI				NI				NI			
(Z)-9-Octadecenamide	301-02-0	--	--	--	--	--	--	NI				32	E,B,x	0	100	NI				160	E,B,x	0	100	120	E,B,x	0	100
1-HEXACOSANOL	506-52-5	--	--	--	--	--	--	NI				NI				NI				NI				63	E,NJ,t	0	10
1,2-Benzenedicarboxylicacid, bis(2-methy	84-69-5	--	--	--	--	--	--	NI				50	E,B,x	0	100	47	E,B,x	0	100	45	E,B,x	0	100	34	E,B,x	0	100
1,2,3,4,4a,9,10,10a-Octa-1-phenanthrene	1740-19-8	--	--	--	--	--	--	NI				NI				NI				290	E,NJ,t	0	10	NI			
1,5,9-Undecatriene, 2,6,10-trimethyl-, (	62951-96-6	--	--	--	--	--	--	NI				NI				NI				48	E,NJ,t	0	10	NI			
2 (5H)-Furanone	497-23-4	--	--	--	--	--	--	NI				NI				NI				NI				NI			
2-Ethyl-1-Hexanol	104-76-7	--	--	--	--	--	--	NI				NI				NI				NI				23	E,NJ,t	0	1,700
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	--	--	--	--	--	--	NI				87	E,NJ,t	0	100	87	E,NJ,t	0	100	86	E,NJ,t	0	100	NI			
13-Tertadecen-1-ol acetate	10001-307-98	--	--	--	--	--	--	NI				NI				NI				130	E,NJ,t	0	10	NI			
Bicyclo[3.1.1]hept-2-ene,2,6,6-trimethyl	2437-95-8	--	--	--	--	--	--	NI				NI				NI				130	E,NJ,t	0	10	NI			
Cyclotetradecane	295-17-0	--	--	--	--	--	--	NI				NI				NI				55	E,NJ,t	0	10	NI			
Erucylamide	112-84-5	--	--	--	--	--	--	NI				NI				NI				570	E,B,x	0	10	530	E,B,x	0	10
Heneicosane	629-94-7	--	--	--	--	--	--	NI				NI				NI				72	E,NJ,t	0	1,000	NI			
Stearic Acid	57-11-4	--	--	--	--	--	--	NI				NI				NI				100	E,B,x	0	1	NI			

Table 5-3
Detected Analytes for SWMU 38
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	Draft BTAG Screening Level	38SB1A 10/3/2003 0-1		MDL	RL	38SB1B 10/3/2003 3.5		MDL	RL	38SB1C 10/3/2003 7-7.5		MDL	RL	38SB2A 10/3/2003 0-1		MDL	RL	38SB2B 10/3/2003 10-12		MDL	RL
								Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
PAHs (µg/kg)																											
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	100	6.6	J,L,s	0.98	30	<28	U,UL,s	0.924	28	<26	U	0.84	26	<24	U	0.84	24	<25	U	0.84	25
Benzo(a)anthracene	56-55-3	C	--	2.2E+02	3.9E+03	4.8E+02	100	<30	U,UL,s	1.12	30	<28	U,UL,s	1.06	28	<26	U	0.96	26	<24	U	0.96	24	<25	U	0.96	25
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	100	23	J,L,s	1.82	30	<28	U,UL,s	1.72	28	<26	U	1.56	26	<24	U	1.56	24	<25	U	1.56	25
Benzo(k)fluoranthene	207-08-9	C	--	2.2E+03	3.9E+04	1.5E+04	100	<30	U,UL,s	1.4	30	<28	U,UL,s	1.32	28	<26	U	1.2	26	<24	U	1.2	24	<25	U	1.2	25
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	100	29	J,L,s	1.68	30	<28	U,UL,s	1.58	28	<26	U	1.44	26	<24	U	1.44	24	<25	U	1.44	25
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	100	110	J,l	2.38	30	<28	U,UL,s	2.24	28	<26	U	2.04	26	<24	U,UJ,l	2.04	24	<25	U,UJ,l	2.04	25
Fluorene	86-73-7	N	--	3.1E+05	4.1E+06	1.4E+05	100	4.6	J,L,s	1.82	30	<28	U,UL,s	1.72	28	<26	U	1.56	26	<24	U	1.56	24	<25	U	1.56	25
Phenanthrene [5]	85-01-8	N	--	2.3E+05	3.1E+06	--	100	46	L,s	0.84	30	<28	U,UL,s	0.792	28	<26	U	0.72	26	<24	U	0.72	24	<25	U	0.72	25
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	100	56	L,s	1.26	30	<28	U,UL,s	1.19	28	<26	U	1.08	26	<24	U	1.08	24	<25	U	1.08	25
Cyanide (mg/kg)																											
Cyanide	57-12-5	N	--	1.6E+02	2.0E+03	1.5E+02	0.005	0.3	J	0.0356	0.5	0.13	J	0.0356	0.5	0.11	J	0.0356	0.5	<0.5	U	0.0356	0.5	<0.5	U	0.0356	0.5
Percent Solids (%)																											
Percent Solids	--	--						70		0.1	0.1	82		0.1	0.1	78		0.1	0.1	86		0.1	0.1	85		0.1	0.1

Table 5-3
Detected Analytes for SWMU 38
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	Draft BTAG Screening Level	38SB2B-DUP(SBD4) 10/3/2003 10-12		MDL	RL	38SB2C 10/3/2003 18-20		MDL	RL	38SB3A 10/3/2003 0-1		MDL	RL	38SB3B 10/3/2003 4		MDL	RL	38SB3C 10/3/2003 6		MDL	RL
								Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
TAL Metals (mg/kg)																											
Aluminum	7429-90-5	--	40,041	--	--	--	1	17,800		2	50	10,600		2	50	26,400		9	250	22,000		2	50	20,000		2	50
Antimony	7440-36-0	N	--	3.13	40.9	13.2	0.48	<0.5	U	0.0518	0.5	<0.5	U	0.0518	0.5	0.26	J	0.0518	0.5	<0.5	U	0.0518	0.5	<0.5	U	0.0518	0.5
Arsenic	7440-38-2	C	15.8	0.43	1.91	0.026	328	***1.6***		0.0232	0.4	***2.1***		0.0232	0.4	***4.6***		0.0232	0.4	***1.8***		0.0232	0.4	***1.5***		0.0232	0.4
Barium	7440-39-3	N	209	1,564	20,440	6,015	440	113	L,m	0.106	5	83	L,m	0.106	5	116	L,m	0.106	5	138	L,m	0.106	5	131	L,m	0.106	5
Beryllium	7440-41-7	N	1.02	15.64	204.4	1,153.7	0.02	0.64	J	0.0391	1	0.43	J	0.0391	1	0.91	J	0.0391	1	0.93	J	0.0391	1	0.63	J	0.0391	1
Cadmium	7440-43-9	N	0.69	3.91	51.1	27.4	2.5	1.7		0.182	1	1.4		0.182	1	1.9		0.182	1	1.3		0.182	1	1.7		0.182	1
Calcium	7440-70-2	--	--	--	--	--	--	1,550	K,m	17	250	1,270	K,m	17	250	6,740	K,m	17	250	2,580	K,m	17	250	2,630	K,m	17	250
Chromium [1]	7440-47-3	N	65.3	23.46	306.6	42.05	0.0075	22		0.912	5	20		0.912	5	82		0.912	5	27		0.912	5	25		0.912	5
Cobalt	7440-48-4	--	72.3	--	--	--	100	12	J,s	0.208	1	9	J,s	0.208	1	9.8	J,s	0.208	1	12	J,s	0.208	1	11	J,s	0.208	1
Copper	7440-50-8	N	53.5	312.86	4,088	10,518	15	13		0.368	1	8.8		0.368	1	85		0.368	1	18		0.368	1	15		0.368	1
Iron	7439-89-6	N	50,962	2,346	30,660	--	12	27,800		21	500	21,800		21	500	30,700		21	500	31,900		21	500	30,200		21	500
Lead [2]	7439-92-1	--	26.8	400	750	--	0.01	11		0.0218	1	7.3		0.0218	1	50		0.218	10	13		0.0218	1	12		0.0218	1
Magnesium	7439-95-4	--	--	--	--	--	4,400	5,010		3	250	3,420		3	250	5,590		3	250	4,960		3	250	4,640		3	250
Manganese	7439-96-5	N	2,543	156.43	2,044	951.9	330	460		0.264	5	375		0.264	5	414		0.264	5	472		0.264	5	478		0.264	5
Mercury [3]	7439-97-6	--	0.13	2.35	30.66	--	0.06	0.01	J	0.0077	0.1	<0.1	U	0.0077	0.1	0.033	J	0.0077	0.1	0.021	J	0.0077	0.1	0.016	J	0.0077	0.1
Nickel	7440-02-0	N	62.8	156.43	2,044	--	2	16		0.0356	0.5	11		0.0356	0.5	35		0.0356	0.5	18		0.0356	0.5	16		0.0356	0.5
Potassium	7440-09-7	--	--	--	--	--	--	1,810		5	100	1,520		5	100	2,410		5	100	2,040		5	100	1,880		5	100
Selenium	7782-49-2	N	--	39.11	511	18.98	1.8	0.61	J	0.0502	1	0.43	J	0.0502	1	0.64	J	0.0502	1	0.78	J	0.0502	1	0.65	J	0.0502	1
Silver	7440-22-4	N	--	39.11	511	31.03	0.0000098	0.066	J	0.0044	3	0.051	J	0.0044	3	0.14	J	0.0044	3	0.061	J	0.0044	3	0.056	J	0.0044	3
Sodium	7440-23-5	--	--	--	--	--	--	52	J	8.92	100	53	J	8.92	100	46	J	8.92	100	55	J	8.92	100	53	J	8.92	100
Thallium	7440-28-0	N	2.11	0.55	7.2	3.64	0.001	0.23	J	0.027	0.5	0.12	J	0.027	0.5	0.19	J	0.027	0.5	0.25	J	0.027	0.5	0.22	J	0.027	0.5
Vanadium	7440-62-2	N	108	7.82	102.2	730.1	0.5	43		0.207	1	24		0.207	1	42		0.207	1	49		0.207	1	45		0.207	1
Zinc	7440-66-6	N	202	2,346	30,660	13,622	10	68	B,x	0.517	4	47	B,x	0.517	4	100	B,x	0.517	4	73	B,x	0.517	4	65	B,x	0.517	4
TCL Pesticides/PCBs (µg/kg)																											
Aroclor 1254 [4]	11097-69-1	C	--	1.6E+02	1.4E+03	1.1E+03	--	NT				NT				NT				NT				NT			
TCL VOCs (µg/kg)																											
2-Butanone	78-93-3	N	--	4.7E+06	6.1E+07	2.9E+04	--	<24	U	6.15	24	<22	U	5.4	22	<36	U	8.9	36	26		6.6	26	28		6.25	24
Acetone	67-64-1	N	--	7.0E+06	9.2E+07	2.2E+04	--	38	B,z	6.15	24	28	B,z	5.4	22	130	B,c	8.9	36	110	B,z	6.6	26	110	B,z	6.25	24
cis-1,2-Dichloroethene	156-59-2	N	--	7.8E+04	1.0E+06	--	100	19		0.873	6.2	<5.4	U	0.767	5.4	<8.9	U	1.26	8.9	<6.6	U	0.937	6.6	<6.2	U	0.888	6.2
Toluene	108-88-3	N	--	6.3E+05	8.2E+06	2.7E+04	100	0.69	J	0.571	6.2	<5.4	U	0.501	5.4	<8.9	U	0.826	8.9	<6.6	U	0.612	6.6	<6.2	U	0.58	6.2
VOC TICs (µg/kg)																											
4-Isopropyltoluene	99-87-6	--	--	--	--	--	--	NI				NI				NI				--				--			
7,7-Dimethyl-2-methylene-bicyclo[2.2.1]h	471-84-1	--	--	--	--	--	--	NI				NI				NI				--				--			
Camphene	79-92-5	--	--	--	--	--	--	NI				NI				NI				--				--			
Hexanal	66-25-1	--	--	--	--	--	--	NI				NI				NI				5.6	E,NJ,t	0	1	--			
TCL SVOCs (µg/kg)																											
2,4-Dinitrotoluene	121-14-2	N	--	1.6E+04	2.0E+05	5.7E+02	--	<210	U	3.78	210	<180	U	3.47	180	<3,000	U	56.7	3,000	<220	U	4.1	220	<210	U	3.78	210
Dinitrotoluene Mix	--	C	--	9.4E+02	4.2E+03	--	--	ND				ND				ND				ND				ND			
4-Chloro-3-Methylphenol	59-50-7	--	--	--	--	--	--	13	J,B,x	6.25	210	13	J,B,x	5.73	180	<3,000	U,UL,s	93.8	3,000	<220	U	6.77	220	17	J,B,x	6.25	210
Bis(2-ethylhexyl)phthalate	117-81-7	C	--	4.6E+04	2.0E+05	2.9E+06	--	45	J	2.48	210	52	J	2.28	180	1,300	J,J,c	37.3	3,000	98	J	2.69	170	53	J	2.48	210
Butylbenzylphthalate	85-68-7	N	--	1.6E+06	2.0E+07	1.7E+07	--	<210	U	5.38	210	<180	U	4.93	180	<3,000	U	80.6	3,000	<220	U	5.82	220	41	J,B,x	5.38	210
Caprolactam	105-60-2	N	--	3.9E+06	5.1E+07	--	--	110	J	7.66	410	85	J	7.02	350	<5,900	U	115	5,900	<430	U	8.29	430	130	J	7.66	410
Diethylphthalate	84-66-2	N	--	6.3E+06	8.2E+07	4.5E+05	--	3	J,B,z	2.28	210	3	J,B,z	2.09	180	<3,000	U	34.2	3,000	5	J,B,x	2.47	220	4	J,B,x	2.28	210
Di-n-butylphthalate	84-74-2	N	--	7.8E+05	1.0E+07	5.0E+06	--	22	J	4.58	210	24	J	4.2	180	8,600		68.8	3,000	500		4.97	220	66	J	4.58	210
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	100	<210	U	2.82	210	<180	U	2.59	180	170	J	42.3	3,000	9	J	3.06	220	<210	U	2.82	210
N-Nitrosodiphenylamine	86-30-6	C	--	1.3E+05	5.8E+05	7.6E+02	--	<210	U	5.7	210	<180	U	5.23	180	160	J	85.5	3,000	17	J	6.18	220	<210	U	5.7	210
Phenanthrene [5]	85-01-8	N	--	2.3E+05	3.1E+06	--	100	<210	U	2.76	210	<180	U	2.53	180	110	J	41.4	3,000	7	J	2.99	220	<210	U	2.76	210
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	100	<210	U	1.78	210	<180	U	1.63	180	90	J	26.6	3,000	5	J	1.92	220	<210	U	1.78	210
SVOC TICs (µg/kg)																											
(M) 1-Eicosanol	629-96-9	--	--	--	--	--	--	47	E,NJ,t	0	10	NI				NI				NI				NI			
(Z)-9-Octadecenamide	301-02-0	--	--	--	--	--	--	110	E,B,x	0	100	130	E,B,x	0	100	NI				NI				NI			
1-HEXACOSANOL	506-52-5	--	--	--	--	--	--	NI				NI				NI				NI				NI			
1,2-Benzenedicarboxylicacid, bis(2-methy	84-69-5	--	--	--	--	--	--	30	E,B,x	0	100	31	E,B,x	0	100	NI				47	E,B,x	0	100	NI			
1,2,3,4,4a,9,10,10a-Octa-1-phenanthrene	1740-19-8	--	--	--	--	--	--	NI				NI				NI				NI				NI			
1,5,9-Undecatriene, 2,6,10-trimethyl-, (	62951-96-6	--	--	--	--	--	--	NI				NI				NI				NI				NI			
2 (5H)-Furanone	497-23-4	--	--	--	--	--	--	NI				NI				72	E,NJ,t	0	50	NI				NI			
2-Ethyl-1-Hexanol	104-76-7	--	--	--	--	--	--	NI				52	E,NJ,t	0	1,700	NI				NI				NI			
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	--	--	--	--	--	--	NI				70	E,NJ,t	0	100	NI				NI				NI			
13-Tertadecen-1-ol acetate	10001-307-98	--	--	--	--	--	--	NI				NI				NI				NI				NI			
Bicyclo[3.1.1]hept-2-ene,2,6,6-trimethyl	2437-95-8	--	--	--	--	--	--	NI				NI				NI				NI				NI			
Cyclotetradecane	295-17-0	--	--	--	--	--	--	NI				NI				NI				NI				NI			
Erucylamide	112-84-5	--	--	--	--	--	--	480	E,B,x	0	10	630	E,B,x	0	10	NI				NI				570	E,B,x	0	10
Heneicosane	629-94-7	--	--	--	--	--	--	NI				NI				NI				NI				NI			
Stearic Acid	57-11-4	--	--	--	--	--	--	NI				NI				NI				NI				120	E,B,x	0	1

Table 5-3
Detected Analytes for SWMU 38
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	Draft BTAG Screening Level	38SB2B-DUP(SBD4) 10/3/2003 10-12		MDL	RL	38SB2C 10/3/2003 18-20		MDL	RL	38SB3A 10/3/2003 0-1		MDL	RL	38SB3B 10/3/2003 4		MDL	RL	38SB3C 10/3/2003 6		MDL	RL
								Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
PAHs (µg/kg)																											
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	100	<26	U,UL,s	0.84	26	<23	U,UL,s	0.77	23	13	J	1.26	38	<38	U,UL,s	1.25	38	<26	U	0.84	26
Benzo(a)anthracene	56-55-3	C	--	2.2E+02	3.9E+03	4.8E+02	100	<26	U,UL,s	0.96	26	<23	U,UL,s	0.88	23	82		1.44	38	<38	U,UL,s	1.43	38	<26	U	0.96	26
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	100	<26	U,UL,s	1.56	26	<23	U,UL,s	1.43	23	15	J	2.34	38	<38	U,UL,s	2.33	38	<26	U	1.56	26
Benzo(k)fluoranthene	207-08-9	C	--	2.2E+03	3.9E+04	1.5E+04	100	<26	U,UL,s	1.2	26	<23	U,UL,s	1.1	23	7.5	J	1.8	38	<38	U,UL,s	1.79	38	<26	U	1.2	26
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	100	<26	U,UL,s	1.44	26	<23	U,UL,s	1.32	23	28	J	2.16	38	<38	U,UL,s	2.15	38	<26	U	1.44	26
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	100	<26	U,UJ,l	2.04	26	<23	U,UJ,l	1.87	23	180		3.06	38	<38	U,UL,s	3.04	38	<26	U	2.04	26
Fluorene	86-73-7	N	--	3.1E+05	4.1E+06	1.4E+05	100	<26	U,UL,s	1.56	26	<23	U,UL,s	1.43	23	8.9	J	2.34	38	<38	U,UL,s	2.33	38	<26	U	1.56	26
Phenanthrene [5]	85-01-8	N	--	2.3E+05	3.1E+06	--	100	<26	U,UL,s	0.72	26	<23	U,UL,s	0.66	23	100		1.08	38	<38	U,UL,s	1.07	38	<26	U	0.72	26
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	100	<26	U,UL,s	1.08	26	<23	U,UL,s	0.99	23	98		1.62	38	<38	U,UL,s	1.61	38	<26	U	1.08	26
Cyanide (mg/kg)																											
Cyanide	57-12-5	N	--	1.6E+02	2.0E+03	1.5E+02	0.005	0.04	J	0.0356	0.5	<0.5	U,UL,h	0.0356	0.5	0.57		0.0356	0.5	0.24	J	0.0356	0.5	0.24	J	0.0356	0.5
Percent Solids (%)																											
Percent Solids	--	--						81		0.1	0.1	93		0.1	0.1	56		0.1	0.1	76		0.1	0.1	80		0.1	0.1

Notes:

CAS = Chemical Abstracts Service
ft bgs = Feet Below Ground Surface
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyl
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon
TIC = Tentatively Identified Compound
MDL = Method Detection Limit
RL = Reporting Limit
NA = Not Applicable
NT = Not Tested
NI = Not Identified
LQ = Laboratory Qualifier
VQ = Validation Qualifier
r = Reason Code

[1,3] = Chromium VI RBC value was used
[2] = Lead criteria are Action Levels; see USEPA Region III guidance
[3] = Mercuric chloride soil RBC value used
[4] = Noncarcinogenic Residential RBC value for Aroclor 1254 was used for screening
[5] = RBC value for pyrene was used for these compounds
[A] = Facility-Wide Background Point Estimate as Reported in the Facility-Wide Background Study Report (IT 2001a)
RBC = USEPA Region III Risk-Based Concentration (RBC) values from the October 31, 2006, RBC Table and October 10, 2006, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
C = Carcinogenic per EPA RBC Table (October 2006)
N = Noncarcinogenic per EPA RBC Table (October 2006)
SSL DAF20 = Soil Screening Level at a Dilution Attenuation Factor of 20
BTAG = Biological Technical Assistance Group Screening Level, Draft 1995

= Concentration Exceeds Adjusted Soil Residential RBC
= Concentration Exceeds Adjusted Soil Industrial RBC
underline = Concentration Exceeds Site Background Values
bold italic = Concentration Exceeds SSL DAF20
= Concentration Exceeds BTAG Screening Level

Laboratory Qualifiers

U	The compound was analyzed for but not detected. The reporting limit will be adjusted to reflect any dilution, and for soil, the percent moisture.
J	Estimated value.
N	Presumptive evidence of a compound.
B	Analyte found in associated blank as well as in the sample.
E	Concentration exceeded the upper level of the calibration range of the instrument for that specific analysis. For TICs, compound not present in calibration standard, calculated using total peak areas ion chromatographs and response factor of 1.
Q	Not estimated. TIC detected in sample, quantified using a response factor from the initial calibration.

Validation Qualifiers

B	Not detected substantially above the level reported in laboratory or field blanks.
N	Tentative Identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.
J	Analyte present. Reported value may not be accurate or precise.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
UL	Not detected, quantitation limit is probably higher.

Reason Codes

GC/MS Organics

c	Calibration failure; poor (RRF) or unstable (%D) response
l	MS/MSD recovery failure
s	Surrogate failure
t	Tentatively identified Compound
x	Field and/or equipment blank contamination
z	Method blank and/or storage blank contamination

GC and HPLC Organics

c	Calibration failure; poor or unstable (%D) response
l	MS/MSD recovery failure
s	No confirmation column
x	Trip blank contamination
z	Method blank and/or storage blank contamination

Inorganics and Conventionals

m	MS/MSD recovery failure
p	Preparation blank contamination
s	Serial dilution failure
x	CRDL standard recovery failure

Table 5-4
Detected Analytes for AOC Q
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	Draft BTAG Screening Level	QSB1A 10/2/2003 0-1		MDL	RL	QSB1A-DUP(SBD3) 10/2/2003 0-1		MDL	RL	QSB1B 10/2/2003 10-12		MDL	RL	QSB1C 10/2/2003 17-19		MDL	RL	QSB2A 10/2/2003 0-1		MDL	RL
								Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
TAL Metals (mg/kg)																											
Aluminum	7429-90-5	--	40,041	--	--	--	1	16,000		91.5	500	12,600		91.5	500	14,000		91.5	500	3,360		18.3	100	7,820		45.8	250
Antimony	7440-36-0	N	--	3.13	40.9	13.2	0.48	0.19	J,B,p	0.0518	0.5	0.2	J,B,p	0.0518	0.5	0.15	J,B,p	0.0518	0.5	0.15	J,B,p	0.0518	0.5	0.13	J,B,p	0.0518	0.5
Arsenic	7440-38-2	C	15.8	0.43	1.91	0.026	328	1.2		0.0232	0.4	1.6		0.0232	0.4	0.97		0.0232	0.4	0.54		0.0232	0.4	0.64		0.0232	0.4
Barium	7440-39-3	N	209	1,564	20,440	6,015	440	148		0.53	5	113		0.53	5	110		0.53	10	27		0.106	1	96		0.106	1
Beryllium	7440-41-7	N	1.02	15.64	204.4	1,154	0.02	0.82	J	0.0391	1	0.57	J	0.0391	1	0.66	J	0.0391	1	0.18	J	0.0391	1	0.58	J	0.0391	1
Cadmium	7440-43-9	N	0.69	3.91	51.1	27.4	2.5	0.88	J,B,p	0.182	1	1.1	B,p	0.182	1	1.3	B,p	0.182	1	1.4	B,p	0.182	1	0.95	J,B,p	0.182	1
Calcium	7440-70-2	--	--	--	--	--	--	10,100	J,f	16.6	250	36,300	J,f	166	2,500	2,260		16.6	250	622		16.6	250	943		16.6	250
Chromium[1]	7440-47-3	N	65.3	23.46	306.6	42.05	0.0075	21		0.912	5	17		0.912	5	18		0.912	5	6		0.912	5	12		0.912	5
Cobalt	7440-48-4	--	72.3	--	--	--	100	7.6		0.208	1	5.9		0.208	1	8.1		0.208	1	3.3		0.208	1	5.9		0.208	1
Copper	7440-50-8	N	53.5	312.9	4,088	10,518	15	10		0.368	1	13		0.368	1	7.6		0.368	1	1.5		0.368	1	6		0.368	1
Iron	7439-89-6	N	50,962	2,346	30,660	--	12	22,600		212	1,000	16,700		106	500	19,600		106	500	6,530		42.4	200	12,700		106	500
Lead[2]	7439-92-1	--	26.8	400	750	--	0.01	15	J,f	0.0218	1	32	J,f	0.0218	1	7.2		0.0218	1	2.6		0.0218	1	9.6		0.0218	1
Magnesium	7439-95-4	--	--	--	--	--	4,400	3,530	K,m	16.05	250	2,880	K,m	16.05	250	3,280	K,m	16.05	250	855	K,m	3.21	50	2,220	K,m	6.05	250
Manganese	7439-96-5	N	2,543	156.43	2,044	951.9	330	519		2.64	10	415		2.64	10	372		2.64	10	81		0.264	1	319		1.32	5
Mercury[3]	7439-97-6	--	0.13	0.78	10.22	--	0.06	0.015	J	0.0077	0.1	0.025	J	0.0077	0.1	<0.1	U	0.0077	0.1	<0.1	U	0.0077	0.1	<0.1	U	0.0077	0.1
Nickel	7440-02-0	N	62.8	156.43	2,044	--	2	13		0.0356	0.5	14		0.0356	0.5	13		0.0356	0.5	4.4		0.0356	0.5	8.5		0.0356	0.5
Potassium	7440-09-7	--	--	--	--	--	--	2,180		25	100	1,810		25	100	1,580		25	100	439		5	20	1,070		25	100
Selenium	7782-49-2	N	--	39.11	511	18.98	1.8	0.59	J	0.0502	1	0.63	J	0.0502	1	0.49	J	0.0502	1	0.24	J	0.0502	1	0.35	J	0.0502	1
Silver	7440-22-4	N	--	39.11	511	31.03	0.0000098	0.067	J	0.0044	3	0.075	J	0.0044	3	0.051	J	0.0044	3	0.026	J	0.0044	3	0.036	J	0.0044	3
Sodium	7440-23-5	--	--	--	--	--	--	64	J,B,p	8.92	100	65	J,B,p	8.92	100	59	J,B,p	8.92	100	31	J,B,p	8.92	100	63	J,B,p	8.92	100
Thallium	7440-28-0	N	2.11	0.55	7.2	3.6	0.001	0.14	J	0.027	0.5	0.13	J	0.027	0.5	0.15	J	0.027	0.5	0.039	J	0.027	0.5	0.1	J	0.027	0.5
Vanadium	7440-62-2	N	108	7.82	102.2	730.1	0.5	29		0.207	1	23		0.207	1	29		0.207	1	8.3		0.207	1	17		0.207	1
Zinc	7440-66-6	N	202	2,346	30,660	13,622	10	67		0.517	4	55		0.517	4	55		0.517	4	17		0.517	4	58		0.517	4
TCL Pesticides/PCBs (µg/kg)																											
Aroclor 1254 [4]	11097-69-1	C	--	1.6E+02	1.4E+03	1.1E+03	0.48	53		3.6	41	51		4.2	45	NT				NT				NT			
TCL VOCs (µg/kg)																											
2-Butanone	78-93-3	N	--	4.7E+06	6.1E+07	2.9E+04	--	25		6.15	24	23	J	6.75	28	<24	U	5.95	24	17	J	5.4	22	<24	U	5.9	24
Acetone	67-64-1	N	--	7.0E+06	9.2E+07	2.2E+04	--	110		6.15	24	57	B,z	6.75	28	36	B,z	5.95	24	36	B,z	5.4	22	42	B,z	5.9	24
Cyclohexane	110-82-7		--	--	--	--	--	0.9	J	0.389	12	<14	U	0.427	14	<12	U	0.376	12	<11	U	0.341	11	<12	U	0.373	12
Ethylbenzene	100-41-4	N	--	7.8E+05	1.0E+07	1.5E+04	100	0.75	J	0.52	6.2	<6.8	U	0.571	6.8	<6	U	0.503	6	<5.4	U	0.457	5.4	<5.9	U	0.499	5.9
Methylcyclohexane	108-87-2		--	--	--	--	--	4.2	J	1.04	12	<14	U	1.14	14	<12	U	1.01	12	<11	U	0.913	11	<12	U	0.997	12
Methylene chloride	75-09-2	C	--	8.5E+04	3.8E+05	1.9E+01	300	4.2	J,J,c	3.46	24	5.7	J,J,c	3.79	28	4.8	J,J,c	3.34	24	4.1	J,J,c	3.03	22	4.5	J,J,c	3.32	24
Toluene	108-88-3	N	--	6.3E+05	8.2E+06	2.7E+04	100	<6.2	U	0.571	6.2	<6.8	U	0.626	6.8	<6	U	0.552	6	<5.4	U	0.501	5.4	<5.9	U	0.548	5.9
Xylenes	1330-20-7	N	--	1.6E+06	2.0E+07	3.0E+03	40	4.1	J	0.518	6.2	<6.8	U	0.568	6.8	<6	U	0.501	6	<5.4	U	0.455	5.4	<5.9	U	0.497	5.9
VOC TICs (µg/kg)																											
1,2,4-Trimethylbenzene	95-63-6	--	--	--	--	--		2.7	Q,NJ,t		10	NI				NI				NI				NI			
2-Methyl-hexane	591764	--	--	--	--	--	--	8.4	E,NJ,t		100	NI				NI				NI				NI			
3-Methyl-hexane	589344	--	--	--	--	--	--	7	E,NJ,t		100	NI				NI				NI				NI			
Hexanal	66251	--	--	--	--	--	--	11	E,NJ,t		1	NI				NI				NI				NI			
Hexane	110-54-3	--	--	--	--	--		14	E,NJ,t		100	NI				NI				NI				NI			
Pentane, 2-methyl-	107835	--	--	--	--	--	--	11	E,NJ,t		8	NI				NI				NI				NI			
Pentane, 3-ethyl-2,2-dimethyl-	16747323	--	--	--	--	--	--	5.7	E,NJ,t		1	NI				NI				NI				NI			
TCL SVOCs (µg/kg)																											
2,4-Dinitrotoluene	121-14-2	N	--	1.6E+04	2.0E+05	5.7E+02	--	77	J	3.78	210	120	J	4.41	230	<200	U	3.78	200	<180	U	3.47	180	<200	U	3.78	200
Dinitrotoluene Mix	--	C	--	9.4E+02	4.2E+03	--	--	77				120				ND				ND				ND			
4-Chloro-3-Methylphenol	59-50-7	--	--	--	--	--	--	18	J	6.25	210	<230	U,UL,s	7.29	230	29	J	6.25	200	12	J	5.73	180	15	J	6.25	200
Bis(2-ethylhexyl)phthalate	117-81-7	C	--	4.6E+04	2.0E+05	2.9E+06	--	86	J	2.48	210	160	J	2.9	230	49	J	2.48	200	42	J	2.28	180	46	J	2.48	200
Butylbenzylphthalate	85-68-7	N	--	1.6E+06	2.0E+07	1.7E+07	--	<210	U	5.38	210	<230	U	6.27	230	<200	U	5.38	200	<180	U	4.93	180	<200	U	5.38	200
Diethylphthalate	84-66-2	N	--	6.3E+06	8.2E+07	4.5E+05	--	21	J,B,z	2.28	210	16	J,B,z	2.66	230	18	J,B,z	2.28	200	13	J,B,z	2.09	180	14	J,B,z	2.28	200
Di-n-butylphthalate	84-74-2	N	--	7.8E+05	1.0E+07	5.0E+06	--	1,100		2.82	210	1,800		5.35	230	38	J	4.58	200	31	J	4.2	180	26	J	4.58	200
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	100	4	J	5.7	210	<230	U	3.29	230	<200	U	2.82	200	<180	U	2.59	180	<200	U	2.82	200
N-Nitrosodiphenylamine	86-30-6	C	--	1.3E+05	5.8E+05	7.6E+02	--	21	J	2.76	210	16	J	6.65	230	<200	U	5.7	200	<180	U	5.23	180	<200	U	5.7	200
Phenanthrene[5]	85-01-8	N	--	2.3E+05	3.1E+06	--	100	<210	U	4.75	210	<230	U	3.22	230	<200	U	2.76	200	<180	U	2.53	180	<200	U	2.76	200
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	100	2	J	1.78	210	3	J	2.07	230	<200	U	1.78	200	<180	U	1.63	180	<200	U	1.78	200
SVOC TICs(µg/kg)																											
(Z)-9-Octadecenamide	301-02-0	--	--	--	--	--	--	NI				NI				120	E,B,x	0	100	80	E,B,x	0	100	300	E,B,x	0	100
1R-.alpha.-Pinene	7785-70-8	--	--	--	--	--	--	NI				NI				NI				NI				70	E,NJ,t	0	10
1-Phenanthrenecarboxylicacid, 1,2,3,4,4a	1235-74-1	--	--	--	--	--	--	NI				NI				NI				NI				120	E,NJ,t	0	100
1,2-Benzenedicarboxylicacid, bis(2-methy	84-69-5	--	--	--	--	--	--	32	E,B,x	0	100	27	E,B,x	0	100	51	E,B,x	0	100	30	E,B,x	0	100	NI			
2 (5H)-Furanone	497-23-4	--	--	--	--	--	--	NI				63	E,NJ,t	0	50	NI				NI				NI			
2-Cyclopenten-1-one, 3-methyl-2-(1,3-pen	22610-80-6	--	--	--	--	--	--	NI				NI				NI				NI				NI			
2-Ethyl-1-Hexanol	104-76-7	--	--	--	--	--	--	NI				NI				27	E,NJ,t	0	1,700	21	E,NJ,t	0	1,700	NI			
2-Fluoro-4-nitrophenol	403-19-0	--	--	--	--	--	--	NI				25	E,NJ,t	0	1	NI				NI				NI			
2-Pentadecanone, 6,10,14-trimethyl-	502-69-2	--	--	--	--	--	--	NI				40	E,NJ,t	0	1	NI				NI				NI			
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	--	--	--	--	--	--	NI				NI				NI				NI				NI			
2,6,10-Dodecatriene-1-ol,3,7,11-trimethy	4602-84-0	--	--	--	--	--	--	NI				NI				NI				NI				NI			
2,6,10-Dodecatrien-1-ol,3,7,11-trimethyl	4128-17-0	--	--	--	--	--	--	NI				NI				NI				NI				NI			
2,6,10,14,18,22-Tetracosahexaene,2,6,10,	111-02-4	--	--	--	--	--	--	NI				NI				NI				55	E,NJ,t	0	1	NI			
3-Hexene-2,5-dione	4436-75-3	--	--	--	--	--	--	NI				NI				210	E,NJ,t	0	10	NI				NI			
7-Nonenamide	90949-53-4	--	--	--	--	--	--	NI				NI				NI				NI				NI			
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,	10001-439-24	--	--	--	--	--	--	24	E,NJ,t	0	1	NI				42	E,NJ,t	0	1	26	E,NJ,t	0	1	22	E,NJ,t	0	1
10-Methylnonadecane	56862-62-5	--	--	--	--	--	--	NI				NI				NI				NI				NI			
a-Pinene	80-56-8	--	--	--	--	--	--	NI				NI				NI				NI				230	E,NJ,t	0	1,700

Table 5-4
Detected Analytes for AOC Q
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	Draft BTAG Screening Level	QSB1A 10/2/2003 0-1		MDL	RL	QSB1A-DUP(SBD3) 10/2/2003 0-1		MDL	RL	QSB1B 10/2/2003 10-12		MDL	RL	QSB1C 10/2/2003 17-19		MDL	RL	QSB2A 10/2/2003 0-1		MDL	RL
								Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
beta-Pinene	127-91-3	--	--	--	--	--	--	NI				NI				NI				NI				35	E,NJ,t	0	1,700
Ditriacontane	544-85-4	--	--	--	--	--	--	NI				NI				NI				NI				24	E,NJ,t	0	100
Docosa-2,6,10,14,18-pentaen-22-al,2,6,10	10001-630-47	--	--	--	--	--	--	NI				NI				NI				NI				47	E,NJ,t	0	10
Docosane	629-97-0	--	--	--	--	--	--	NI				NI				NI				NI				NI			
Eicosane	112-95-8	--	--	--	--	--	--	NI				NI				27	E,B,x	0	1,000	29	E,B,x	0	1,000	28	E,B,x	0	1,000
Erucylamide	112-84-5	--	--	--	--	--	--	NI				NI				540	E,NJ,t	0	10	380	E,NJ,t	0	10	NI			
Heneicosane	629-94-7	--	--	--	--	--	--	NI				30	E,B,x	0	1,000	NI				39	E,B,x	0	1,000	NI			
Hentriacontane	630-04-6	--	--	--	--	--	--	NI				220	E,NJ,t	0	10	NI				NI				NI			
Heptacosane	593-49-7	--	--	--	--	--	--	NI				NI				NI				31	E,NJ,t	0	10	NI			
Heptadecane	629-78-7	--	--	--	--	--	--	NI				NI				NI				NI				NI			
Heptadecane, 9-octyl-	7225-64-1	--	--	--	--	--	--	NI				NI				NI				NI				NI			
Hexatriacontane	630-06-8	--	--	--	--	--	--	NI				NI				42	E,NJ,t	0	10	NI				NI			
Nonadecane, 9-methyl-	13287-24-6	--	--	--	--	--	--	NI				NI				23	E,NJ,t	0	1	45	E,NJ,t	0	1	NI			
Octacosane	630-02-4	--	--	--	--	--	--	NI				NI				36	E,NJ,t	0	10	42	E,NJ,t	0	10	NI			
Octadecane, 3-ethyl-5-(2-ethylbutyl)-	55282-12-7	--	--	--	--	--	--	NI				NI				29	E,NJ,t	0	1	NI				NI			
Tetratriacontane	14167-59-0	--	--	--	--	--	--	NI				NI				NI				34	E,B,x	0	10	29	E,B,x	0	10
PAHs (µg/kg)																											
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	100	7.8	U,UJ,l	2.04	26	7.8	J,J,l			<57	U,UJ,l	2.04	57	<23	U,UJ,l	1.87	23	<25	U,UJ,l	2.04	25
Phenanthrene [B]	85-01-8	N	--	2.3E+05	3.1E+06	--	100	1.6	U	0.72	26	1.6	J			<57	U,UJ,s	0.72	57	<23	U	0.66	23	<25	U	0.72	25
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	100	3.8	U	1.08	26	3.8	J			<57	U,UJ,s	1.08	57	<23	U	0.99	23	<25	U	1.08	25
Explosives (mg/kg)																											
2,4-Dinitrotoluene	121-14-2	N	--	1.6E+01	2.0E+02	5.7E-01	--	0.31	J	0.142	0.5	0.2	J	0.142	0.5	<0.5	U	0.142	0.5	<0.5	U	0.142	0.5	<0.5	U	0.142	0.5
Dinitrotoluene Mix	--	C	--	9.4E-01	4.2E+00	--	--	0.31				0.2				ND				ND				ND			
Cyanide (mg/kg)																											
Cyanide	57-12-5	N	--	1.6E+02	2.0E+03	1.5E+02	0.005	0.81		0.0356	0.5	1.3		0.0356	0.5	<0.5	U	0.0356	0.5	<0.5	U	0.0356	0.5	<0.5	U	0.0356	0.5
Percent Solids (%)																											
Percent Solids	--	--	--	--	--	--	--	81		0.1	0.1	74		0.1	0.1	84		0.1	0.1	93		0.1	0.1	85		0.1	0.1

Table 5-4
Detected Analytes for AOC Q
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	Draft BTAG Screening Level	QSB2B 10/2/2003 10-12		MDL	RL	QSB2C 10/2/2003 18-20		MDL	RL	QSB3A 10/2/2003 0-1		MDL	RL	QSB3B 10/2/2003 10-12		MDL	RL	QSB3C 10/2/2003 17-19		MDL	RL
								Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
TAL Metals (mg/kg)																											
Aluminum	7429-90-5	--	40,041	--	--	--	1	14,200		91.5	500	7,970		45.75	250	14,500		91.5	500	9,890		91.5	500	5,130		45.8	250
Antimony	7440-36-0	N	--	3.13	40.9	13.2	0.48	0.28	J,B,p	0.0518	0.5	0.16	J,B,p	0.0518	0.5	0.17	J,B,p	0.0518	0.5	0.15	J,B,p	0.0518	0.5	0.11	J,B,p	0.0518	0.5
Arsenic	7440-38-2	C	15.8	0.43	1.91	0.026	328	0.9		0.0232	0.4	0.7		0.0232	0.4	1.4		0.0232	0.4	0.76		0.0232	0.4	0.63		0.0232	0.4
Barium	7440-39-3	N	209	1,564	20,440	6,015	440	116		0.53	5	66		0.106	1	137		0.53	5	75		0.106	1	42		0.106	1
Beryllium	7440-41-7	N	1.02	15.64	204.4	1,154	0.02	0.74	J	0.0391	1	0.41	J	0.0391	1	0.89	J	0.0391	1	0.62	J	0.0391	1	0.28	J	0.0391	1
Cadmium	7440-43-9	N	0.69	3.91	51.1	27.4	2.5	1.6	B,p	0.182	1	0.88	J,B,p	0.182	1	1.6	B,p	0.182	1	1.2	B,p	0.182	1	1.3	B,p	0.182	1
Calcium	7440-70-2	--	--	--	--	--	--	1,900		16.6	250	1,230		16.6	250	25,600		166	2,500	2,000		16.6	250	1,080		16.6	250
Chromium[1]	7440-47-3	N	65.3	23.46	306.6	42.05	0.0075	17		0.912	5	10		0.912	5	19		0.912	5	14		0.912	5	8.8		0.912	5
Cobalt	7440-48-4	--	72.3	--	--	--	100	8.4		0.208	1	5.6		0.208	1	8.4		0.208	1	6.7		0.208	1	4.4		0.208	1
Copper	7440-50-8	N	53.5	312.9	4,088	10,518	15	8.3		0.368	1	5.3		0.368	1	12		0.368	1	6.5		0.368	1	3.3		0.368	1
Iron	7439-89-6	N	50,962	2,346	30,660	--	12	20,000		106	500	12,500		106	500	20,600		212	1,000	15,500		106	500	8,730		42.4	200
Lead[2]	7439-92-1	--	26.8	400	750	--	0.01	7.6		0.0218	1	4.4		0.0218	1	21		0.0218	1	5.5		0.0218	1	3.5		0.0218	1
Magnesium	7439-95-4	--	--	--	--	--	4,400	3,370	K,m	16.05	250	1,890	K,m	16.05	250	3,380	K,m	16.05	250	2,730	K,m	16.05	250	1,280	K,m	16.05	250
Manganese	7439-96-5	N	2,543	156.43	2,044	951.9	330	441		2.64	100	222		1.32	5	511		2.64	10	273		1.32	5	151		1.32	5
Mercury[3]	7439-97-6	--	0.13	0.78	10.22	--	0.06	<0.1	U	0.0077	0.1	<0.1	U	0.0077	0.1	0.019	J	0.0077	0.1	<0.1	U	0.0077	0.1	<0.1	U	0.0077	0.1
Nickel	7440-02-0	N	62.8	156.43	2,044	--	2	13		0.0356	0.5	7.1		0.0356	0.5	15		0.0356	0.5	9.6		0.0356	0.5	5.9		0.0356	0.5
Potassium	7440-09-7	--	--	--	--	--	--	1,230		25	100	876		5	20	1,330		25	100	1,270		25	100	651		5	20
Selenium	7782-49-2	N	--	39.11	511	18.98	1.8	0.47	J	0.0502	1	0.33	J	0.0502	1	0.67	J	0.0502	1	0.41	J	0.0502	1	0.31	J	0.0502	1
Silver	7440-22-4	N	--	39.11	511	31.03	0.0000098	0.055	J	0.0044	3	0.032	J	0.0044	3	0.063	J	0.0044	3	0.033	J	0.0044	3	0.028	J	0.0044	3
Sodium	7440-23-5	--	--	--	--	--	--	67	J,B,p	8.92	100	55	J,B,p	8.92	100	60	J,B,p	8.92	100	56	J,B,p	8.92	100	49	J,B,p	8.92	100
Thallium	7440-28-0	N	2.11	0.55	7.2	3.6	0.001	0.15	J	0.027	0.5	0.08	J	0.027	0.5	0.16	J	0.027	0.5	0.11	J	0.027	0.5	0.058	J	0.027	0.5
Vanadium	7440-62-2	N	108	7.82	102.2	730.1	0.5	30		0.207	1	18		0.207	1	28		0.207	1	24		0.207	1	12		0.207	1
Zinc	7440-66-6	N	202	2,346	30,660	13,622	10	61		0.517	4	33		0.517	4	65		0.517	4	45		0.517	4	25		0.517	4
TCL Pesticides/PCBs (µg/kg)																											
Aroclor 1254 [4]	11097-69-1	C	--	1.6E+02	1.4E+03	1.1E+03	0.48	NT				NT				NT				NT				NT			
TCL VOCs (µg/kg)																											
2-Butanone	78-93-3	N	--	4.7E+06	6.1E+07	2.9E+04	--	<24	U	5.95	24	<22	U	5.5	22	23	J	6.4	26	<22	U	5.75	22	<22	U	5.45	22
Acetone	67-64-1	N	--	7.0E+06	9.2E+07	2.2E+04	--	24	B,z	5.95	24	22	B,z	5.5	22	56	B,z	6.4	26	24	B,z	5.75	22	18	J,B,z	5.45	22
Cyclohexane	110-82-7		--	--	--	--	--	<12	U	0.376	12	<11	U	0.348	11	<13	U	0.404	13	<11	U	0.363	11	<11	U	0.344	11
Ethylbenzene	100-41-4	N	--	7.8E+05	1.0E+07	1.5E+04	100	<6	U	0.503	6	<5.5	U	0.465	5.5	<6.4	U	0.541	6.4	<5.7	U	0.486	5.7	<5.4	U	0.461	5.4
Methylcyclohexane	108-87-2		--	--	--	--	--	<12	U	1.01	12	<11	U	0.93	11	<13	U	1.08	13	<11	U	0.972	11	<11	U	0.921	11
Methylene chloride	75-09-2	C	--	8.5E+04	3.8E+05	1.9E+01	300	4.9	J,J,c	3.34	24	4	J,J,c	3.09	22	6.8	J,J,c	3.6	26	4.8	J,J,c	3.23	22	5.6	J,J,c	3.06	22
Toluene	108-88-3	N	--	6.3E+05	8.2E+06	2.7E+04	100	0.65	J	0.552	6	<5.5	U	0.51	5.5	<6.4	U	0.594	6.4	<5.7	U	0.534	5.7	<5.4	U	0.506	5.4
Xylenes	1330-20-7	N	--	1.6E+06	2.0E+07	3.0E+03	40	<6	U	0.501	6	<5.5	U	0.463	5.5	<6.4	U	0.539	6.4	<5.7	U	0.484	5.7	<5.4	U	0.459	5.4
VOC TICs (µg/kg)																											
1,2,4-Trimethylbenzene	95-63-6	--	--	--	--	--		NI				NI				NI				NI				NI			
2-Methyl-hexane	591764	--	--	--	--	--	--	NI				NI				NI				NI				NI			
3-Methyl-hexane	589344	--	--	--	--	--	--	NI				NI				NI				NI				NI			
Hexanal	66251	--	--	--	--	--	--	NI				NI				NI				NI				NI			
Hexane	110-54-3	--	--	--	--	--		NI				NI				NI				NI				NI			
Pentane, 2-methyl-	107835	--	--	--	--	--	--	NI				NI				NI				NI				NI			
Pentane, 3-ethyl-2,2-dimethyl-	16747323	--	--	--	--	--	--	NI				NI				NI				NI				NI			
TCL SVOCs (µg/kg)																											
2,4-Dinitrotoluene	121-14-2	N	--	1.6E+04	2.0E+05	5.7E+02	--	<200	U	3.78	200	<190	U	3.47	190	120	J	4.1	220	<200	U	3.47	200	<180	U	3.47	180
Dinitrotoluene Mix	--	C	--	9.4E+02	4.2E+03	--	--	ND				ND				120				ND				ND			
4-Chloro-3-Methylphenol	59-50-7	--	--	--	--	--	--	15	J	6.25	200	10	J	5.73	190	<220	U	6.77	220	9	J	5.73	200	17	J	5.73	180
Bis(2-ethylhexyl)phthalate	117-81-7	C	--	4.6E+04	2.0E+05	2.9E+06	--	45	J	2.48	200	44	J	2.28	190	290		2.69	220	45	J	2.28	200	43	J	2.28	180
Butylbenzylphthalate	85-68-7	N	--	1.6E+06	2.0E+07	1.7E+07	--	<200	U	5.38	200	<190	U	4.93	190	44	J,B,x	5.82	220	<200	U	4.93	200	<180	U	4.93	180
Diethylphthalate	84-66-2	N	--	6.3E+06	8.2E+07	4.5E+05	--	13	J,B,z	2.28	200	11	J,B,z	2.09	190	18	J,B,z	2.47	220	14	J,B,z	2.09	200	13	J,B,z	2.09	180
Di-n-butylphthalate	84-74-2	N	--	7.8E+05	1.0E+07	5.0E+06	--	26	J	4.58	200	23	J	4.2	190	1,700		4.97	220	27	J	4.2	200	24	J	4.2	180
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	100	<200	U	2.82	200	<190	U	2.59	190	8	J	3.06	220	<200	U	2.59	200	<180	U	2.59	180
N-Nitrosodiphenylamine	86-30-6	C	--	1.3E+05	5.8E+05	7.6E+02	--	<200	U	5.7	200	<190	U	5.23	190	32	J	6.18	220	<200	U	5.23	200	<180	U	5.23	180
Phenanthrene[5]	85-01-8	N	--	2.3E+05	3.1E+06	--	100	<200	U	2.76	200	<190	U	2.53	190	3	J	2.99	220	<200	U	2.53	200	<180	U	2.53	180
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	100	<200	U	1.78	200	<190	U	1.63	190	4	J	1.92	220	<200	U	1.63	200	<180	U	1.63	180
SVOC TICs(µg/kg)																											
(Z)-9-Octadecenamide	301-02-0	--	--	--	--	--	--	NI				69	E,B,x	0	100	NI				62	E,B,x	0	100	79	E,B,x	0	100
1R-.alpha.-Pinene	7785-70-8	--	--	--	--	--	--	NI				NI				NI				NI				NI			
1-Phenanthrenecarboxylicacid, 1,2,3,4,4a	1235-74-1	--	--	--	--	--	--	NI				NI				NI				NI				NI			
1,2-Benzenedicarboxylicacid, bis(2-methy	84-69-5	--	--	--	--	--	--	40	E,B,x	0	100	33	E,B,x	0	100	28	E,B,x	0	100	35	E,B,x	0	100	36	E,B,x	0	100
2 (5H)-Furanone	497-23-4	--	--	--	--	--	--	NI				NI				NI				NI				NI			
2-Cyclopenten-1-one, 3-methyl-2-(1,3-pen	22610-80-6	--	--	--	--	--	--	NI				NI				23	E,NJ,t	0	10	NI				NI			
2-Ethyl-1-Hexanol	104-76-7	--	--	--	--	--	--	NI				NI				NI				23	E,NJ,t	0	1,700	NI			
2-Fluoro-4-nitrophenol	403-19-0	--	--	--	--	--	--	NI				NI				NI				NI				NI			
2-Pentadecanone, 6,10,14-trimethyl-	502-69-2	--	--	--	--	--	--	NI				NI				NI				NI				NI			
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	--	--	--	--	--	--	67	E,B,x	0	100	NI				NI				NI				70	E,B,x	0	100
2,6,10-Dodecatriene-1-ol,3,7,11-trimethy	4602-84-0	--	--	--	--	--	--	NI				NI				NI				40	E,NJ,t	0	10	NI			
2,6,10-Dodecatrien-1-ol,3,7,11-trimethyl	4128-17-0	--	--	--	--	--	--	NI				40	E,NJ,t	0	10	NI				NI				NI			
2,6,10,14,18,22-Tetracosahexaene,2,6,10,	111-02-4	--	--	--	--	--	--	NI				NI				NI				NI				NI			
3-Hexene-2,5-dione	4436-75-3	--	--	--	--	--	--	NI				NI				NI				NI				85	E,NJ,t	0	10
7-Nonenamide	90949-53-4	--	--	--	--	--	--	77	E,NJ,t	0	10	NI				NI				NI				NI			
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,	10001-439-24	--	--	--	--	--	--	23	E,NJ,t	0	1	19	E,NJ,t	0	1	NI				21	E,NJ,t	0	1	25	E,NJ,t	0	1
10-Methylnonadecane	56862-62-5	--	--	--	--	--	--	27	E,NJ,t	0	1	NI				NI				NI				NI			
a-Pinene	80-56-8	--	--	--	--	--	--	NI				NI				NI				NI				NI			

Table 5-4
Detected Analytes for AOC Q
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	Draft BTAG Screening Level	QSB2B 10/2/2003 10-12		MDL	RL	QSB2C 10/2/2003 18-20		MDL	RL	QSB3A 10/2/2003 0-1		MDL	RL	QSB3B 10/2/2003 10-12		MDL	RL	QSB3C 10/2/2003 17-19		MDL	RL
								Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
beta-Pinene	127-91-3	--	--	--	--	--	--	NI				NI				NI				NI				NI			
Ditriacontane	544-85-4	--	--	--	--	--	--	NI				NI				NI				NI				23	E,NJ,t	0	100
Docosa-2,6,10,14,18-pentaen-22-al,2,6,10	10001-630-47	--	--	--	--	--	--	49	E,NJ,t	0	10	NI				NI				NI				NI			
Docosane	629-97-0	--	--	--	--	--	--	NI				NI				230	E,NJ,t	0	10	33	E,NJ,t	0	10	32	E,NJ,t	0	10
Eicosane	112-95-8	--	--	--	--	--	--	NI				NI				180	E,B,x	0	1,000	NI				NI			
Erucylamide	112-84-5	--	--	--	--	--	--	400	E,NJ,t	0	10	360	E,NJ,t	0	10	NI				310	E,NJ,t	0	10	NI			
Heneicosane	629-94-7	--	--	--	--	--	--	29	E,B,x	0	1,000	23	E,B,x	0	1,000	NI				21	E,B,x	0	1,000	27	E,B,x	0	1,000
Hentriacontane	630-04-6	--	--	--	--	--	--	NI				NI				NI				NI				NI			
Heptacosane	593-49-7	--	--	--	--	--	--	NI				NI				NI				NI				NI			
Heptadecane	629-78-7	--	--	--	--	--	--	NI				24	E,NJ,t	0	1,000	NI				NI				NI			
Heptadecane, 9-octyl-	7225-64-1	--	--	--	--	--	--	36	E,NJ,t	0	1	NI				NI				NI				NI			
Hexatriacontane	630-06-8	--	--	--	--	--	--	NI				27	E,NJ,t	0	10	NI				NI				NI			
Nonadecane, 9-methyl-	13287-24-6	--	--	--	--	--	--	NI				NI				NI				NI				NI			
Octacosane	630-02-4	--	--	--	--	--	--	45	E,NJ,t	0	10	NI				410	E,NJ,t	0	10	NI				NI			
Octadecane, 3-ethyl-5-(2-ethylbutyl)-	55282-12-7	--	--	--	--	--	--	NI				NI				NI				NI				NI			
Tetratriacontane	14167-59-0	--	--	--	--	--	--	42	E,B,x	0	10	NI				NI				33	E,B,x	0	10	31	E,B,x	0	10
PAHs (µg/kg)																											
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	100	<25	U,UJ,l	2.04	25	<23	U,UJ,l	1.87	23	6.4	J,J,l	2.21	27	<24	U,UJ,l	2.04	24	<23	U,UJ,l	1.87	23
Phenanthrene [5]	85-01-8	N	--	2.3E+05	3.1E+06	--	100	<25	U	0.72	25	<23	U	0.66	23	<21	U,UJ,s	0.78	21	<24	U,UJ,s	0.72	24	<23	U,UJ,s	0.66	23
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	100	<25	U	1.08	25	<23	U	0.99	23	3	J,J,s	1.17	27	<24	U,UJ,s	1.08	24	<23	U,UJ,s	0.99	23
Explosives (mg/kg)																											
2,4-Dinitrotoluene	121-14-2	N	--	1.6E+01	2.0E+02	5.7E-01	--	<0.5	U	0.142	0.5	<0.5	U	0.142	0.5	<0.5	U	0.142	0.5	<0.5	U	0.142	0.5	<0.5	U	0.142	0.5
Dinitrotoluene Mix	--	C	--	9.4E-01	4.2E+00	--	--	ND				ND				ND				ND				ND			
Cyanide (mg/kg)																											
Cyanide	57-12-5	N	--	1.6E+02	2.0E+03	1.5E+02	0.005	0.06	J	0.0356	0.5	0.04	J	0.0356	0.5	2.2		0.0356	0.5	<0.5	U	0.0356	0.5	<0.5	U	0.0356	0.5
Percent Solids (%)																											
Percent Solids	--	--	--	--	--	--	--	84		0.1	0.1	91		0.1	0.1	78		0.1	0.1	87		0.1	0.1	92		0.1	0.1

Notes:

CAS = Chemical Abstracts Service
ft bgs = Feet Below Ground Surface
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyl
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
PAH = Polynuclear Aromatic Compound
TIC = Tentatively Identified Compound
MDL = Method Detection Limit
RL = Reporting Limit
NT = Not Tested
NI = Not Identified
LQ = Laboratory Qualifier
VQ = Validation Qualifier
r = Reason Code
NA = Not Applicable

(1) = Chromium VI RBC value was used
(2) = Lead criteria are Action Levels; see USEPA Region III guidance
(3) = Mercuric chloride soil RBC value used
(4) = Noncarcinogenic Residential RBC value for Aroclor 1254 was used for screening
(5) = RBC value for pyrene was used for these compounds
[A] = Facility-Wide Background Point Estimate as Reported in the Facility-Wide Background Study Report (IT 2001a)
RBC = USEPA Region III Risk-Based Concentration (RBC) values from the October 31, 2006, RBC Table and October 10, 2006, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
C = Carcinogenic per EPA RBC Table (October 2006)
N = Noncarcinogenic per EPA RBC Table (October 2006)
SSL DAF20 = Soil Screening Levels at a Dilution Attenuation Factor of 20
BTAG = Biological Technical Assistance Group Screening Level, Draft 1995

= Concentration Exceeds Adjusted Soil Residential RBC

= Concentration Exceeds Adjusted Soil Industrial RBC

underline = Concentration Exceeds Site Background Values

bold italic = Concentration Exceeds SSL DAF20

= Concentration Exceeds BTAG Screening Level

Laboratory Qualifiers

U	The compound was analyzed for but not detected. The reporting limit will be adjusted to reflect any dilution, and for soil, the percent moisture.
J	Estimated value.
B	Analyte found in associated blank as well as in the sample.
E	Concentration exceeded the upper level of the calibration range of the instrument for that specific analysis. For TICs, compound not present in calibration standard, calculated using total peak areas ion chromatographs and response factor of 1.
Q	Not estimated. TIC detected in sample, quantified using a response factor from the initial calibration.

Validation Qualifiers

B	Not detected substantially above the level reported in laboratory or field blanks.
N	Tentative Identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.
J	Analyte present. Reported value may not be accurate or precise.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
UL	Not detected, quantitation limit is probably higher.

Reason Codes

GC/MS Organics

c	Calibration failure; poor (RRF) or unstable (%D) response
l	MS/MSD recovery failure
s	Surrogate failure
t	Tentatively identified Compound
x	Field and/or equipment blank contamination
z	Method blank and/or storage blank contamination

Inorganics and Conventionals

f	Field duplicate imprecision
m	MS/MSD recovery failure
p	Preparation blank contamination

GC and HPLC Organics

c	Calibration failure; poor or unstable (%D) response
l	MS/MSD recovery failure
s	No confirmation column
x	Trip blank contamination
z	Method blank and/or storage blank contamination

Table 5-5
HHRS COPC Selection (Surface Soil) for SWMU 37
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	C/N	Adjusted RBC Residential	Adjusted RBC Industrial	COPC Flag (Y/N)	Rationale for Selection or Deletion
	TAL Metals (mg/kg)												
7429905	Aluminum	10,600	17,000	mg/kg	37SB2A	3/3	91.5 - 91.5	17,000	--	--	--	Y	NSV
7440360	Antimony	0.18	1.2	mg/kg	37SB2A	3/3	0.0518 - 0.0518	1.2	N	3.13	40.88	N	BSL
7440382	Arsenic	1	5	mg/kg	37SB2A	3/3	0.0232 - 0.0232	5	C	0.43	1.91	Y	***ARES/IND***
7440393	Barium	50	103	mg/kg	37SB3A	3/3	0.106 - 0.53	103	N	1,564	20,440	N	BSL
7440417	Beryllium	0.48	0.72	mg/kg	37SB2A	3/3	0.0391 - 0.0391	0.72	N	16	204	N	BSL
7440439	Cadmium	1.1	1.9	mg/kg	37SB1A	3/3	0.182 - 0.182	1.9	N	3.91	51	N	BSL
7440702	Calcium	1,480	106,000	mg/kg	37SB2A	3/3	16.6 - 4150	106,000	--	Nutrient	Nutrient	N	Nutrient
7440473	Chromium[1]	15	114	mg/kg	37SB2A	3/3	0.912 - 4.56	114	N	23.5	307	Y	**ARES**
7440484	Cobalt	3	5.6	mg/kg	37SB3A	3/3	0.208 - 0.208	5.6	--	--	--	Y	NSV
7440508	Copper	7	193	mg/kg	37SB2A	3/3	0.368 - 1.84	193	N	313	4,088	N	BSL
7439896	Iron	14,300	19,500	mg/kg	37SB2A	3/3	106 - 212	19,500	N	2,346	30,660	Y	**ARES**
7439921	Lead[2]	15	277	mg/kg	37SB2A	3/3	0.0218 - 1.09	277	--	400	750	N	BSL
7439954	Magnesium	2,600	3,780	mg/kg	37SB2A	3/3	16.05 - 16.1	3,780	--	Nutrient	Nutrient	N	Nutrient
7439965	Manganese	147	403	mg/kg	37SB3A	3/3	1.32 - 2.64	403	N	156	2,044	Y	**ARES**
7439976	Mercury[3]	0.01	0.6	mg/kg	37SB2A	3/3	0.0077 - 0.0077	0.6	--	0.78	10.22	N	BSL
7440020	Nickel	8	50	mg/kg	37SB2A	3/3	0.0356 - 0.356	50	N	156	2,044	N	BSL
7440097	Potassium	677	1,290	mg/kg	37SB3A	3/3	5 - 25	1,290	--	Nutrient	Nutrient	N	Nutrient
7782492	Selenium	0.42	0.47	mg/kg	37SB1A	3/3	0.0502 - 0.0502	0.47	N	39.1	511	N	BSL
7440224	Silver	0.05	0.24	mg/kg	37SB2A	3/3	0.0044 - 0.0044	0.24	N	39.1	511	N	BSL
7440235	Sodium	70	87	mg/kg	37SB2A	3/3	8.92 - 8.92	87	--	Nutrient	Nutrient	N	Nutrient
7440280	Thallium	0.06	0.12	mg/kg	37SB3A	3/3	0.027 - 0.027	0.12	N	0.55	7.15	N	BSL
7440622	Vanadium	16	21	mg/kg	37SB3A	3/3	0.207 - 0.207	21	N	7.82	102	Y	**ARES**
7440666	Zinc	67	129	mg/kg	37SB2A	3/3	0.517 - 2.585	129	N	2,346	30,660	N	BSL
	TCL Pesticides/PCBs (µg/kg)												
60571	Dieldrin	1.1E+01	1.1E+01	µg/kg	37SB1A	1/1	0.494 - 0.494	1.1E+01	C	4.0E+01	1.8E+02	N	BSL
11097691	Aroclor 1254[4]	1.8E+02	1.8E+02	µg/kg	37SB1A	1/1	4.8 - 4.8	1.8E+02	C	1.6E+02	1.4E+03	Y	**ARES**
	TCL VOCs (µg/kg)												
78933	2-Butanone	2.4E+01	2.4E+01	µg/kg	37SB3A	1/3	5.7 - 8.2	2.4E+01	N	4.7E+06	6.1E+07	N	BSL
67641	Acetone	3.7E+01	1.1E+02	µg/kg	37SB1A	3/3	5.7 - 8.2	1.1E+02	N	7.0E+06	9.2E+07	N	BSL
75092	Methylene chloride	4.5E+00	1.0E+01	µg/kg	37SB2A	2/3	3.2 - 4.61	1.0E+01	C	8.5E+04	3.8E+05	N	BSL
	TCL SVOCs (µg/kg)												
121142	2,4-Dinitrotoluene	2.6E+02	1.8E+03	µg/kg	37SB2A	2/3	3.47 - 75.6	1.8E+03	N	1.6E+04	2.0E+05	N	BSL
--	Dinitrotoluene Mix	2.6E+02	1.8E+03	µg/kg	37SB2A	2/3	0 - 0	1.8E+03	--	9.4E+02	4.2E+03	Y	**ARES**
59507	4-Chloro-3-Methylphenol	1.2E+01	1.2E+01	µg/kg	37SB3A	1/3	5.73 - 125	1.2E+01	--	--	--	Y	NSV
117817	Bis(2-ethylhexyl)phthalate	4.6E+01	1.0E+03	µg/kg	37SB2A	3/3	2.28 - 49.7	1.0E+03	C	4.6E+04	2.0E+05	N	BSL
84662	Diethylphthalate	1.8E+01	1.2E+02	µg/kg	37SB2A	2/3	2.09 - 45.6	1.2E+02	N	6.3E+06	8.2E+07	N	BSL
84742	Di-n-butylphthalate	5.9E+01	2.6E+04	µg/kg	37SB2A	3/3	4.2 - 91.7	2.6E+04	N	7.8E+05	1.0E+07	N	BSL
206440	Fluoranthene	1.2E+02	1.9E+02	µg/kg	37SB2A	2/3	2.59 - 56.4	1.9E+02	N	3.1E+05	4.1E+06	N	BSL
86306	N-Nitrosodiphenylamine	3.0E+02	4.5E+02	µg/kg	37SB1A	2/3	5.23 - 114	4.5E+02	C	1.3E+05	5.8E+05	N	BSL
85018	Phenanthrene[5]	4.0E+01	4.0E+01	µg/kg	37SB1A	1/3	2.53 - 55.2	4.0E+01	N	2.3E+05	3.1E+06	N	BSL
129000	Pyrene	1.1E+02	1.1E+02	µg/kg	37SB1A	2/3	1.63 - 35.5	1.1E+02	N	2.3E+05	3.1E+06	N	BSL
	SVOC TICs (µg/kg)												
301020	(Z)-9-Octadecenamide	4.6E+01	4.6E+01	µg/kg	37SB3A	1/3	0 - 0	4.6E+01	--	--	--	Y	NSV
17851535	1,2-Benzenedicarboxylic acid, butyl 2-me	2.1E+01	2.1E+01	µg/kg	37SB3A	1/3	0 - 0	2.1E+01	--	--	--	Y	NSV
89189	1,2-Benzenedicarboxylic acid, butyl 8-me	2.8E+02	2.8E+02	µg/kg	37SB1A	1/3	0 - 0	2.8E+02	--	--	--	Y	NSV
497234	2 (5H)-Furanone	3.2E+02	3.2E+02	µg/kg	37SB1A	1/3	0 - 0	3.2E+02	--	--	--	Y	NSV
4436753	3-Hexene-2,5-dione	4.0E+02	4.0E+02	µg/kg	37SB2A	1/3	0 - 0	4.0E+02	--	--	--	Y	NSV
7098228	Tetratetracontane	2.7E+01	2.7E+01	µg/kg	37SB3A	1/3	0 - 0	2.7E+01	--	--	--	Y	NSV

Table 5-5
HHRS COPC Selection (Surface Soil) for SWMU 37
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	C/N	Adjusted RBC Residential	Adjusted RBC Industrial	COPC Flag (Y/N)	Rationale for Selection or Deletion
	PAHs (µg/kg)												
120127	Anthracene	2.4E+00	2.4E+00	µg/kg	37SB2A	1/3	0.77 - 1.15	2.4E+00	N	2.3E+06	3.1E+07	N	BSL
205992	Benzo(b)fluoranthene	7.6E+00	7.6E+00	µg/kg	37SB2A	1/3	1.43 - 2.13	7.6E+00	C	2.2E+02	3.9E+03	N	BSL
207089	Benzo(k)fluoranthene	5.5E+00	5.5E+00	µg/kg	37SB2A	1/3	1.1 - 1.64	5.5E+00	C	2.2E+03	3.9E+04	N	BSL
218019	Chrysene	1.2E+01	1.2E+01	µg/kg	37SB2A	1/3	1.32 - 1.97	1.2E+01	C	2.2E+04	3.9E+05	N	BSL
206440	Fluoranthene	2.2E+00	7.3E+01	µg/kg	37SB1A	3/3	1.87 - 2.79	7.3E+01	N	3.1E+05	4.1E+06	N	BSL
193395	Indeno(1,2,3-cd)pyrene	8.1E+00	8.1E+00	µg/kg	37SB2A	1/3	0.77 - 1.15	8.1E+00	C	2.2E+02	3.9E+03	N	BSL
85018	Phenanthrene[5]	1.5E+01	1.8E+01	µg/kg	37SB2A	2/3	0.66 - 0.984	1.8E+01	N	2.3E+05	3.1E+06	N	BSL
129000	Pyrene	1.8E+00	5.9E+01	µg/kg	37SB2A	3/3	0.99 - 1.48	5.9E+01	N	2.3E+05	3.1E+06	N	BSL
	Explosives (mg/kg)												
121142	2,4-Dinitrotoluene	2.7E-01	6.3E-01	mg/kg	37SB2A	2/3	0.142 - 0.142	6.3E-01	N	1.6E+01	2.0E+02	N	BSL
--	Dinitrotoluene Mix	2.7E-01	6.3E-01	mg/kg	37SB2A	2/3	0 - 0	6.3E-01	--	9.4E-01	4.2E+00	N	BSL
	Cyanide (mg/kg)												
57125	Cyanide	5.0E-01	8.0E-01	mg/kg	37SB1A	2/3	0.0356 - 0.0356	8.0E-01	N	1.6E+02	2.0E+03	N	BSL

Notes:

CAS = Chemical Abstracts Service
COPC = Chemical of Potential Concern
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyl
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
PAH = Polynuclear Aromatic Compound
TIC = Tentatively Identified Compound
[1] = Chromium VI RBC value was used
[2] = Lead criteria are Action Levels; see USEPA Region III guidance
[3] = Mercuric chloride soil RBC value used
[4] = Noncarcinogenic Residential RBC value for Aroclor 1254 was used for screening
[5] = RBC value for pyrene was used for these compounds

DUP AVG = results for duplicate samples averaged
RBC = USEPA Region III Risk-Based Concentration
(RBC) values from the October 31, 2006,
RBC Table and October 10, 2006, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
C = Carcinogenic per EPA RBC Table (October 2006)
N = Noncarcinogenic per EPA RBC Table (October 2006)

ARES = Above Residential RBC
ARES/IND = Above Residential RBC/Industrial RBC
BSL = Below Residential/Industrial RBC Screening Levels
NSV = No Screening Value Available

Table 5-6
HHRS COPC Selection (Total Soil) for SWMU 37
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	C/N	Adjusted RBC Residential	Adjusted RBC Industrial	COPC Flag (Y/N)	Rationale for Selection or Deletion
	TAL Metals (mg/kg)												
7429905	Aluminum	10,600	17,500	mg/kg	37SB2B	9/9	91.5 - 91.5	17,500	--	--	--	Y	NSV
7440360	Antimony	0.17	1.2	mg/kg	37SB2A	9/9	0.0518 - 0.0518	1.2	N	3.13	40.88	N	BSL
7440382	Arsenic	1	5	mg/kg	37SB2A	9/9	0.0232 - 0.0232	5	C	0.43	1.91	Y	***ARES/IND***
7440393	Barium	50	132	mg/kg	37SB1B	9/9	0.106 - 5.3	132	N	1,564	20,440	N	BSL
7440417	Beryllium	0.34	0.72	mg/kg	37SB2A	9/9	0.0391 - 0.0391	0.72	N	16	204	N	BSL
7440439	Cadmium	0.59	1.9	mg/kg	37SB1A	9/9	0.182 - 0.182	1.9	N	3.91	51	N	BSL
7440702	Calcium	1,030	106,000	mg/kg	37SB2A	9/9	16.6 - 4150	106,000	--	Nutrient	Nutrient	N	Nutrient
7440473	Chromium[1]	15	114	mg/kg	37SB2A	9/9	0.912 - 4.56	114	N	23.5	307	Y	**ARES**
7440484	Cobalt	2.80	11	mg/kg	37SB2B	9/9	0.208 - 0.208	11	--	--	--	Y	NSV
7440508	Copper	6.90	193	mg/kg	37SB2A	9/9	0.368 - 1.84	193	N	313	4,088	N	BSL
7439896	Iron	14,300	28,200	mg/kg	37SB2B	9/9	106 - 212	28,200	N	2,346	30,660	Y	**ARES**
7439921	Lead[2]	7.4	277	mg/kg	37SB2A	9/9	0.0218 - 1.09	277	--	400	750	N	BSL
7439954	Magnesium	2,600	4,790	mg/kg	37SB2B	9/9	16.05 - 32.1	4,790	--	Nutrient	Nutrient	N	Nutrient
7439965	Manganese	147	503	mg/kg	37SB1C	9/9	1.32 - 2.64	503	N	156	2,044	Y	**ARES**
7439976	Mercury[3]	0.01	0.6	mg/kg	37SB2A	3/9	0.0077 - 0.0077	0.6	--	0.78	10.22	N	BSL
7440020	Nickel	8.40	50	mg/kg	37SB2A	9/9	0.0356 - 0.356	50	N	156	2,044	N	BSL
7440097	Potassium	677	2,140	mg/kg	37SB2B	9/9	5 - 25	2,140	--	Nutrient	Nutrient	N	Nutrient
7782492	Selenium	0.42	0.6	mg/kg	37SB1B	9/9	0.0502 - 0.0502	0.6	N	39.1	511	N	BSL
7440224	Silver	0.04	0.24	mg/kg	37SB2A	9/9	0.0044 - 0.0044	0.24	N	39.1	511	N	BSL
7440235	Sodium	67	93	mg/kg	37SB1C	9/9	8.92 - 8.92	93	--	Nutrient	Nutrient	N	Nutrient
7440280	Thallium	0.06	0.19	mg/kg	37SB2B	9/9	0.027 - 0.027	0.19	N	0.55	7.15	N	BSL
7440622	Vanadium	16	43	mg/kg	37SB2B	9/9	0.207 - 0.207	43	N	7.82	102	Y	**ARES**
7440666	Zinc	38	129	mg/kg	37SB2A	9/9	0.517 - 2.585	129	N	2,346	30,660	N	BSL
	TCL Pesticides/PCBs (µg/kg)												
60571	Dieldrin	1.1E+01	1.1E+01	µg/kg	37SB1A	1/1	0.494 - 0.494	1.1E+01	C	4.0E+01	1.8E+02	N	BSL
11097691	Aroclor 1254[4]	1.8E+02	1.8E+02	µg/kg	37SB1A	1/1	4.8 - 4.8	1.8E+02	C	1.6E+02	1.4E+03	Y	**ARES**
	TCL VOCs (µg/kg)												
78933	2-Butanone	1.8E+01	2.4E+01	µg/kg	37SB1B	3/9	5.4 - 8.2	2.4E+01	N	4.7E+06	6.1E+07	N	BSL
67641	Acetone	1.6E+01	1.1E+02	µg/kg	37SB1A	9/9	5.4 - 8.2	1.1E+02	N	7.0E+06	9.2E+07	N	BSL
156592	cis-1,2-Dichloroethene	1.3E+00	1.3E+00	µg/kg	37SB2B	1/9	0.767 - 1.16	1.3E+00	N	7.8E+04	1.0E+06	N	BSL
108872	Methylcyclohexane	3.0E+00	3.0E+00	µg/kg	37SB3B	1/9	0.913 - 1.39	3.0E+00	--	--	--	Y	NSV
75092	Methylene chloride	4.5E+00	1.0E+01	µg/kg	37SB2A	8/9	3.03 - 4.61	1.0E+01	C	8.5E+04	3.8E+05	N	BSL
108883	Toluene	1.0E+00	1.0E+00	µg/kg	37SB2B	1/9	0.501 - 0.761	1.0E+00	N	6.3E+05	8.2E+06	N	BSL
79016	Trichloroethene	6.8E+00	6.3E+01	µg/kg	37SB2C	2/9	0.731 - 1.11	6.3E+01	C	1.6E+03	7.2E+03	N	BSL
1330207	Xylenes	7.8E-01	2.0E+00	µg/kg	37SB3B	2/9	0.455 - 0.69	2.0E+00	N	1.6E+06	2.0E+07	N	BSL
	VOC TICs (µg/kg)												
95636	1,2,4-Trimethylbenzene	3.6E+00	3.6E+00	µg/kg	37SB3B	1/9	0 - 0	3.6E+00	--	--	--	Y	NSV
352207	1,3-Dimethyl-,trans-cyclohexane	5.7E+00	5.7E+00	µg/kg	37SB3B	1/9	0 - 0	5.7E+00	--	--	--	Y	NSV
108678	1,3,5-Trimethylbenzene	1.8E+00	1.8E+00	µg/kg	37SB3B	1/9	0 - 0	1.8E+00	--	--	--	Y	NSV
115117	2-Methyl-1-Propene	8.4E+00	8.4E+00	µg/kg	37SB2C	1/9	0 - 0	8.4E+00	--	--	--	Y	NSV
1678917	Ethyl-cyclohexane	6.4E+00	6.4E+00	µg/kg	37SB3B	1/9	0 - 0	6.4E+00	--	--	--	Y	NSV
592278	Heptane, 2-methyl-	6.5E+00	6.5E+00	µg/kg	37SB3B	1/9	0 - 0	6.5E+00	--	--	--	Y	NSV
111842	Nonane	5.1E+00	5.1E+00	µg/kg	37SB3B	1/9	0 - 0	5.1E+00	--	--	--	Y	NSV
111659	Octane	8.3E+00	8.3E+00	µg/kg	37SB3B	1/9	0 - 0	8.3E+00	--	--	--	Y	NSV
	TCL SVOCs (µg/kg)												
121142	2,4-Dinitrotoluene	2.6E+02	1.8E+03	µg/kg	37SB2A	2/9	3.15 - 75.6	1.8E+03	N	1.6E+04	2.0E+05	N	BSL
--	Dinitrotoluene Mix	2.6E+02	1.8E+03	µg/kg	37SB2A	2/9	0 - 0	1.8E+03	--	9.4E+02	4.2E+03	Y	**ARES**
59507	4-Chloro-3-Methylphenol	1.2E+01	2.4E+01	µg/kg	37SB1B	6/9	5.21 - 125	2.4E+01	--	--	--	Y	NSV
117817	Bis(2-ethylhexyl)phthalate	4.1E+01	1.0E+03	µg/kg	37SB2A	9/9	2.07 - 49.7	1.0E+03	C	4.6E+04	2.0E+05	N	BSL
84662	Diethylphthalate	1.1E+01	1.2E+02	µg/kg	37SB2A	7/9	1.9 - 45.6	1.2E+02	N	6.3E+06	8.2E+07	N	BSL
131113	Dimethylphthalate	3.0E+01	3.0E+01	µg/kg	37SB1B	1/9	3.31 - 79.4	3.0E+01	--	--	--	Y	NSV
84742	Di-n-butylphthalate	1.8E+01	2.6E+04	µg/kg	37SB2A	9/9	3.82 - 91.7	2.6E+04	N	7.8E+05	1.0E+07	N	BSL
117840	Di-n-octylphthalate	3.8E+01	3.8E+01	µg/kg	37SB3B	1/9	3.1 - 74.4	3.8E+01	--	--	--	Y	NSV
206440	Fluoranthene	1.2E+02	1.9E+02	µg/kg	37SB2A	2/9	2.35 - 56.4	1.9E+02	N	3.1E+05	4.1E+06	N	BSL
86306	N-Nitrosodiphenylamine	3.0E+02	4.5E+02	µg/kg	37SB1A	2/9	4.75 - 114	4.5E+02	C	1.3E+05	5.8E+05	N	BSL
85018	Phenanthrene[5]	4.0E+01	4.0E+01	µg/kg	37SB1A	1/9	2.3 - 55.2	4.0E+01	N	2.3E+05	3.1E+06	N	BSL
129000	Pyrene	1.1E+02	1.1E+02	µg/kg	37SB1A	2/9	1.48 - 35.5	1.1E+02	N	2.3E+05	3.1E+06	N	BSL

Table 5-6
HHRS COPC Selection (Total Soil) for SWMU 37
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	C/N	Adjusted RBC Residential	Adjusted RBC Industrial	COPC Flag (Y/N)	Rationale for Selection or Deletion
	SVOC TICs (µg/kg)												
301020	(Z)-9-Octadecenamide	4.5E+01	1.2E+02	µg/kg	37SB3B	7/9	0 - 0	1.2E+02	--	--	--	Y	NSV
84695	1,2-Benzenedicarboxylicacid, bis(2-methy	2.4E+01	4.5E+01	µg/kg	37SB1B	5/9	0 - 0	4.5E+01	--	--	--	Y	NSV
17851535	1,2-Benzenedicarboxylic acid, butyl 2-me	2.1E+01	2.1E+01	µg/kg	37SB3A	1/9	0 - 0	2.1E+01	--	--	--	Y	NSV
89189	1,2-Benzenedicarboxylic acid, butyl 8-me	2.8E+02	2.8E+02	µg/kg	37SB1A	1/9	0 - 0	2.8E+02	--	--	--	Y	NSV
84640	1,2-Benzenedicarboxylic acid, butyl cycl	2.6E+01	2.6E+01	µg/kg	37SB3B	1/9	0 - 0	2.6E+01	--	--	--	Y	NSV
497234	2 (5H)-Furanone	3.2E+02	3.2E+02	µg/kg	37SB1A	1/9	0 - 0	3.2E+02	--	--	--	Y	NSV
104767	2-Ethyl-1-Hexanol	2.5E+01	2.5E+01	µg/kg	37SB1C	1/9	0 - 0	2.5E+01	--	--	--	Y	NSV
101371	2,4,6-Triallyloxy-1,3,5-triazine	6.7E+01	1.0E+02	µg/kg	37SB1B	4/9	0 - 0	1.0E+02	--	--	--	Y	NSV
4436753	3-Hexene-2,5-dione	2.0E+02	4.0E+02	µg/kg	37SB2A	2/9	0 - 0	4.0E+02	--	--	--	Y	NSV
1000143924	7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,	2.5E+01	3.9E+01	µg/kg	37SB1C	4/9	0 - 0	3.9E+01	--	--	--	Y	NSV
112845	Erucylamide	1.5E+02	4.5E+02	µg/kg	37SB3C	3/9	0 - 0	4.5E+02	--	--	--	Y	NSV
111068	Hexadecanoic acid, butylester	2.8E+01	2.8E+01	µg/kg	37SB1C	1/9	0 - 0	2.8E+01	--	--	--	Y	NSV
646139	Octadecanoic acid, 2-methylpropyl ester	3.0E+01	3.0E+01	µg/kg	37SB1C	1/9	0 - 0	3.0E+01	--	--	--	Y	NSV
7098228	Tetratetracontane	2.7E+01	2.7E+01	µg/kg	37SB3A	1/9	0 - 0	2.7E+01	--	--	--	Y	NSV
	PAHs (µg/kg)												
120127	Anthracene	2.4E+00	2.4E+00	µg/kg	37SB2A	1/9	0.77 - 1.15	2.4E+00	N	2.3E+06	3.1E+07	N	BSL
205992	Benzo(b)fluoranthene	7.6E+00	7.6E+00	µg/kg	37SB2A	1/9	1.43 - 2.13	7.6E+00	C	2.2E+02	3.9E+03	N	BSL
207089	Benzo(k)fluoranthene	5.5E+00	5.5E+00	µg/kg	37SB2A	1/9	1.1 - 1.64	5.5E+00	C	2.2E+03	3.9E+04	N	BSL
218019	Chrysene	1.2E+01	1.2E+01	µg/kg	37SB2A	1/9	1.32 - 1.97	1.2E+01	C	2.2E+04	3.9E+05	N	BSL
206440	Fluoranthene	2.2E+00	7.3E+01	µg/kg	37SB1A	3/9	1.87 - 2.79	7.3E+01	N	3.1E+05	4.1E+06	N	BSL
193395	Indeno(1,2,3-cd)pyrene	8.1E+00	8.1E+00	µg/kg	37SB2A	1/9	0.77 - 1.15	8.1E+00	C	2.2E+02	3.9E+03	N	BSL
85018	Phenanthrene[5]	1.5E+01	1.8E+01	µg/kg	37SB2A	2/9	0.66 - 0.984	1.8E+01	N	2.3E+05	3.1E+06	N	BSL
129000	Pyrene	1.2E+00	5.9E+01	µg/kg	37SB2A	4/9	0.99 - 1.48	5.9E+01	N	2.3E+05	3.1E+06	N	BSL
	Explosives (mg/kg)												
121142	2,4-Dinitrotoluene	2.7E-01	6.3E-01	mg/kg	37SB2A	2/9	0.142 - 0.142	6.3E-01	N	1.6E+01	2.0E+02	N	BSL
	Cyanide (mg/kg)												
57125	Cyanide	4.0E-02	8.0E-01	mg/kg	37SB1A	5/9	0.0356 - 0.0356	8.0E-01	N	1.6E+02	2.0E+03	N	BSL

Notes:

CAS = Chemical Abstracts Service
COPC = Chemical of Potential Concern
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyl
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
PAH = Polynuclear Aromatic Compound
TIC = Tentatively Identified Compound
[1] = Chromium VI RBC value was used
[2] = Lead criteria are Action Levels; see USEPA Region III guidance
[3] = Mercuric chloride soil RBC value used
[4] = Noncarcinogenic Residential RBC value for Aroclor 1254 was used for screening
[5] = RBC value for pyrene was used for these compounds

DUP AVG = results for duplicate samples averaged
RBC = USEPA Region III Risk-Based Concentration
(RBC) values from the October 31, 2006,
RBC Table and October 10, 2006, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
C = Carcinogenic per EPA RBC Table (October 2006)
N = Noncarcinogenic per EPA RBC Table (October 2006)

ARES = Above Residential RBC
ARES/IND = Above Residential RBC/Industrial RBC
BSL = Below Residential/Industrial RBC Screening Levels
NSV = No Screening Value Available

Table 5-7
HHRS COPC Selection (Surface Soil) for SWMU 38
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	C/N	Adjusted RBC Residential	Adjusted RBC Industrial	COPC Flag (Y/N)	Rationale for Selection or Deletion
	TAL Metals (mg/kg)												
7429905	Aluminum	11,100	26,400	mg/kg	38SB3A	3/3	1.83 - 9.15	26,400	--	--	--	Y	NSV
7440360	Antimony	0.26	0.31	mg/kg	38SB1A	2/3	0.0518 - 0.0518	0.31	N	3.13	40.9	N	BSL
7440382	Arsenic	0.8	4.6	mg/kg	38SB3A	3/3	0.0232 - 0.0232	4.6	C	0.43	1.91	Y	***ARES/IND***
7440393	Barium	94	116	mg/kg	38SB3A	3/3	0.106 - 0.106	116	N	1,564	20,440	N	BSL
7440417	Beryllium	0.6	0.91	mg/kg	38SB3A	3/3	0.0391 - 0.0391	0.91	N	15.6	204	N	BSL
7440439	Cadmium	1.40	1.9	mg/kg	38SB3A	3/3	0.182 - 0.182	1.9	N	3.91	51	N	BSL
7440702	Calcium	1,150	27,600	mg/kg	38SB1A	3/3	16.6 - 16.6	27,600	--	Nutrient	Nutrient	N	Nutrient
7440473	Chromium[1]	17	82	mg/kg	38SB3A	3/3	0.912 - 0.912	82.0	N	23.5	307	Y	**ARES**
7440484	Cobalt	7.9	9.8	mg/kg	38SB3A	3/3	0.208 - 0.208	9.8	--	--	--	Y	NSV
7440508	Copper	7.2	85	mg/kg	38SB3A	3/3	0.368 - 0.368	85	N	313	4,088	N	BSL
7439896	Iron	16,600	30,700	mg/kg	38SB3A	3/3	10.6 - 21.2	30,700	N	2,346	30,660	Y	***ARES/IND***
7439921	Lead[2]	10	52	mg/kg	38SB1A	3/3	0.0218 - 0.218	52	--	400	750	N	BSL
7439954	Magnesium	2,840	5,590	mg/kg	38SB3A	3/3	3.21 - 3.21	5,590	--	Nutrient	Nutrient	N	Nutrient
7439965	Manganese	400	414	mg/kg	38SB2A	3/3	0.264 - 0.264	414	N	156	2,044	Y	**ARES**
7439976	Mercury[3]	0.01	0.16	mg/kg	38SB1A	3/3	0.0077 - 0.0077	0.16	--	0.78	10.22	N	BSL
7440020	Nickel	11	35	mg/kg	38SB3A	3/3	0.0356 - 0.0356	35	N	156	2,044	N	BSL
7440097	Potassium	1,600	2,410	mg/kg	38SB3A	3/3	5 - 5	2,410	--	Nutrient	Nutrient	N	Nutrient
7782492	Selenium	0.55	0.64	mg/kg	38SB3A	3/3	0.0502 - 0.0502	0.64	N	39.11	511	N	BSL
7440224	Silver	0.06	0.14	mg/kg	38SB3A	3/3	0.0044 - 0.0044	0.14	N	39.11	511	N	BSL
7440235	Sodium	38	55	mg/kg	38SB1A	3/3	8.92 - 8.92	55	--	Nutrient	Nutrient	N	Nutrient
7440280	Thallium	0.15	0.19	mg/kg	38SB3A	3/3	0.027 - 0.027	0.19	N	0.55	7.15	N	BSL
7440622	Vanadium	24	42	mg/kg	38SB3A	3/3	0.207 - 0.207	42	N	7.82	102	Y	**ARES**
7440666	Zinc	55	100	mg/kg	38SB3A	3/3	0.517 - 0.517	100	N	2,346	30,660	N	BSL
	TCL Pesticides/PCBs (µg/kg)												
11097691	Aroclor 1254[4]	5.7E+02	5.7E+02	µg/kg	38SB1A	1/1	4.2 - 4.2	5.7E+02	C	1.6E+02	1.4E+03	Y	**ARES**
	TCL VOCs (µg/kg)												
78933	2-Butanone	2.6E+01	2.6E+01	µg/kg	38SB2A	1/3	5.8 - 8.9	2.6E+01	N	4.7E+06	6.1E+07	N	BSL
67641	Acetone	1.0E+02	2.0E+02	µg/kg	38SB2A	3/3	5.8 - 8.9	2.0E+02	N	7.0E+06	9.2E+07	N	BSL
108883	Toluene	3.0E+00	3.0E+00	µg/kg	38SB2A	1/3	0.538 - 0.826	3.0E+00	N	6.3E+05	8.2E+06	N	BSL
	VOC TICs (µg/kg)												
99876	4-Isopropyltoluene	4.4E+00	4.4E+00	µg/kg	38SB2A	1/3	0 - 0	4.4E+00	--	--	--	Y	NSV
471841	7,7-Dimethyl-2-methylene-bicyclo[2.2.1]h	1.1E+01	1.1E+01	µg/kg	38SB2A	1/3	0 - 0	1.1E+01	--	--	--	Y	NSV
79925	Camphene	1.0E+01	1.3E+01	µg/kg	38SB2A	2/3	0 - 0	1.3E+01	--	--	--	Y	NSV
66251	Hexanal	8.8E+00	8.8E+00	µg/kg	38SB1A	1/3	0 - 0	8.8E+00	--	--	--	Y	NSV
	TCL SVOCs (µg/kg)												
121142	2,4-Dinitrotoluene	1.2E+02	1.2E+02	µg/kg	38SB1A	1/3	3.78 - 56.7	1.2E+02	N	1.6E+04	2.0E+05	N	BSL
--	Dinitrotoluene Mix	1.2E+02	1.2E+02	µg/kg	38SB1A	1/3	0 - 0	1.2E+02	C	9.4E+02	4.2E+03	N	BSL
59507	4-Chloro-3-Methylphenol	2.5E+01	2.5E+01	µg/kg	38SB2A	1/3	6.25 - 93.8	2.5E+01	--	--	--	Y	NSV
117817	Bis(2-ethylhexyl)phthalate	4.6E+01	1.3E+03	µg/kg	38SB3A	3/3	2.48 - 37.3	1.3E+03	C	4.6E+04	2.0E+05	N	BSL
85687	Butylbenzylphthalate	5.2E+01	5.2E+01	µg/kg	38SB2A	1/3	5.38 - 80.6	5.2E+01	N	1.6E+06	2.0E+07	N	BSL
84662	Diethylphthalate	4.0E+00	4.0E+00	µg/kg	38SB2A	1/3	2.28 - 34.2	4.0E+00	N	6.3E+06	8.2E+07	N	BSL
84742	Di-n-butylphthalate	4.2E+01	1.4E+04	µg/kg	38SB1A	3/3	4.58 - 68.8	1.4E+04	N	7.8E+05	1.0E+07	N	BSL
206440	Fluoranthene	8.0E+01	1.7E+02	µg/kg	38SB3A	2/3	2.82 - 42.3	1.7E+02	N	3.1E+05	4.1E+06	N	BSL
86306	N-Nitrosodiphenylamine	1.5E+02	1.6E+02	µg/kg	38SB3A	2/3	5.7 - 85.5	1.6E+02	C	1.3E+05	5.8E+05	N	BSL
85018	Phenanthrene[5]	4.0E+01	1.1E+02	µg/kg	38SB3A	2/3	2.76 - 41.4	1.1E+02	N	2.3E+05	3.1E+06	N	BSL
129000	Pyrene	5.0E+01	9.0E+01	µg/kg	38SB3A	2/3	1.78 - 26.6	9.0E+01	N	2.3E+05	3.1E+06	N	BSL

Table 5-7
HHRS COPC Selection (Surface Soil) for SWMU 38
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	C/N	Adjusted RBC Residential	Adjusted RBC Industrial	COPC Flag (Y/N)	Rationale for Selection or Deletion
	SVOC TICs (µg/kg)												
301020	(Z)-9-Octadecenamide	1.6E+02	1.6E+02	µg/kg	38SB2A	1/3	0 - 0	1.6E+02	--	--	--	Y	NSV
84695	1,2-Benzenedicarboxylicacid, bis(2-methy	4.5E+01	4.5E+01	µg/kg	38SB2A	1/3	0 - 0	4.5E+01	--	--	--	Y	NSV
1740198	1,2,3,4,4a,9,10,10a-Octa-1-phenanthrene	2.9E+02	2.9E+02	µg/kg	38SB2A	1/3	0 - 0	2.9E+02	--	--	--	Y	NSV
62951966	1,5,9-Undecatriene, 2,6,10-trimethyl-, (	4.8E+01	4.8E+01	µg/kg	38SB2A	1/3	0 - 0	4.8E+01	--	--	--	Y	NSV
497234	2 (5H)-Furanone	7.2E+01	7.2E+01	µg/kg	38SB3A	1/3	0 - 0	7.2E+01	--	--	--	Y	NSV
101371	2,4,6-Triallyloxy-1,3,5-triazine	8.6E+01	8.6E+01	µg/kg	38SB2A	1/3	0 - 0	8.6E+01	--	--	--	Y	NSV
1E+09	13-Tertadecen-1-ol acetate	1.3E+02	1.3E+02	µg/kg	38SB2A	1/3	0 - 0	1.3E+02	--	--	--	Y	NSV
2437958	Bicyclo[3.1.1]hept-2-ene,2,6,6-trimethyl	1.3E+02	1.3E+02	µg/kg	38SB2A	1/3	0 - 0	1.3E+02	--	--	--	Y	NSV
295170	Cyclotetradecane	5.5E+01	5.5E+01	µg/kg	38SB2A	1/3	0 - 0	5.5E+01	--	--	--	Y	NSV
112845	Erucylamide	5.7E+02	5.7E+02	µg/kg	38SB2A	1/3	0 - 0	5.7E+02	--	--	--	Y	NSV
629947	Heneicosane	7.2E+01	7.2E+01	µg/kg	38SB2A	1/3	0 - 0	7.2E+01	--	--	--	Y	NSV
57114	Stearic Acid	1.0E+02	1.0E+02	µg/kg	38SB2A	1/3	0 - 0	1.0E+02	--	--	--	Y	NSV
	PAHs (µg/kg)												
120127	Anthracene	6.6E+00	1.3E+01	µg/kg	38SB3A	2/3	0.84 - 1.26	1.3E+01	N	2.3E+06	3.1E+07	N	BSL
56553	Benzo(a)anthracene	8.2E+01	8.2E+01	µg/kg	38SB3A	1/3	0.96 - 1.44	8.2E+01	C	2.2E+02	3.9E+03	N	BSL
205992	Benzo(b)fluoranthene	1.5E+01	2.3E+01	µg/kg	38SB1A	2/3	1.56 - 2.34	2.3E+01	C	2.2E+02	3.9E+03	N	BSL
207089	Benzo(k)fluoranthene	7.5E+00	7.5E+00	µg/kg	38SB3A	1/3	1.2 - 1.8	7.5E+00	C	2.2E+03	3.9E+04	N	BSL
218019	Chrysene	2.8E+01	2.9E+01	µg/kg	38SB1A	2/3	1.44 - 2.16	2.9E+01	C	2.2E+04	3.9E+05	N	BSL
206440	Fluoranthene	1.1E+02	1.8E+02	µg/kg	38SB3A	2/3	2.04 - 3.06	1.8E+02	N	3.1E+05	4.1E+06	N	BSL
86737	Fluorene	4.6E+00	8.9E+00	µg/kg	38SB3A	2/3	1.56 - 2.34	8.9E+00	N	3.1E+05	4.1E+06	N	BSL
85018	Phenanthrene[5]	4.6E+01	1.0E+02	µg/kg	38SB3A	2/3	0.72 - 1.08	1.0E+02	N	2.3E+05	3.1E+06	N	BSL
129000	Pyrene	5.6E+01	9.8E+01	µg/kg	38SB3A	2/3	1.08 - 1.62	9.8E+01	N	2.3E+05	3.1E+06	N	BSL
	Cyanide (mg/kg)												
57125	Cyanide	3.0E-01	5.7E-01	mg.kg	38SB3A	2/3	0.0356 - 0.0356	5.7E-01	N	1.6E+02	2.0E+03	N	BSL

Notes:

CAS = Chemical Abstracts Service
COPC = Chemical of Potential Concern
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyls
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
PAH = Polynuclear Aromatic Compound
TIC = Tentatively Identified Compound
[1] = Chromium VI RBC value was used
[2] = Lead criteria are Action Levels; see USEPA Region III guidance
[3] = Mercuric chloride soil RBC value used
[4] = Noncarcinogenic Residential RBC value for Aroclor 1254 was used for screening
[5] = RBC value for pyrene was used for these compounds

DUP AVG = results for duplicate samples averaged
RBC = USEPA Region III Risk-Based Concentration
(RBC) values from the October 31, 2006,
RBC Table and October 10, 2006, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
C = Carcinogenic per EPA RBC Table (October 2006)
N = Noncarcinogenic per EPA RBC Table (October 2006)

ARES = Above Residential RBC
ARES/IND = Above Residential RBC/Industrial RBC
BSL = Below Residential/Industrial RBC Screening Levels
NSV = No Screening Value Available

Table 5-8
HHRS COPC Selection (Total Soil) for SWMU 38
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	C/N	Adjusted RBC Residential	Adjusted RBC Industrial	COPC Flag (Y/N)	Rationale for Selection or Deletion
	TAL Metals (mg/kg)												
7429905	Aluminum	10,600	26,400	mg/kg	38SB3A	9/9	1.83 - 9.15	26,400	--	--	--	Y	NSV
7440360	Antimony	0.26	0.31	mg/kg	38SB1A	2/9	0.0518 - 0.0518	0.31	N	3.13	40.88	N	BSL
7440382	Arsenic	0.8	4.6	mg/kg	38SB3A	9/9	0.0232 - 0.0232	5	C	0.43	1.91	Y	***ARES/IND***
7440393	Barium	83	138	mg/kg	38SB3B	9/9	0.106 - 0.106	138	N	1,564	20,440	N	BSL
7440417	Beryllium	0.43	0.93	mg/kg	38SB3B	9/9	0.0391 - 0.0391	0.93	N	16	204	N	BSL
7440439	Cadmium	1.30	1.90	mg/kg	38SB1C	9/9	0.182 - 0.182	1.90	N	3.91	51	N	BSL
7440702	Calcium	1,150	27,600	mg/kg	38SB1A	9/9	16.6 - 16.6	27,600	--	Nutrient	Nutrient	N	Nutrient
7440473	Chromium[1]	17	82	mg/kg	38SB3A	9/9	0.912 - 0.912	82	N	23.5	307	Y	**ARES**
7440484	Cobalt	7.90	13	mg/kg	38SB1B	9/9	0.208 - 0.208	13	--	--	--	Y	NSV
7440508	Copper	7.20	85	mg/kg	38SB3A	9/9	0.368 - 0.368	85	N	313	4,088	N	BSL
7439896	Iron	16,600	32,200	mg/kg	38SB1B	9/9	10.6 - 21.2	32,200	N	2,346	30,660	Y	***ARES/IND***
7439921	Lead[2]	7.30	52	mg/kg	38SB1A	9/9	0.0218 - 0.218	52	--	400	750	N	BSL
7439954	Magnesium	2,840	8,240	mg/kg	38SB1C	9/9	3.21 - 3.21	8,240	--	Nutrient	Nutrient	N	Nutrient
7439965	Manganese	375	478	mg/kg	38SB3C	9/9	0.264 - 0.264	478	N	156	2,044	Y	**ARES**
7439976	Mercury[3]	0.01	0.16	mg/kg	38SB1A	8/9	0.0077 - 0.0077	0.16	--	0.8	10	N	BSL
7440020	Nickel	11.00	35.00	mg/kg	38SB3A	9/9	0.0356 - 0.0356	35	N	156.43	2,044	N	BSL
7440097	Potassium	1,520	2,410	mg/kg	38SB3A	9/9	5 - 5	2,410	--	Nutrient	Nutrient	N	Nutrient
7782492	Selenium	0.43	0.78	mg/kg	38SB3B	9/9	0.0502 - 0.0502	0.78	N	39.1	511	N	BSL
7440224	Silver	0.05	0.14	mg/kg	38SB3A	9/9	0.0044 - 0.0044	0.14	N	39.1	511	N	BSL
7440235	Sodium	38	55	mg/kg	38SB1A	9/9	8.92 - 8.92	55	--	Nutrient	Nutrient	N	Nutrient
7440280	Thallium	0.12	0.25	mg/kg	38SB1B	9/9	0.027 - 0.027	0.25	N	0.55	7.15	N	BSL
7440622	Vanadium	24	50	mg/kg	38SB1B	9/9	0.207 - 0.207	50	N	7.82	102	Y	**ARES**
7440666	Zinc	47	100	mg/kg	38SB3A	9/9	0.517 - 0.517	100	N	2,346	30,660	N	BSL
	TCL Pesticides/PCBs (µg/kg)												
11097691	Aroclor 1254[4]	5.7E+02	5.7E+02	µg/kg	38SB1A	1/1	4.2 - 4.2	5.7E+02	C	1.6E+02	1.4E+03	Y	**ARES**
	TCL VOCs (µg/kg)												
78933	2-Butanone	2.0E+01	2.8E+01	µg/kg	38SB3C	5/9	5.4 - 8.9	2.8E+01	N	4.7E+06	6.1E+07	N	BSL
67641	Acetone	2.8E+01	2.0E+02	µg/kg	38SB2A	9/9	5.4 - 8.9	2.0E+02	N	7.0E+06	9.2E+07	N	BSL
156592	cis-1,2-Dichloroethene	9.7E+00	9.7E+00	µg/kg	38SB2B-AVG DUP	1/9	0.767 - 1.26	9.7E+00	N	7.8E+04	1.0E+06	N	BSL
108883	Toluene	4.8E-01	3.0E+00	µg/kg	38SB2A	2/9	0.501 - 0.826	3.0E+00	N	6.3E+05	8.2E+06	N	BSL
	VOC TICs (µg/kg)												
99876	4-Isopropyltoluene	4.4E+00	4.4E+00	µg/kg	38SB2A	1/9	0 - 0	4.4E+00	--	--	--	Y	NSV
471841	7,7-Dimethyl-2-methylene-bicyclo[2.2.1]h	1.1E+01	1.1E+01	µg/kg	38SB2A	1/9	0 - 0	1.1E+01	--	--	--	Y	NSV
79925	Camphene	1.0E+01	1.3E+01	µg/kg	38SB2A	2/9	0 - 0	1.3E+01	--	--	--	Y	NSV
66251	Hexanal	5.6E+00	8.8E+00	µg/kg	38SB1A	2/9	0 - 0	8.8E+00	--	--	--	Y	NSV
	TCL SVOCs (µg/kg)												
121142	2,4-Dinitrotoluene	1.2E+02	1.2E+02	µg/kg	38SB1A	1/9	3.47 - 56.7	1.2E+02	N	1.6E+04	2.0E+05	N	BSL
--	Dinitrotoluene Mix	1.2E+02	1.2E+02	µg/kg	38SB1A	1/9	0 - 0	1.2E+02	C	9.4E+02	4.2E+03	N	BSL
59507	4-Chloro-3-Methylphenol	1.3E+01	2.5E+01	µg/kg	38SB2A	6/9	5.73 - 93.8	2.5E+01	--	--	--	Y	NSV
117817	Bis(2-ethylhexyl)phthalate	4.6E+01	1.3E+03	µg/kg	38SB3A	9/9	2.28 - 37.3	1.3E+03	C	4.6E+04	2.0E+05	N	BSL
85687	Butylbenzylphthalate	4.1E+01	5.2E+01	µg/kg	38SB2A	2/9	4.93 - 80.6	5.2E+01	N	1.6E+06	2.0E+07	N	BSL
105602	Caprolactam	5.7E+01	1.3E+02	µg/kg	38SB3C	3/9	7.02 - 115	1.3E+02	N	3.9E+06	5.1E+07	N	BSL
84662	Diethylphthalate	3.0E+00	6.0E+00	µg/kg	38SB1B	7/9	2.09 - 34.2	6.0E+00	N	6.3E+06	8.2E+07	N	BSL
84742	Di-n-butylphthalate	2.3E+01	1.4E+04	µg/kg	38SB1A	9/9	4.2 - 68.8	1.4E+04	N	7.8E+05	1.0E+07	N	BSL
206440	Fluoranthene	9.0E+00	1.7E+02	µg/kg	38SB3A	3/9	2.59 - 42.3	1.7E+02	N	3.1E+05	4.1E+06	N	BSL
86306	N-Nitrosodiphenylamine	1.7E+01	1.6E+02	µg/kg	38SB3A	3/9	5.23 - 85.5	1.6E+02	C	1.3E+05	5.8E+05	N	BSL
85018	Phenanthrene[5]	7.0E+00	1.1E+02	µg/kg	38SB3A	3/9	2.53 - 41.4	1.1E+02	N	2.3E+05	3.1E+06	N	BSL
129000	Pyrene	5.0E+00	9.0E+01	µg/kg	38SB3A	3/9	1.63 - 26.6	9.0E+01	N	2.3E+05	3.1E+06	N	BSL
	SVOC TICs (µg/kg)												
629969	(M) 1-Eicosanol	4.7E+01	4.7E+01	µg/kg	38SB2B-AVG DUP	1/9	0 - 0	4.7E+01	--	--	--	Y	NSV
301020	(Z)-9-Octadecenamide	3.2E+01	1.6E+02	µg/kg	38SB2A	4/9	0 - 0	1.6E+02	--	--	--	Y	NSV
506525	1-HEXACOSANOL	6.3E+01	6.3E+01	µg/kg	38SB2B-AVG DUP	1/9	0 - 0	6.3E+01	--	--	--	Y	NSV
84695	1,2-Benzenedicarboxylicacid, bis(2-methy	3.1E+01	5.0E+01	µg/kg	38SB1B	6/9	0 - 0	5.0E+01	--	--	--	Y	NSV
1740198	1,2,3,4,4a,9,10,10a-Octa-1-phenanthrene	2.9E+02	2.9E+02	µg/kg	38SB2A	1/9	0 - 0	2.9E+02	--	--	--	Y	NSV
62951966	1,5,9-Undecatriene, 2,6,10-trimethyl-, (	4.8E+01	4.8E+01	µg/kg	38SB2A	1/9	0 - 0	4.8E+01	--	--	--	Y	NSV

Table 5-8
HHRS COPC Selection (Total Soil) for SWMU 38
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	C/N	Adjusted RBC Residential	Adjusted RBC Industrial	COPC Flag (Y/N)	Rationale for Selection or Deletion
497234	2 (5H)-Furanone	7.2E+01	7.2E+01	µg/kg	38SB3A	1/9	0 - 0	7.2E+01	--	--	--	Y	NSV
104767	2-Ethyl-1-Hexanol	2.3E+01	5.2E+01	µg/kg	38SB2C	2/9	0 - 0	5.2E+01	--	--	--	Y	NSV
101371	2,4,6-Triallyloxy-1,3,5-triazine	7.0E+01	8.7E+01	µg/kg	38SB1B	4/9	0 - 0	8.7E+01	--	--	--	Y	NSV
1000130798	13-Tertadecen-1-ol acetate	1.3E+02	1.3E+02	µg/kg	38SB2A	1/9	0 - 0	1.3E+02	--	--	--	Y	NSV
2437958	Bicyclo[3.1.1]hept-2-ene,2,6,6-trimethyl	1.3E+02	1.3E+02	µg/kg	38SB2A	1/9	0 - 0	1.3E+02	--	--	--	Y	NSV
295170	Cyclotetradecane	5.5E+01	5.5E+01	µg/kg	38SB2A	1/9	0 - 0	5.5E+01	--	--	--	Y	NSV
112845	Erucylamide	5.1E+02	6.3E+02	µg/kg	38SB2C	4/9	0 - 0	6.3E+02	--	--	--	Y	NSV
629947	Heneicosane	7.2E+01	7.2E+01	µg/kg	38SB2A	1/9	0 - 0	7.2E+01	--	--	--	Y	NSV
57114	Stearic Acid	1.0E+02	1.2E+02	µg/kg	38SB3C	2/9	0 - 0	1.2E+02	--	--	--	Y	NSV
	PAHs (µg/kg)												
120127	Anthracene	6.6E+00	1.3E+01	µg/kg	38SB3A	2/9	0.77 - 1.26	1.3E+01	N	2.3E+06	3.1E+07	N	BSL
56553	Benzo(a)anthracene	8.2E+01	8.2E+01	µg/kg	38SB3A	1/9	0.88 - 1.44	8.2E+01	C	2.2E+02	3.9E+03	N	BSL
205992	Benzo(b)fluoranthene	1.5E+01	2.3E+01	µg/kg	38SB1A	2/9	1.43 - 2.34	2.3E+01	C	2.2E+02	3.9E+03	N	BSL
207089	Benzo(k)fluoranthene	7.5E+00	7.5E+00	µg/kg	38SB3A	1/9	1.1 - 1.8	7.5E+00	C	2.2E+03	3.9E+04	N	BSL
218019	Chrysene	2.8E+01	2.9E+01	µg/kg	38SB1A	2/9	1.32 - 2.16	2.9E+01	C	2.2E+04	3.9E+05	N	BSL
206440	Fluoranthene	1.1E+02	1.8E+02	µg/kg	38SB3A	2/9	1.87 - 3.06	1.8E+02	N	3.1E+05	4.1E+06	N	BSL
86737	Fluorene	4.6E+00	8.9E+00	µg/kg	38SB3A	2/9	1.43 - 2.34	8.9E+00	N	3.1E+05	4.1E+06	N	BSL
85018	Phenanthrene[5]	4.6E+01	1.0E+02	µg/kg	38SB3A	2/9	0.66 - 1.08	1.0E+02	N	2.3E+05	3.1E+06	N	BSL
129000	Pyrene	5.6E+01	9.8E+01	µg/kg	38SB3A	2/9	0.99 - 1.62	9.8E+01	N	2.3E+05	3.1E+06	N	BSL
	Cyanide (mg/kg)												
57125	Cyanide	3.0E-02	5.7E-01	mg/kg	38SB3A	7/9	0.0356 - 0.0356	5.7E-01	N	1.6E+02	2.0E+03	N	BSL

Notes:

CAS = Chemical Abstracts Service
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SVOC = Semivolatile Organic Compound
PAH = Polynuclear Aromatic Compound
TIC = Tentatively Identified Compound
[1] = Chromium VI RBC value was used
[2] = Lead criteria are Action Levels; see USEPA Region III guidance
[3] = Mercuric chloride soil RBC value used
[4] = Noncarcinogenic Residential RBC value for Aroclor 1254 was used for screening
[5] = RBC value for pyrene was used for these compounds

DUP AVG = results for duplicate samples averaged
RBC = USEPA Region III Risk-Based Concentration
(RBC) values from the October 31, 2006,
RBC Table and October 10, 2006, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
C = Carcinogenic per EPA RBC Table (October 2006)
N = Noncarcinogenic per EPA RBC Table (October 2006)

ARES = Above Residential RBC
ARES/IND = Above Residential RBC/Industrial RBC
BSL = Below Residential/Industrial RBC Screening Levels
NSV = No Screening Value Available

Table 5-9
HHRS COPC Selection (Surface Soil) for AOC Q
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	C/N	Adjusted RBC Residential	Adjusted RBC Industrial	COPC Flag (Y/N)	Rationale for Selection or Deletion
	TAL Metals (mg/kg)												
7429905	Aluminum	7,820	14,500	mg/kg	QSB3A	3/3	45.8 - 91.5	14,500	--	--	--	Y	NSV
7440360	Antimony	0.13	0.195	mg/kg	QSB1A-AVG DUP	3/3	0.0518 - 0.0518	0.195	N	3.13	40.9	N	BSL
7440382	Arsenic	0.64	1.4	mg/kg	QSB1A-AVG DUP	3/3	0.0232 - 0.0232	1.4	C	0.43	1.91	Y	**ARES**
7440393	Barium	96	137	mg/kg	QSB3A	3/3	0.106 - 0.53	137	N	1,564	20,440	N	BSL
7440417	Beryllium	0.58	0.89	mg/kg	QSB3A	3/3	0.0391 - 0.0391	0.89	N	16	204	N	BSL
7440439	Cadmium	0.95	1.6	mg/kg	QSB3A	3/3	0.182 - 0.182	1.6	N	3.91	51	N	BSL
7440702	Calcium	943	25,600	mg/kg	QSB3A	3/3	16.6 - 166	25,600	--	Nutrient	Nutrient	N	Nutrient
7440473	Chromium[1]	12	19	mg/kg	QSB1A-AVG DUP	3/3	0.912 - 0.912	19	N	23.5	306.6	N	BSL
7440484	Cobalt	5.9	8.4	mg/kg	QSB3A	3/3	0.208 - 0.208	8.4	--	--	--	Y	NSV
7440508	Copper	6	12	mg/kg	QSB3A	3/3	0.368 - 0.368	12	N	313	4,088	N	BSL
7439896	Iron	12,700	20,600	mg/kg	QSB3A	3/3	106 - 212	20,600	N	2,346	30,660	Y	**ARES**
7439921	Lead[2]	9.6	24	mg/kg	QSB1A-AVG DUP	3/3	0.0218 - 0.0218	24	--	400	750	N	BSL
7439954	Magnesium	2,220	3,380	mg/kg	QSB3A	3/3	6.05 - 16.05	3,380	--	Nutrient	Nutrient	N	Nutrient
7439965	Manganese	319	511	mg/kg	QSB3A	3/3	1.32 - 2.64	511	N	156	2,044	Y	**ARES**
7439976	Mercury[3]	0.019	0.02	mg/kg	QSB1A-AVG DUP	2/3	0.0077 - 0.0077	0.02	--	0.78	10.22	N	BSL
7440020	Nickel	8.5	15	mg/kg	QSB3A	3/3	0.0356 - 0.0356	15	N	156	2,044	N	BSL
7440097	Potassium	1,070	1,995	mg/kg	QSB1A-AVG DUP	3/3	25 - 25	1,995	--	Nutrient	Nutrient	N	Nutrient
7782492	Selenium	0.35	0.67	mg/kg	QSB3A	3/3	0.0502 - 0.0502	0.67	N	39.1	511	N	BSL
7440224	Silver	0.036	0.071	mg/kg	QSB1A-AVG DUP	3/3	0.0044 - 0.0044	0.07	N	39.1	511	N	BSL
7440235	Sodium	60	65	mg/kg	QSB1A-AVG DUP	3/3	8.92 - 8.92	65	--	Nutrient	Nutrient	N	Nutrient
7440280	Thallium	0.1	0.16	mg/kg	QSB3A	3/3	0.027 - 0.027	0.16	N	0.55	7.15	N	BSL
7440622	Vanadium	17	28	mg/kg	QSB3A	3/3	0.207 - 0.207	28	N	7.82	102	Y	**ARES**
7440666	Zinc	58	65	mg/kg	QSB3A	3/3	0.517 - 0.517	65	N	2,346	30,660	N	BSL
	TCL Pesticides/PCBs (µg/kg)												
11097691	Aroclor 1254 [4]	5.2E+01	5.2E+01	µg/kg	QSB1A-AVG DUP	1/1	3.6 - 3.6	5.2E+01	C	1.6E+02	1.4E+03	N	BSL
	TCL VOCs (µg/kg)												
78933	2-Butanone	2.3E+01	2.4E+01	µg/kg	QSB1A-AVG DUP	2/3	5.9 - 6.4	2.4E+01	N	4.7E+06	6.1E+07	N	BSL
67641	Acetone	4.2E+01	8.4E+01	µg/kg	QSB1A-AVG DUP	3/3	5.9 - 6.4	8.4E+01	N	7.0E+06	9.2E+07	N	BSL
110827	Cyclohexane	5.6E-01	5.6E-01	µg/kg	QSB1A-AVG DUP	1/3	0.373 - 0.404	5.6E-01	--	--	--	Y	NSV
100414	Ethylbenzene	5.2E-01	5.2E-01	µg/kg	QSB1A-AVG DUP	1/3	0.499 - 0.541	5.2E-01	N	7.8E+05	1.0E+07	N	BSL
108872	Methylcyclohexane	2.4E+00	2.4E+00	µg/kg	QSB1A-AVG DUP	1/3	0.997 - 1.08	2.4E+00	--	--	--	Y	NSV
75092	Methylene chloride	4.5E+00	6.8E+00	µg/kg	QSB3A	3/3	3.32 - 3.6	6.8E+00	C	8.5E+04	3.8E+05	N	BSL
1330207	Xylenes	2.2E+00	2.2E+00	µg/kg	QSB1A-AVG DUP	1/3	0.497 - 0.539	2.2E+00	N	1.6E+06	2.0E+07	N	BSL
	VOC TICs (µg/kg)												
95636	1,2,4-Trimethylbenzene	2.7E+00	2.7E+00	µg/kg	QSB1A-AVG DUP	1/3	0 - 0	2.7E+00	--	--	--	Y	NSV
591764	2-Methyl-hexane	8.4E+00	8.4E+00	µg/kg	QSB1A-AVG DUP	1/3	0 - 0	8.4E+00	--	--	--	Y	NSV
589344	3-Methyl-hexane	7.0E+00	7.0E+00	µg/kg	QSB1A-AVG DUP	1/3	0 - 0	7.0E+00	--	--	--	Y	NSV
66251	Hexanal	1.1E+01	1.1E+01	µg/kg	QSB1A-AVG DUP	1/3	0 - 0	1.1E+01	--	--	--	Y	NSV
110543	Hexane	1.4E+01	1.4E+01	µg/kg	QSB1A-AVG DUP	1/3	0 - 0	1.4E+01	--	--	--	Y	NSV
107835	Pentane, 2-methyl-	1.1E+01	1.1E+01	µg/kg	QSB1A-AVG DUP	1/3	0 - 0	1.1E+01	--	--	--	Y	NSV
16747323	Pentane, 3-ethyl-2,2-dimethyl-	5.7E+00	5.7E+00	µg/kg	QSB1A-AVG DUP	1/3	0 - 0	5.7E+00	--	--	--	Y	NSV
	TCL SVOCs (µg/kg)												
121142	2,4-Dinitrotoluene	9.9E+01	1.2E+02	µg/kg	QSB3A	2/3	3.78 - 4.1	1.2E+02	N	1.6E+04	2.0E+05	N	BSL
--	Dinitrotoluene Mix	9.9E+01	1.2E+02	µg/kg	QSB3A	2/3	0 - 0	1.2E+02	C	9.4E+02	4.2E+03	N	BSL
59507	4-Chloro-3-Methylphenol	1.1E+01	1.5E+01	µg/kg	QSB2A	2/3	6.25 - 6.77	1.5E+01	--	--	--	Y	NSV
117817	Bis(2-ethylhexyl)phthalate	4.6E+01	2.9E+02	µg/kg	QSB3A	3/3	2.48 - 2.69	2.9E+02	C	4.6E+04	2.0E+05	N	BSL
85687	Butylbenzylphthalate	4.4E+01	4.4E+01	µg/kg	QSB3A	1/3	5.38 - 5.82	4.4E+01	N	1.6E+06	2.0E+07	N	BSL
84662	Diethylphthalate	1.4E+01	1.9E+01	µg/kg	QSB1A-AVG DUP	3/3	2.28 - 2.47	1.9E+01	N	6.3E+06	8.2E+07	N	BSL
84742	Di-n-butylphthalate	2.6E+01	1.7E+03	µg/kg	QSB3A	3/3	2.82 - 4.97	1.7E+03	N	7.8E+05	1.0E+07	N	BSL
206440	Fluoranthene	2.8E+00	8.0E+00	µg/kg	QSB3A	2/3	2.82 - 5.7	8.0E+00	N	3.1E+05	4.1E+06	N	BSL
86306	N-Nitrosodiphenylamine	1.9E+01	3.2E+01	µg/kg	QSB3A	2/3	2.76 - 6.18	3.2E+01	C	1.3E+05	5.8E+05	N	BSL
85018	Phenanthrene[5]	3.0E+00	3.0E+00	µg/kg	QSB3A	1/3	2.76 - 4.75	3.0E+00	N	2.3E+05	3.1E+06	N	BSL
129000	Pyrene	2.5E+00	4.0E+00	µg/kg	QSB3A	2/3	1.78 - 1.92	4.0E+00	N	2.3E+05	3.1E+06	N	BSL

Table 5-9
HHRS COPC Selection (Surface Soil) for AOC Q
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	C/N	Adjusted RBC Residential	Adjusted RBC Industrial	COPC Flag (Y/N)	Rationale for Selection or Deletion
	SVOC TICs(µg/kg)												
301020	(Z)-9-Octadecenamide	3.0E+02	3.0E+02	µg/kg	QSB2A	1/3	0 - 0	3.0E+02	--	--	--	Y	NSV
7785708	1R-.alpha.-Pinene	7.0E+01	7.0E+01	µg/kg	QSB2A	1/3	0 - 0	7.0E+01	--	--	--	Y	NSV
1235741	1-Phenanthrenecarboxylicacid, 1,2,3,4,4a	1.2E+02	1.2E+02	µg/kg	QSB2A	1/3	0 - 0	1.2E+02	--	--	--	Y	NSV
84695	1,2-Benzenedicarboxylicacid, bis(2-methy	2.8E+01	3.0E+01	µg/kg	QSB1A-AVG DUP	2/3	0 - 0	3.0E+01	--	--	--	Y	NSV
497234	2 (5H)-Furanone	6.3E+01	6.3E+01	µg/kg	QSB1A-AVG DUP	1/3	0 - 0	6.3E+01	--	--	--	Y	NSV
22610806	2-Cyclopenten-1-one, 3-methyl-2-(1,3-pen	2.3E+01	2.3E+01	µg/kg	QSB3A	1/3	0 - 0	2.3E+01	--	--	--	Y	NSV
403190	2-Fluoro-4-nitrophenol	2.5E+01	2.5E+01	µg/kg	QSB1A-AVG DUP	1/3	0 - 0	2.5E+01	--	--	--	Y	NSV
502692	2-Pentadecanone, 6,10,14-trimethyl-	4.0E+01	4.0E+01	µg/kg	QSB1A-AVG DUP	1/3	0 - 0	4.0E+01	--	--	--	Y	NSV
1000143924	7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,	2.2E+01	2.4E+01	µg/kg	QSB1A-AVG DUP	2/3	0 - 0	2.4E+01	--	--	--	Y	NSV
80568	a-Pinene	2.3E+02	2.3E+02	µg/kg	QSB2A	1/3	0 - 0	2.3E+02	--	--	--	Y	NSV
127913	beta-Pinene	3.5E+01	3.5E+01	µg/kg	QSB2A	1/3	0 - 0	3.5E+01	--	--	--	Y	NSV
544854	Ditriacontane	2.4E+01	2.4E+01	µg/kg	QSB2A	1/3	0 - 0	2.4E+01	--	--	--	Y	NSV
1000163047	Docosa-2,6,10,14,18-pentaen-22-al,2,6,10	4.7E+01	4.7E+01	µg/kg	QSB2A	1/3	0 - 0	4.7E+01	--	--	--	Y	NSV
629970	Docosane	2.3E+02	2.3E+02	µg/kg	QSB3A	1/3	0 - 0	2.3E+02	--	--	--	Y	NSV
112958	Eicosane	2.8E+01	1.8E+02	µg/kg	QSB3A	2/3	0 - 0	1.8E+02	--	--	--	Y	NSV
630046	Hentriacontane	2.2E+02	2.2E+02	µg/kg	QSB1A-AVG DUP	1/3	0 - 0	2.2E+02	--	--	--	Y	NSV
630024	Octacosane	4.1E+02	4.1E+02	µg/kg	QSB3A	1/3	0 - 0	4.1E+02	--	--	--	Y	NSV
14167590	Tetratriacontane	2.9E+01	2.9E+01	µg/kg	QSB2A	1/3	0 - 0	2.9E+01	--	--	--	Y	NSV
	PAHs (µg/kg)												
206440	Fluoranthene	6.4E+00	7.8E+00	µg/kg	QSB1A-AVG DUP	2/3	2.04 - 2.21	7.8E+00	N	3.1E+05	4.1E+06	N	BSL
85018	Phenanthrene[5]	1.6E+00	1.6E+00	µg/kg	QSB1A-AVG DUP	1/3	0.72 - 0.78	1.6E+00	N	2.3E+05	3.1E+06	N	BSL
129000	Pyrene	3.0E+00	3.8E+00	µg/kg	QSB1A-AVG DUP	2/3	1.08 - 1.17	3.8E+00	N	2.3E+05	3.1E+06	N	BSL
	Explosives (mg/kg)												
121142	2,4-Dinitrotoluene	2.6E-01	2.6E-01	mg/kg	QSB1A-AVG DUP	1/3	0.142 - 0.142	2.6E-01	N	1.6E+01	2.0E+02	N	BSL
--	Dinitrotoluene Mix	2.6E-01	2.6E-01	mg/kg	QSB1A-AVG DUP	1/3	0 - 0	2.6E-01	C	9.4E-01	4.2E+00	N	BSL
	Cyanide (mg/kg)												
57125	Cyanide	1.1E+00	2.2E+00	mg/kg	QSB3A	2/3	0.0356 - 0.0356	2.2E+00	N	1.6E+02	2.0E+03	N	BSL

Notes:

CAS = Chemical Abstracts Service
COPC = Chemical of Potential Concern
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyls
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
PAH = Polynuclear Aromatic Compound
TIC = Tentatively Identified Compound
[1] = Chromium VI RBC value was used
[2] = Lead criteria are Action Levels; see USEPA Region III guidance
[3] = Mercuric chloride soil RBC value used
[4] = Noncarcinogenic Residential RBC value for Aroclor 1254 was used for screening
[5] = RBC value for pyrene was used for these compounds

DUP AVG = results for duplicate samples averaged
RBC = USEPA Region III Risk-Based Concentration (RBC) values from the October 31, 2006, RBC Table and October 10, 2006, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
C = Carcinogenic per EPA RBC Table (October 2006)
N = Noncarcinogenic per EPA RBC Table (October 2006)

ARES = Above Residential RBC
ARES/IND = Above Residential RBC/Industrial RBC
BSL = Below Residential/Industrial RBC Screening Levels
NSV = No Screening Value Available

Table 5-10
HHRS COPC Selection (Total Soil) for AOC Q
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	RBC Residential	C/N	Adjusted RBC Residential	Adjusted RBC Industrial	COPC Flag (Y/N)	Rationale for Selection or Deletion
	TAL Metals (mg/kg)												
7429905	Aluminum	3,360	14,500	mg/kg	QSB3A	9/9	18.3 - 91.5	14,500	--	--	--	Y	NSV
7440360	Antimony	0.11	0.28	mg/kg	QSB2B	9/9	0.0518 - 0.0518	0.28	N	3.13	40.9	N	BSL
7440382	Arsenic	0.54	1.4	mg/kg	QSB1A-AVG DUP	9/9	0.0232 - 0.0232	1.4	C	0.43	1.91	Y	**ARES**
7440393	Barium	27	137	mg/kg	QSB3A	9/9	0.106 - 0.53	137	N	1,564	20,440	N	BSL
7440417	Beryllium	0.18	0.89	mg/kg	QSB3A	9/9	0.0391 - 0.0391	0.89	N	15.64	204	N	BSL
7440439	Cadmium	0.88	1.6	mg/kg	QSB2B	9/9	0.182 - 0.182	1.60	N	3.91	51	N	BSL
7440702	Calcium	622	25,600	mg/kg	QSB3A	9/9	16.6 - 166	25,600	--	Nutrient	Nutrient	N	Nutrient
7440473	Chromium[1]	6	19	mg/kg	QSB1A-AVG DUP	9/9	0.912 - 0.912	19	N	23.5	306.6	N	BSL
7440484	Cobalt	3.30	8.4	mg/kg	QSB2B	9/9	0.208 - 0.208	8.4	--	--	--	Y	NSV
7440508	Copper	1.50	12	mg/kg	QSB3A	9/9	0.368 - 0.368	12	N	313	4,088	N	BSL
7439896	Iron	6,530	20,600	mg/kg	QSB3A	9/9	42.4 - 212	20,600	N	2,346	30,660	Y	**ARES**
7439921	Lead[2]	2.60	24	mg/kg	QSB1A-AVG DUP	9/9	0.0218 - 0.0218	24	--	400	750	N	BSL
7439954	Magnesium	855	3,380	mg/kg	QSB3A	9/9	3.21 - 16.05	3,380	--	Nutrient	Nutrient	N	Nutrient
7439965	Manganese	81	511	mg/kg	QSB3A	9/9	0.264 - 2.64	511	N	156	2,044	Y	**ARES**
7439976	Mercury[3]	0.019	0.02	mg/kg	QSB1A-AVG DUP	2/9	0.0077 - 0.0077	0.02	--	0.78	10.22	N	BSL
7440020	Nickel	4.4	15.00	mg/kg	QSB3A	9/9	0.0356 - 0.0356	15	N	156	2,044	N	BSL
7440097	Potassium	439	1,995	mg/kg	QSB1A-AVG DUP	9/9	5 - 25	1,995	--	Nutrient	Nutrient	N	Nutrient
7782492	Selenium	0.24	0.67	mg/kg	QSB3A	9/9	0.0502 - 0.0502	0.67	N	39.1	511	N	BSL
7440224	Silver	0.026	0.071	mg/kg	QSB1A-AVG DUP	9/9	0.0044 - 0.0044	0.07	N	39.1	511	N	BSL
7440235	Sodium	31	67	mg/kg	QSB2B	9/9	8.92 - 8.92	67	--	Nutrient	Nutrient	N	Nutrient
7440280	Thallium	0.04	0.16	mg/kg	QSB3A	9/9	0.027 - 0.027	0.16	N	0.55	7.15	N	BSL
7440622	Vanadium	8.3	30	mg/kg	QSB2B	9/9	0.207 - 0.207	30	N	7.8	102	Y	**ARES**
7440666	Zinc	17	65	mg/kg	QSB3A	9/9	0.517 - 0.517	65	N	2,346	30,660	N	BSL
	TCL Pesticides/PCBs (µg/kg)												
11097691	Aroclor 1254 [4]	5.2E+01	5.2E+01	µg/kg	QSB1A-AVG DUP	1/1	3.6 - 3.6	5.2E+01	C	1.6E+02	1.4E+03	N	BSL
	TCL VOCs (µg/kg)												
78933	2-Butanone	1.7E+01	2.4E+01	µg/kg	QSB1A-AVG DUP	3/9	5.4 - 6.4	2.4E+01	N	4.7E+06	6.1E+07	N	BSL
67641	Acetone	1.8E+01	8.4E+01	µg/kg	QSB1A-AVG DUP	9/9	5.4 - 6.4	8.4E+01	N	7.0E+06	9.2E+07	N	BSL
110827	Cyclohexane	5.6E-01	5.6E-01	µg/kg	QSB1A-AVG DUP	1/9	0.341 - 0.404	5.6E-01	--	--	--	Y	NSV
100414	Ethylbenzene	5.2E-01	5.2E-01	µg/kg	QSB1A-AVG DUP	1/9	0.457 - 0.541	5.2E-01	N	7.8E+05	1.0E+07	N	BSL
108872	Methylcyclohexane	2.4E+00	2.4E+00	µg/kg	QSB1A-AVG DUP	1/9	0.913 - 1.08	2.4E+00	--	--	--	Y	NSV
75092	Methylene chloride	4.0E+00	6.8E+00	µg/kg	QSB3A	9/9	3.03 - 3.6	6.8E+00	C	8.5E+04	3.8E+05	N	BSL
108883	Toluene	6.5E-01	6.5E-01	µg/kg	QSB2B	1/9	0.501 - 0.594	6.5E-01	N	6.3E+05	8.2E+06	N	BSL
1330207	Xylenes	2.2E+00	2.2E+00	µg/kg	QSB1A-AVG DUP	1/9	0.455 - 0.539	2.2E+00	N	1.6E+06	2.0E+07	N	BSL
	VOC TICs (µg/kg)												
95636	1,2,4-Trimethylbenzene	2.7E+00	2.7E+00	µg/kg	QSB1A-AVG DUP	1/9	0 - 0	2.7E+00	--	--	--	Y	NSV
591764	2-Methyl-hexane	8.4E+00	8.4E+00	µg/kg	QSB1A-AVG DUP	1/9	0 - 0	8.4E+00	--	--	--	Y	NSV
589344	3-Methyl-hexane	7.0E+00	7.0E+00	µg/kg	QSB1A-AVG DUP	1/9	0 - 0	7.0E+00	--	--	--	Y	NSV
66251	Hexanal	1.1E+01	1.1E+01	µg/kg	QSB1A-AVG DUP	1/9	0 - 0	1.1E+01	--	--	--	Y	NSV
110543	Hexane	1.4E+01	1.4E+01	µg/kg	QSB1A-AVG DUP	1/9	0 - 0	1.4E+01	--	--	--	Y	NSV
107835	Pentane, 2-methyl-	1.1E+01	1.1E+01	µg/kg	QSB1A-AVG DUP	1/9	0 - 0	1.1E+01	--	--	--	Y	NSV
16747323	Pentane, 3-ethyl-2,2-dimethyl-	5.7E+00	5.7E+00	µg/kg	QSB1A-AVG DUP	1/9	0 - 0	5.7E+00	--	--	--	Y	NSV
	TCL SVOCs (µg/kg)											N	
121142	2,4-Dinitrotoluene	9.9E+01	1.2E+02	µg/kg	QSB3A	2/9	3.47 - 4.1	1.2E+02	N	1.6E+04	2.0E+05	N	BSL
--	Dinitrotoluene Mix	9.9E+01	1.2E+02	µg/kg	QSB3A	2/9	0 - 0	1.2E+02	C	9.4E+02	4.2E+03	N	BSL
59507	4-Chloro-3-Methylphenol	9.0E+00	2.9E+01	µg/kg	QSB1B	8/9	5.73 - 6.77	2.9E+01	--	--	--	Y	NSV
117817	Bis(2-ethylhexyl)phthalate	4.2E+01	2.9E+02	µg/kg	QSB3A	9/9	2.28 - 2.69	2.9E+02	C	4.6E+04	2.0E+05	N	BSL
85687	Butylbenzylphthalate	4.4E+01	4.4E+01	µg/kg	QSB3A	1/9	4.93 - 5.82	4.4E+01	N	1.6E+06	2.0E+07	N	BSL
84662	Diethylphthalate	1.1E+01	1.9E+01	µg/kg	QSB1A-AVG DUP	9/9	2.09 - 2.47	1.9E+01	N	6.3E+06	8.2E+07	N	BSL
84742	Di-n-butylphthalate	2.3E+01	1.7E+03	µg/kg	QSB3A	9/9	2.82 - 4.97	1.7E+03	N	7.8E+05	1.0E+07	N	BSL
206440	Fluoranthene	2.8E+00	8.0E+00	µg/kg	QSB3A	2/9	2.59 - 5.7	8.0E+00	N	3.1E+05	4.1E+06	N	BSL
86306	N-Nitrosodiphenylamine	1.9E+01	3.2E+01	µg/kg	QSB3A	2/9	2.76 - 6.18	3.2E+01	C	1.3E+05	5.8E+05	N	BSL
85018	Phenanthrene[5]	3.0E+00	3.0E+00	µg/kg	QSB3A	1/9	2.53 - 4.75	3.0E+00	N	2.3E+05	3.1E+06	N	BSL
129000	Pyrene	2.5E+00	4.0E+00	µg/kg	QSB3A	2/9	1.63 - 1.92	4.0E+00	N	2.3E+05	3.1E+06	N	BSL
	SVOC TICs(µg/kg)												
301020	(Z)-9-Octadecenamide	6.2E+01	3.0E+02	µg/kg	QSB2A	6/9	0 - 0	3.0E+02	--	--	--	Y	NSV
7785708	1R-.alpha.-Pinene	7.0E+01	7.0E+01	µg/kg	QSB2A	1/9	0 - 0	7.0E+01	--	--	--	Y	NSV
1235741	1-Phenanthrenecarboxylicacid, 1,2,3,4,4a	1.2E+02	1.2E+02	µg/kg	QSB2A	1/9	0 - 0	1.2E+02	--	--	--	Y	NSV
84695	1,2-Benzenedicarboxylicacid, bis(2-methy	2.8E+01	5.1E+01	µg/kg	QSB1B	8/9	0 - 0	5.1E+01	--	--	--	Y	NSV
497234	2 (5H)-Furanone	6.3E+01	6.3E+01	µg/kg	QSB1A-AVG DUP	1/9	0 - 0	6.3E+01	--	--	--	Y	NSV

Table 5-10
HHRS COPC Selection (Total Soil) for AOC Q
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	RBC Residential	C/N	Adjusted RBC Residential	Adjusted RBC Industrial	COPC Flag (Y/N)	Rationale for Selection or Deletion
22610806	2-Cyclopenten-1-one, 3-methyl-2-(1,3-pen	2.3E+01	2.3E+01	µg/kg	QSB3A	1/9	0 - 0	2.3E+01	--	--	--	Y	NSV
104767	2-Ethyl-1-Hexanol	2.1E+01	2.7E+01	µg/kg	QSB1B	3/9	0 - 0	2.7E+01	--	--	--	Y	NSV
403190	2-Fluoro-4-nitrophenol	2.5E+01	2.5E+01	µg/kg	QSB1A-AVG DUP	1/9	0 - 0	2.5E+01	--	--	--	Y	NSV
502692	2-Pentadecanone, 6,10,14-trimethyl-	4.0E+01	4.0E+01	µg/kg	QSB1A-AVG DUP	1/9	0 - 0	4.0E+01	--	--	--	Y	NSV
101371	2,4,6-Triallyloxy-1,3,5-triazine	6.7E+01	7.0E+01	µg/kg	QSB3C	2/9	0 - 0	7.0E+01	--	--	--	Y	NSV
4602840	2,6,10-Dodecatriene-1-ol,3,7,11-trimethy	4.0E+01	4.0E+01	µg/kg	QSB3B	1/9	0 - 0	4.0E+01	--	--	--	Y	NSV
4128170	2,6,10-Dodecatrien-1-ol,3,7,11-trimethyl	4.0E+01	4.0E+01	µg/kg	QSB2C	1/9	0 - 0	4.0E+01	--	--	--	Y	NSV
111024	2,6,10,14,18,22-Tetracosahexaene,2,6,10,	5.5E+01	5.5E+01	µg/kg	QSB1C	1/9	0 - 0	5.5E+01	--	--	--	Y	NSV
4436753	3-Hexene-2,5-dione	8.5E+01	2.1E+02	µg/kg	QSB1B	2/9	0 - 0	2.1E+02	--	--	--	Y	NSV
90949534	7-Nonenamide	7.7E+01	7.7E+01	µg/kg	QSB2B	1/9	0 - 0	7.7E+01	--	--	--	Y	NSV
1000143924	7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,	1.9E+01	4.2E+01	µg/kg	QSB1B	8/9	0 - 0	4.2E+01	--	--	--	Y	NSV
56862625	10-Methylnonadecane	2.7E+01	2.7E+01	µg/kg	QSB2B	1/9	0 - 0	2.7E+01	--	--	--	Y	NSV
80568	a-Pinene	2.3E+02	2.3E+02	µg/kg	QSB2A	1/9	0 - 0	2.3E+02	--	--	--	Y	NSV
127913	beta-Pinene	3.5E+01	3.5E+01	µg/kg	QSB2A	1/9	0 - 0	3.5E+01	--	--	--	Y	NSV
544854	Ditriacontane	2.3E+01	2.4E+01	µg/kg	QSB2A	2/9	0 - 0	2.4E+01	--	--	--	Y	NSV
1000163047	Docosa-2,6,10,14,18-pentaen-22-al,2,6,10	4.7E+01	4.9E+01	µg/kg	QSB2B	2/9	0 - 0	4.9E+01	--	--	--	Y	NSV
629970	Docosane	3.2E+01	2.3E+02	µg/kg	QSB3A	3/9	0 - 0	2.3E+02	--	--	--	Y	NSV
112958	Eicosane	2.7E+01	1.8E+02	µg/kg	QSB3A	4/9	0 - 0	1.8E+02	--	--	--	Y	NSV
112845	Erucylamide	3.1E+02	5.4E+02	µg/kg	QSB1B	5/9	0 - 0	5.4E+02	--	--	--	Y	NSV
629947	Heneicosane	2.1E+01	3.9E+01	µg/kg	QSB1C	6/9	0 - 0	3.9E+01	--	--	--	Y	NSV
630046	Hentriacontane	2.2E+02	2.2E+02	µg/kg	QSB1A-AVG DUP	1/9	0 - 0	2.2E+02	--	--	--	Y	NSV
593497	Heptacosane	3.1E+01	3.1E+01	µg/kg	QSB1C	1/9	0 - 0	3.1E+01	--	--	--	Y	NSV
629787	Heptadecane	2.4E+01	2.4E+01	µg/kg	QSB2C	1/9	0 - 0	2.4E+01	--	--	--	Y	NSV
7225641	Heptadecane, 9-octyl-	3.6E+01	3.6E+01	µg/kg	QSB2B	1/9	0 - 0	3.6E+01	--	--	--	Y	NSV
630068	Hexatriacontane	2.7E+01	4.2E+01	µg/kg	QSB1B	2/9	0 - 0	4.2E+01	--	--	--	Y	NSV
13287246	Nonadecane, 9-methyl-	2.3E+01	4.5E+01	µg/kg	QSB1C	2/9	0 - 0	4.5E+01	--	--	--	Y	NSV
630024	Octacosane	3.6E+01	4.1E+02	µg/kg	QSB3A	4/9	0 - 0	4.1E+02	--	--	--	Y	NSV
55282127	Octadecane, 3-ethyl-5-(2-ethylbutyl)-	2.9E+01	2.9E+01	µg/kg	QSB1B	1/9	0 - 0	2.9E+01	--	--	--	Y	NSV
14167590	Tetratriacontane	2.9E+01	4.2E+01	µg/kg	QSB2B	5/9	0 - 0	4.2E+01	--	--	--	Y	NSV
	PAHs (µg/kg)												
206440	Fluoranthene	6.4E+00	7.8E+00	µg/kg	QSB1A-AVG DUP	2/9	1.87 - 2.21	7.8E+00	N	3.1E+05	4.1E+06	N	BSL
85018	Phenanthrene[5]	1.6E+00	1.6E+00	µg/kg	QSB1A-AVG DUP	1/9	0.66 - 0.78	1.6E+00	N	2.3E+05	3.1E+06	N	BSL
129000	Pyrene	3.0E+00	3.8E+00	µg/kg	QSB1A-AVG DUP	2/9	0.99 - 1.17	3.8E+00	N	2.3E+05	3.1E+06	N	BSL
	Explosives (mg/kg)												
121142	2,4-Dinitrotoluene	2.6E-01	2.6E-01	mg/kg	QSB1A-AVG DUP	1/9	0.142 - 0.142	2.6E-01	N	1.6E+01	2.0E+02	N	BSL
--	Dinitrotoluene Mix	2.6E-01	2.6E-01	mg.kg	QSB1A-AVG DUP	1/9	0 - 0	2.6E-01	C	9.4E+02	4.2E+03	N	BSL
	Cyanide (mg/kg)												
57125	Cyanide	4.0E-02	2.2E+00	mg/kg	QSB3A	4/9	0.0356 - 0.0356	2.2E+00	N	1.6E+02	2.0E+03	N	BSL

Notes:

CAS = Chemical Abstracts Service
COPC = Chemical of Potential Concern
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyls
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
PAH = Polynuclear Aromatic Compound
TIC = Tentatively Identified Compound
[1] = Chromium VI RBC value was used
[2] = Lead criteria are Action Levels; see USEPA Region III guidance
[3] = Mercuric chloride soil RBC value used
[4] = Noncarcinogenic Residential RBC value for Aroclor 1254 was used for screening
[5] = RBC value for pyrene was used for these compounds

DUP AVG = results for duplicate samples averaged
RBC = USEPA Region III Risk-Based Concentration
(RBC) values from the October 31, 2006,
RBC Table and October 10, 2006, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
C = Carcinogenic per EPA RBC Table (October 2006)
N = Noncarcinogenic per EPA RBC Table (October 2006)

ARES = Above Residential RBC
ARES/IND = Above Residential RBC/Industrial RBC
BSL = Below Residential/Industrial RBC Screening Levels
NSV = No Screening Value Available

Table 5-11
Cumulative HHRS for SWMU 37 (Surface Soil)
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Units	MDC	C/N	RBC Residential	RBC Industrial	Non Carcinogenic HI (RBC_{Res})	Excess Cancer Risk (RBC_{Res})	Non Carcinogenic HI (RBC_{Ind})	Excess Cancer Risk (RBC_{Ind})
	TAL Metals									
7429905	Aluminum	mg/kg	1.70E+04	--	--	--	--	--	--	--
7440382	Arsenic	mg/kg	5.00E+00	C	4.26E-01	1.91E+00	--	1.E-05	--	3.E-06
7440382	Arsenic	mg/kg	5.00E+00	N	2.35E+01	3.07E+02	2.E-01	--	2.E-02	--
7440473	Chromium[1]	mg/kg	1.14E+02	N	2.35E+02	3.07E+03	5.E-01	--	4.E-02	--
7440484	Cobalt	mg/kg	5.60E+00	--	--	--	--	--	--	--
7439896	Iron	mg/kg	1.95E+04	N	2.35E+04	3.07E+05	8.E-01	--	6.E-02	--
7439965	Manganese	mg/kg	4.03E+02	N	1.56E+03	2.04E+04	3.E-01	--	2.E-02	--
7440622	Vanadium	mg/kg	2.10E+01	N	7.82E+01	1.02E+03	3.E-01	--	2.E-02	--
	TCL Pesticides/PCBs (µg/kg)								--	
11097691	Aroclor 1254 [2]	µg/kg	1.80E+02	C	3.20E+02	1.43E+03	--	6.E-07	--	1.E-07
11097691	Aroclor 1254 [2]	µg/kg	1.80E+02	N	1.56E+03	2.00E+04	1.E-01	--	9.E-03	--
	TCL SVOCs								--	
59507	4-Chloro-3-Methylphenol	µg/kg	1.20E+01	--	--	--	--	--	--	--
121142	2,4-Dinitrotoluene	µg/kg	1.80E+03	N	1.56E+05	2.04E+06	1.E-02	--	9.E-04	--
--	Dinitrotoluene Mix	µg/kg	1.80E+03	C	9.40E+02	4.20E+03	--	2.E-06	--	5.E-07
	SVOC TICs								--	
301020	(Z)-9-Octadecenamide	µg/kg	4.60E+01	--	--	--	--	--	--	--
17851535	1,2-Benzenedicarboxylic acid, butyl 2-me	µg/kg	2.10E+01	--	--	--	--	--	--	--
89189	1,2-Benzenedicarboxylic acid, butyl 8-me	µg/kg	2.80E+02	--	--	--	--	--	--	--
497234	2 (5H)-Furanone	µg/kg	3.20E+02	--	--	--	--	--	--	--
4436753	3-Hexene-2,5-dione	µg/kg	4.00E+02	--	--	--	--	--	--	--
7098228	Tetratetracontane	µg/kg	2.70E+01	--	--	--	--	--	--	--
						Cumulative Risk	2.E+00	1.E-05	2.E-01	3.E-06

Notes:

CAS = Chemical Abstracts Service
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyl
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
TIC = Tentatively Identified Compound
[1] = Chromium VI RBC value was used
[4] = Noncarcinogenic Residential RBC value for Aroclor 1254 was used for screening

MDC = Maximum Detected Concentration
HI = Hazard Index
RBC = USEPA Region III Risk-Based Concentration
(RBC) values from the October 31, 2006,
RBC Table and October 10, 2006, Alternate RBC Table
C = Carcinogenic per EPA RBC Table (October 2006)
N = Noncarcinogenic per EPA RBC Table (October 2006)

Table 5-12
Exposure Point Concentration Summary for SWMU 37
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Medium:	Total Soil
Exposure Medium:	Total Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic (1)	Rationale (2)
Total Soil	Aluminum	mg/kg	1.41E+04	1.54E+04	1.8E+04	1.54E+04	mg/kg	95% UCL (Student's t)	85% < FOD, Normal
	Arsenic	mg/kg	2.05E+00	3.43E+00	5.0E+00	3.43E+00	mg/kg	95% UCL (Land's)	85% < FOD, Lognormal
	Cobalt	mg/kg	--	--	1.1E+01	1.10E+01	mg/kg	--	--
	Chromium	mg/kg	3.46E+01	5.25E+01	1.1E+02	5.25E+01	mg/kg	95% UCL (Bootstrap)	85% < FOD, Unknown
	Iron	mg/kg	2.14E+04	2.45E+04	2.8E+04	2.45E+04	mg/kg	95% UCL (Student's t)	85% < FOD, Normal
	Manganese	mg/kg	3.35E+02	4.17E+02	5.0E+02	4.17E+02	mg/kg	95% UCL (Student's t)	85% < FOD, Normal
	Vanadium	mg/kg	2.73E+01	3.25E+01	4.3E+01	3.25E+01	mg/kg	95% UCL (Student's t)	85% < FOD, Normal
	DNT Mixture	ug/kg	--	--	1.8E+03	1.80E+03	mg/kg	--	--

Notes:
UCL = Upper Confidence Limit
mg/kg = Milligram Per Kilogram

(1) See Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites (OSWER Directive 9285.6-10, December 2002) for details on the following methods for calculating the 95% UCL:
95% UCL (Bounding) = The frequency of detection is less than 50%; therefore, the 95% UCL is calculated by the bounding method.
95% UCL (Student's t, adj) = The frequency of detection is between 50% and 85%, and the underlying distribution (detects only) is normal; therefore, Aitchison's Method is used to adjust the detects-only mean and standard deviaiton, and the 95% UCL is calculated using the Student's t method.
95% UCL (Land, adj) = The frequency of detection is between 50% and 85%, and the underlying distribution (detects only) is lognormal; therefore, Aitchison's Method is used to adjust the detects-only mean and standard deviation, and the 95% UCL is calculated using Land's method.
95% UCL (Student's t) = The frequency of detection is greater than 85%, and the distribution is normal.; therefore, the 95% UCL is calculated using the Student's t method.
95% UCL (Bootstrap) = The frequency of detection is between 50% and 85% and the underlying distribution (detects only) is neither normal nor lognormal, OR the frequency of detection is greater than 85% and the distribution (with non-detects represented by half of the detection limit) is neither normal nor lognormal; therefore, the 95% UCL is calculated using Hall's bootstrap method.
Maximum: The 95% UCL exceeds the maximum detected concentration; therefore, the maximum detected concentration is used to represent the 95% UCL.

(2) FOD = Frequency of detection
FOD < 50%: Frequency of detection is less than 50%
50% < FOD < 85%, Normal: Frequency of detection is between 50% and 85%, and the underlying distribution (detects only) is normal.
50% < FOD < 85%, Lognormal: Frequency of detection is between 50% and 85%, and the underlying distribution (detects only) is lognormal.
50% < FOD < 85%, Unknown: Frequency of detection is between 50% and 85%, and the underlying distribution (detects only) is neither normal nor lognormal.
85% < FOD, Normal: Frequency of detection is greater than 85%, and the distribution is normal.
85% < FOD, Lognormal: Frequency of detection is greater than 85%, and the distribution is lognormal.
85% < FOD, Unknown: Frequency of detection is greater than 85%, and the distribution is neither normal nor lognormal.

Table 5-13
Cumulative HHRS for SWMU 37 (Total Soil)
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Units	Maximum EPC	C/N	RBC Residential	RBC Industrial	Non Carcinogenic HI (RBC_{Res})	Excess Cancer Risk (RBC_{Res})	Non Carcinogenic HI (RBC_{Ind})	Excess Cancer Risk (RBC_{Ind})
	TAL Metals									
7429905	Aluminum	mg/kg	1.54E+04	--	--	--	--	--	--	--
7440382	Arsenic	mg/kg	3.43E+00	C	4.26E-01	1.91E+00	--	8.E-06	--	2.E-06
7440382	Arsenic	mg/kg	3.43E+00	N	2.35E+01	3.07E+02	1.E-01	--	1.E-02	--
7440484	Cobalt	mg/kg	1.10E+01	--	--	--	--		--	
7440473	Chromium[1]	mg/kg	5.25E+01	N	2.35E+02	3.07E+03	2.E-01	--	2.E-02	--
7439896	Iron	mg/kg	2.45E+04	N	2.35E+04	3.07E+05	1.E+00	--	8.E-02	--
7439965	Manganese	mg/kg	4.17E+02	N	1.56E+03	2.04E+04	3.E-01	--	2.E-02	--
7440622	Vanadium	mg/kg	3.25E+01	N	7.82E+01	1.02E+03	4.E-01	--	3.E-02	--
	TCL Pesticides/PCBs (µg/kg)									
11097691	Aroclor 1254 [4]	µg/kg	1.80E+02	C	3.20E+02	1.43E+03	--	6.E-07	--	1.E-07
11097691	Aroclor 1254 [4]	µg/kg	1.80E+02	N	1.56E+03	2.00E+04	1.E-01	--	9.E-03	--
	TCL VOCs									
108872	Methylcyclohexane	µg/kg	3.00E+00	--	--	--	--	--	--	--
	VOC TICs	µg/kg					--		--	
352207	1,3-Dimethyl-,trans-cyclohexane	µg/kg	5.70E+00	--	--	--	--	--	--	--
115117	2-Methyl-1-Propene	µg/kg	8.40E+00	--	--	--	--	--	--	--
1678917	Ethyl-cyclohexane	µg/kg	6.40E+00	--	--	--	--	--	--	--
592278	Heptane, 2-methyl-	µg/kg	6.50E+00	--	--	--	--	--	--	--
111842	Nonane	µg/kg	5.10E+00	--	--	--	--	--	--	--
111659	Octane	µg/kg	8.30E+00	--	--	--	--	--	--	--
	TCL SVOCs	µg/kg					--		--	
59507	4-Chloro-3-Methylphenol	µg/kg	2.40E+01	--	--	--	--	--	--	--
121142	2,4-Dinitrotoluene	µg/kg	1.80E+03	N	1.56E+05	2.04E+06	1.E-02	--	9.E-04	--
--	Dinitrotoluene Mix	µg/kg	1.80E+03	C	9.40E+02	4.20E+03	--	2.E-06	--	4.E-07
131113	Dimethylphthalate	µg/kg	3.00E+01	--	--	--	--	--	--	--
117840	Di-n-octylphthalate	µg/kg	3.80E+01	--	--	--	--	--	--	--
	SVOC TICs	µg/kg					--		--	
301020	(Z)-9-Octadecenamide	µg/kg	1.20E+02	--	--	--	--	--	--	--
84695	1,2-Benzenedicarboxylicacid, bis(2-methy	µg/kg	4.50E+01	--	--	--	--	--	--	--
17851535	1,2-Benzenedicarboxylic acid, butyl 2-me	µg/kg	2.10E+01	--	--	--	--	--	--	--
89189	1,2-Benzenedicarboxylic acid, butyl 8-me	µg/kg	2.80E+02	--	--	--	--	--	--	--
84640	1,2-Benzenedicarboxylic acid, butyl cycl	µg/kg	2.60E+01	--	--	--	--	--	--	--
497234	2 (5H)-Furanone	µg/kg	3.20E+02	--	--	--	--	--	--	--
104767	2-Ethyl-1-Hexanol	µg/kg	2.50E+01	--	--	--	--	--	--	--
101371	2,4,6-Triallyloxy-1,3,5-triazine	µg/kg	1.00E+02	--	--	--	--	--	--	--
4436753	3-Hexene-2,5-dione	µg/kg	4.00E+02	--	--	--	--	--	--	--
1000143924	7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,	µg/kg	3.90E+01	--	--	--	--	--	--	--
112845	Erucylamide	µg/kg	4.50E+02	--	--	--	--	--	--	--
111068	Hexadecanoic acid, butylester	µg/kg	2.80E+01	--	--	--	--	--	--	--
646139	Octadecanoic acid, 2-methylpropyl ester	µg/kg	3.00E+01	--	--	--	--	--	--	--
7098228	Tetratetracontane	µg/kg	2.70E+01	--	--	--	--	--	--	--
						Cumulative Risk	2.E+00	1.E-05	2.E-01	2.E-06

Notes:

CAS = Chemical Abstracts Service
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyl
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
TIC = Tentatively Identified Compound

[1] = Chromium VI RBC value was used
[4] = Noncarcinogenic Residential RBC value for Aroclor 1254 was used for screening
HI = Hazard Index
EPC = Exposure Point Concentration
RBC = USEPA Region III Risk-Based Concentration
(RBC) values from the October 31, 2006,
RBC Table and October 10, 2006, Alternate RBC Table
C = Carcinogenic per EPA RBC Table (October 2006)
N = Noncarcinogenic per EPA RBC Table (October 2006)

Table 5-14
Cumulative HHRS for SWMU 38 (Surface Soil)
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Units	MDC	C/N	RBC Residential	RBC Industrial	Non Carcinogenic HI (RBC_{Res})	Excess Cancer Risk (RBC_{Res})	Non Carcinogenic HI (RBC_{Ind})	Excess Cancer Risk (RBC_{Ind})
	TAL Metals									
7429905	Aluminum	mg/kg	2.64E+04	--	--	--	--	--	--	--
7440382	Arsenic	mg/kg	4.60E+00	C	4.26E-01	1.91E+00	--	1.E-05	--	2.E-06
7440382	Arsenic	mg/kg	4.60E+00	N	2.35E+01	3.07E+02	2.E-01	--	1.E-02	--
7440473	Chromium[1]	mg/kg	8.20E+01	N	2.35E+02	3.07E+03	3.E-01	--	3.E-02	--
7440484	Cobalt	mg/kg	9.80E+00	--	--	--	--	--	--	--
7439896	Iron	mg/kg	3.07E+04	N	2.35E+04	3.07E+05	1.E+00	--	1.E-01	--
7439965	Manganese	mg/kg	4.14E+02	N	1.56E+03	2.04E+04	3.E-01	--	2.E-02	--
7440622	Vanadium	mg/kg	4.20E+01	N	7.82E+01	1.02E+03	5.E-01	--	4.E-02	--
	TCL Pesticides/PCBs									
11097691	Aroclor 1254 [4]	µg/kg	5.70E+02	C	3.20E+02	1.43E+03	--	2.E-06	--	4.E-07
11097691	Aroclor 1254 [4]	µg/kg	5.70E+02	N	1.56E+03	2.00E+04	4.E-01	--	3.E-02	--
	VOC TICs									
99876	4-Isopropyltoluene	µg/kg	4.40E+00	--	--	--	--	--	--	--
471841	7,7-Dimethyl-2-methylene-bicyclo[2.2.1]h	µg/kg	1.10E+01	--	--	--	--	--	--	--
79925	Camphene	µg/kg	1.30E+01	--	--	--	--	--	--	--
66251	Hexanal	µg/kg	8.80E+00	--	--	--	--	--	--	--
	TCL SVOCs									
59507	4-Chloro-3-Methylphenol	µg/kg	2.50E+01	--	--	--	--	--	--	--
	SVOC TICs									
301020	(Z)-9-Octadecenamide	µg/kg	1.60E+02	--	--	--	--	--	--	--
84695	1,2-Benzenedicarboxylicacid, bis(2-methy	µg/kg	4.50E+01	--	--	--	--	--	--	--
1740198	1,2,3,4,4a,9,10,10a-Octa-1-phenanthrene	µg/kg	2.90E+02	--	--	--	--	--	--	--
62951966	1,5,9-Undecatriene, 2,6,10-trimethyl-, (	µg/kg	4.80E+01	--	--	--	--	--	--	--
497234	2 (5H)-Furanone	µg/kg	7.20E+01	--	--	--	--	--	--	--
101371	2,4,6-Triallyloxy-1,3,5-triazine	µg/kg	8.60E+01	--	--	--	--	--	--	--
1000130798	13-Tertadecen-1-ol acetate	µg/kg	1.30E+02	--	--	--	--	--	--	--
2437958	Bicyclo[3.1.1]hept-2-ene,2,6,6-trimethyl	µg/kg	1.30E+02	--	--	--	--	--	--	--
295170	Cyclotetradecane	µg/kg	5.50E+01	--	--	--	--	--	--	--
112845	Erucylamide	µg/kg	5.70E+02	--	--	--	--	--	--	--
629947	Heneicosane	µg/kg	7.20E+01	--	--	--	--	--	--	--
57114	Stearic Acid	µg/kg	1.00E+02	--	--	--	--	--	--	--
						Cumulative Risk	3.E+00	1.E-05	2.E-01	3.E-06

Notes:

CAS = Chemical Abstracts Service
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyls
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
TIC = Tentatively Identified Compound
[1] = Chromium VI RBC value was used
[4] = Noncarcinogenic Residential RBC value for Aroclor 1254 was used for screening

MDC = Maximum Detected Concentration
HI = Hazard Index
RBC = USEPA Region III Risk-Based Concentration (RBC) values from the October 31, 2006, RBC Table and October 10, 2006, Alternate RBC Table
C = Carcinogenic per EPA RBC Table (October 2006)
N = Noncarcinogenic per EPA RBC Table (October 2006)

Table 5-15
Exposure Point Concentration Summary for SWMU 38
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Medium:	Total Soil
Exposure Medium:	Total Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic (1)	Rationale (2)
Total Soil	Aluminum	mg/kg	1.91E+04	2.23E+04	2.6E+04	2.23E+04	mg/kg	95% UCL (Student's t)	85% < FOD, Normal
	Arsenic	mg/kg	2.11E+00	3.22E+00	4.6E+00	3.22E+00	mg/kg	95% UCL (H-UCL)	85% < FOD, Lognormal
	Chromium	mg/kg	3.53E+01	4.85E+01	8.2E+01	4.85E+01	mg/kg	95% UCL (Bootstrap)	85% < FOD, Unknown
	Cobalt	mg/kg	--	--	1.3E+01	1.30E+01	mg/kg	--	--
	Iron	mg/kg	2.68E+04	3.01E+04	3.2E+04	3.01E+04	mg/kg	95% UCL (Student's t)	85% < FOD, Normal
	Manganese	mg/kg	4.21E+02	4.46E+02	4.8E+02	4.46E+02	mg/kg	95% UCL (Student's t)	85% < FOD, Normal
	Vanadium	mg/kg	3.92E+01	4.52E+01	5.0E+01	4.52E+01	mg/kg	95% UCL (Student's t)	85% < FOD, Normal
	Aroclor 1254	µg/kg	--	--	5.7E+02	5.70E+02	µg/kg	N/A	N/A

Notes:
UCL = Upper Confidence Limit
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram

(1) See Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites (OSWER Directive 9285.6-10, December 2002) for details on the following methods for calculating the 95% UCL:
95% UCL (Bounding) = The frequency of detection is less than 50%; therefore, the 95% UCL is calculated by the bounding method.
95% UCL (Student's t, adj) = The frequency of detection is between 50% and 85%, and the underlying distribution (detects only) is normal; therefore, Aitchison's Method is used to adjust the detects-only mean and standard deviaiton, and the 95% UCL is calculated using the Student's t method.
95% UCL (Land, adj) = The frequency of detection is between 50% and 85%, and the underlying distribution (detects only) is lognormal; therefore, Aitchison's Method is used to adjust the detects-only mean and standard deviation, and the 95% UCL is calculated using Land's method.
95% UCL (Student's t) = The frequency of detection is greater than 85%, and the distribution is normal.; therefore, the 95% UCL is calculated using the Student's t method.
95% UCL (Bootstrap) = The frequency of detection is between 50% and 85% and the underlying distribution (detects only) is neither normal nor lognormal, OR the frequency of detection is greater than 85% and the distribution (with non-detects represented by half of the detection limit) is neither normal nor lognormal; therefore, the 95% UCL is calculated using Hall's bootstrap method.
Maximum: The 95% UCL exceeds the maximum detected concentration; therefore, the maximum detected concentration is used to represent the 95% UCL.

(2) FOD = Frequency of detection
FOD < 50%: Frequency of detection is less than 50%
50% < FOD < 85%, Normal: Frequency of detection is between 50% and 85%, and the underlying distribution (detects only) is normal.
50% < FOD < 85%, Lognormal: Frequency of detection is between 50% and 85%, and the underlying distribution (detects only) is lognormal.
50% < FOD < 85%, Unknown: Frequency of detection is between 50% and 85%, and the underlying distribution (detects only) is neither normal nor lognormal.
85% < FOD, Normal: Frequency of detection is greater than 85%, and the distribution is normal.
85% < FOD, Lognormal: Frequency of detection is greater than 85%, and the distribution is lognormal.
85% < FOD, Unknown: Frequency of detection is greater than 85%, and the distribution is neither normal nor lognormal.

Table 5-16
Cumulative HHRS for SWMU 38 (Total Soil)
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Units	Maximum EPC	C/N	RBC Residential	RBC Industrial	Non Carcinogenic HI (RBC_{Res})	Excess Cancer Risk (RBC_{Res})	Non Carcinogenic HI (RBC_{Ind})	Excess Cancer Risk (RBC_{Ind})
	TAL Metals									
7429905	Aluminum	mg/kg	2.23E+04	--	--	--	--	--	--	--
7440382	Arsenic	mg/kg	3.22E+00	C	4.26E-01	1.91E+00	--	8.E-06	--	2.E-06
7440382	Arsenic	mg/kg	3.22E+00	N	2.35E+01	3.07E+02	1.E-01	--	1.E-02	--
7440473	Chromium[1]	mg/kg	4.85E+01	N	2.35E+02	3.07E+03	2.E-01	--	2.E-02	--
7440484	Cobalt	mg/kg	1.30E+01	--	--	--	--	--	--	--
7439896	Iron	mg/kg	3.01E+04	N	2.35E+04	3.07E+05	1.E+00	--	1.E-01	--
7439965	Manganese	mg/kg	4.46E+02	N	1.56E+03	2.04E+04	3.E-01	--	2.E-02	--
7440622	Vanadium	mg/kg	4.52E+01	N	7.82E+01	1.02E+03	6.E-01	--	4.E-02	--
	TCL Pesticides/PCBs								--	
11097691	Aroclor 1254 [4]	µg/kg	5.70E+02	C	3.20E+02	1.43E+03	--	2.E-06	--	4.E-07
11097691	Aroclor 1254 [4]	µg/kg	5.70E+02	N	1.56E+03	2.00E+04	4.E-01	--	3.E-02	--
	VOC TICs								--	
99876	4-Isopropyltoluene	µg/kg	4.40E+00	--	--	--	--	--	--	--
471841	7,7-Dimethyl-2-methylene-bicyclo[2.2.1]h	µg/kg	1.10E+01	--	--	--	--	--	--	--
79925	Camphene	µg/kg	1.30E+01	--	--	--	--	--	--	--
66251	Hexanal	µg/kg	8.80E+00	--	--	--	--	--	--	--
	TCL SVOCs								--	
59507	4-Chloro-3-Methylphenol	µg/kg	2.50E+01	--	--	--	--	--	--	--
	SVOC TICs								--	
629969	(M) 1-Eicosanol	µg/kg	4.70E+01	--	--	--	--	--	--	--
301020	(Z)-9-Octadecenamide	µg/kg	1.60E+02	--	--	--	--	--	--	--
506525	1-HEXACOSANOL	µg/kg	6.30E+01	--	--	--	--	--	--	--
84695	1,2-Benzenedicarboxylicacid, bis(2-methy	µg/kg	5.00E+01	--	--	--	--	--	--	--
1740198	1,2,3,4,4a,9,10,10a-Octa-1-phenanthrene	µg/kg	2.90E+02	--	--	--	--	--	--	--
62951966	1,5,9-Undecatriene, 2,6,10-trimethyl-, (	µg/kg	4.80E+01	--	--	--	--	--	--	--
497234	2 (5H)-Furanone	µg/kg	7.20E+01	--	--	--	--	--	--	--
104767	2-Ethyl-1-Hexanol	µg/kg	5.20E+01	--	--	--	--	--	--	--
101371	2,4,6-Triallyloxy-1,3,5-triazine	µg/kg	8.70E+01	--	--	--	--	--	--	--
1000130798	13-Tertadecen-1-ol acetate	µg/kg	1.30E+02	--	--	--	--	--	--	--
2437958	Bicyclo[3.1.1]hept-2-ene,2,6,6-trimethyl	µg/kg	1.30E+02	--	--	--	--	--	--	--
295170	Cyclotetradecane	µg/kg	5.50E+01	--	--	--	--	--	--	--
112845	Erucylamide	µg/kg	6.30E+02	--	--	--	--	--	--	--
629947	Heneicosane	µg/kg	7.20E+01	--	--	--	--	--	--	--
57114	Stearic Acid	µg/kg	1.20E+02	--	--	--	--	--	--	--
						Cumulative Risk	3.E+00	9.E-06	2.E-01	2.E-06

Notes:

CAS = Chemical Abstracts Service
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyls
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
TIC = Tentatively Identified Compound
[1] = Chromium VI RBC value was used
[4] = Noncarcinogenic Residential RBC value for Aroclor 1254 was used for screening

MDC = Maximum Detected Concentration
HI = Hazard Index
RBC = USEPA Region III Risk-Based Concentration
(RBC) values from the October 31, 2006,
RBC Table and October 10, 2006, Alternate RBC Table
C = Carcinogenic per EPA RBC Table (October 2006)
N = Noncarcinogenic per EPA RBC Table (October 2006)

Table 5-17
Cumulative HHRS for AOC Q (Surface Soil)
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Units	MDC	C/N	RBC Residential	RBC Industrial	Non Carcinogenic HI (RBC_{Res})	Excess Cancer Risk (RBC_{Res})	Non Carcinogenic HI (RBC_{Ind})	Excess Cancer Risk (RBC_{Ind})
	TAL Metals									
7429905	Aluminum	mg/kg	1.5E+04	--	--	--	--	--	--	--
7440382	Arsenic	mg/kg	1.4E+00	C	4.3E-01	1.9E+00	--	3.E-06	--	7.E-07
7440382	Arsenic	mg/kg	1.4E+00	N	2.4E+01	3.1E+02	6.E-02	--	5.E-03	--
7440484	Cobalt	mg/kg	8.4E+00	--	--	--	--	--	--	--
7439896	Iron	mg/kg	2.1E+04	N	2.3E+04	3.1E+05	9.E-01	--	7.E-02	--
7439965	Manganese	mg/kg	5.1E+02	N	1.6E+03	2.0E+04	3.E-01	--	3.E-02	--
7440622	Vanadium	mg/kg	2.8E+01	N	7.8E+01	1.0E+03	4.E-01	--	3.E-02	--
	TCL VOCs									
110827	Cyclohexane	µg/kg	5.6E-01	--	--	--	--	--	--	--
108872	Methylcyclohexane	µg/kg	2.4E+00	--	--	--	--	--	--	--
	VOC TICs									--
591764	2-Methyl-hexane	µg/kg	8.4E+00	--	--	--	--	--	--	--
589344	3-Methyl-hexane	µg/kg	7.0E+00	--	--	--	--	--	--	--
66251	Hexanal	µg/kg	1.1E+01	--	--	--	--	--	--	--
107835	Pentane, 2-methyl-	µg/kg	1.1E+01	--	--	--	--	--	--	--
16747323	Pentane, 3-ethyl-2,2-dimethyl-	µg/kg	5.7E+00	--	--	--	--	--	--	--
	TCL SVOCs									
59507	4-Chloro-3-Methylphenol	µg/kg	1.5E+01	--	--	--	--	--	--	--
	SVOC TICs									
301020	(Z)-9-Octadecenamide	µg/kg	3.0E+02	--	--	--	--	--	--	--
7785708	1R-.alpha.-Pinene	µg/kg	7.0E+01	--	--	--	--	--	--	--
1235741	1-Phenanthrenecarboxylicacid, 1,2,3,4,4a	µg/kg	1.2E+02	--	--	--	--	--	--	--
84695	1,2-Benzenedicarboxylicacid, bis(2-methy	µg/kg	3.0E+01	--	--	--	--	--	--	--
497234	2 (5H)-Furanone	µg/kg	6.3E+01	--	--	--	--	--	--	--
22610806	2-Cyclopenten-1-one, 3-methyl-2-(1,3-pen	µg/kg	2.3E+01	--	--	--	--	--	--	--
403190	2-Fluoro-4-nitrophenol	µg/kg	2.5E+01	--	--	--	--	--	--	--
502692	2-Pentadecanone, 6,10,14-trimethyl-	µg/kg	4.0E+01	--	--	--	--	--	--	--
1000143924	7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,	µg/kg	2.4E+01	--	--	--	--	--	--	--
80568	a-Pinene	µg/kg	2.3E+02	--	--	--	--	--	--	--
127913	beta-Pinene	µg/kg	3.5E+01	--	--	--	--	--	--	--
544854	Ditriacontane	µg/kg	2.4E+01	--	--	--	--	--	--	--
1000163047	Docosa-2,6,10,14,18-pentaen-22-al,2,6,10	µg/kg	4.7E+01	--	--	--	--	--	--	--
629970	Docosane	µg/kg	2.3E+02	--	--	--	--	--	--	--
112958	Eicosane	µg/kg	1.8E+02	--	--	--	--	--	--	--
629947	Heneicosane	µg/kg	3.0E+01	--	--	--	--	--	--	--
630046	Hentriacontane	µg/kg	2.2E+02	--	--	--	--	--	--	--
630024	Octacosane	µg/kg	4.1E+02	--	--	--	--	--	--	--
14167590	Tetratriacontane	µg/kg	2.9E+01	--	--	--	--	--	--	--
						Cumulative Risk	2.E+00	3.E-06	1.E-01	7.E-07

Notes:

CAS = Chemical Abstracts Service
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
TIC = Tentatively Identified Compound

HI = Hazard Index
MDC = Maximum Detected Concentration
RBC = USEPA Region III Risk-Based Concentration
(RBC) values from the October 31, 2006,
RBC Table and October 10, 2006, Alternate RBC Table
C = Carcinogenic per EPA RBC Table (October 2006)
N = Noncarcinogenic per EPA RBC Table (October 2006)

Table 5-18
Exposure Point Concentration Summary for AOC Q
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Medium:	Total Soil
Exposure Medium:	Total Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic (1)	Rationale (2)
Total Soil	Aluminum	mg/kg	1.01E+04	1.28E+04	1.5E+04	1.28E+04	mg/kg	95% UCL (Student's t)	85% < FOD, Normal
	Arsenic	mg/kg	8.80E-01	1.08E+00	1.4E+00	1.08E+00	mg/kg	95% UCL (Student's t)	85% < FOD, Normal
	Cobalt	mg/kg	--	--	8.4E+00	8.40E+00	mg/kg	--	--
	Iron	mg/kg	1.51E+04	1.84E+04	2.1E+04	1.84E+04	mg/kg	95% UCL (Student's t)	85% < FOD, Normal
	Manganese	mg/kg	3.15E+02	4.06E+02	5.1E+02	4.06E+02	mg/kg	95% UCL (Student's t)	85% < FOD, Normal
	Vanadium	mg/kg	2.14E+01	2.62E+01	3.0E+01	2.62E+01	mg/kg	95% UCL (Student's t)	85% < FOD, Normal

Notes:
UCL = Upper Confidence Limit
mg/kg = Milligram Per Kilogram

(1) See *Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites*(OSWER Directive 9285.6-10, December 2002) for details on the following methods for calculating the 95% UCL:
95% UCL (Bounding) = The frequency of detection is less than 50%; therefore, the 95% UCL is calculated by the bounding method.
95% UCL (Student's t, adj) = The frequency of detection is between 50% and 85%, and the underlying distribution (detects only) is normal; therefore, Aitchison's Method is used to adjust the detects-only mean and standard deviaiton, and the 95% UCL is calculated using the Student's t method.
95% UCL (Land, adj) = The frequency of detection is between 50% and 85%, and the underlying distribution (detects only) is lognormal; therefore, Aitchison's Method is used to adjust the detects-only mean and standard deviation, and the 95% UCL is calculated using Land's method.
95% UCL (Student's t) = The frequency of detection is greater than 85%, and the distribution is normal.; therefore, the 95% UCL is calculated using the Student's t method.
95% UCL (Bootstrap) = The frequency of detection is between 50% and 85% and the underlying distribution (detects only) is neither normal nor lognormal**OR** the frequency of detection is greater than 85% and the distribution (with non-detects represented by half of the detection limit) is neither normal nor lognormal; therefore, the 95% UCL is calculated using Hall's bootstrap method.
Maximum: The 95% UCL exceeds the maximum detected concentration; therefore, the maximum detected concentration is used to represent the 95% UCL.

(2) FOD = Frequency of detection
FOD < 50%: Frequency of detection is less than 50%
50% < FOD < 85%, Normal: Frequency of detection is between 50% and 85%, and the underlying distribution (detects only) is normal.
50% < FOD < 85%, Lognormal: Frequency of detection is between 50% and 85%, and the underlying distribution (detects only) is lognormal.
50% < FOD < 85%, Unknown: Frequency of detection is between 50% and 85%, and the underlying distribution (detects only) is neither normal nor lognormal.
85% < FOD, Normal: Frequency of detection is greater than 85%, and the distribution is normal.
85% < FOD, Lognormal: Frequency of detection is greater than 85%, and the distribution is lognormal.
85% < FOD, Unknown: Frequency of detection is greater than 85%, and the distribution is neither normal nor lognormal.

Table 5-19
Cumulative HHRS for AOC Q (Total Soil)
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Units	Maximum EPC	C/N	RBC Residential	RBC Industrial	Non Carcinogenic HI (RBC_{Res})	Excess Cancer Risk (RBC_{Res})	Non Carcinogenic HI (RBC_{Ind})	Excess Cancer Risk (RBC_{Ind})
	TAL Metals									
7429905	Aluminum	mg/kg	1.3E+04	--	--	--	--	--	--	--
7440382	Arsenic	mg/kg	1.1E+00	C	4.3E-01	1.9E+00	--	3.E-06	--	6.E-07
7440382	Arsenic	mg/kg	1.1E+00	N	2.4E+01	3.1E+02	5.E-02	--	4.E-03	--
7440484	Cobalt	mg/kg	8.4E+00	--	--	--	--	--	--	--
7439896	Iron	mg/kg	1.8E+04	N	2.3E+04	3.1E+05	8.E-01	--	6.E-02	--
7439965	Manganese	mg/kg	4.1E+02	N	1.6E+03	2.0E+04	3.E-01	--	2.E-02	--
7440622	Vanadium	mg/kg	2.6E+01	N	7.8E+01	1.0E+03	3.E-01	--	3.E-02	--
	TCL VOCs									
110827	Cyclohexane	µg/kg	5.6E-01	--	--	--	--	--	--	--
108872	Methylcyclohexane	µg/kg	2.4E+00	--	--	--	--	--	--	--
	VOC TICs									--
591764	2-Methyl-hexane	µg/kg	8.4E+00	--	--	--	--	--	--	--
589344	3-Methyl-hexane	µg/kg	7.0E+00	--	--	--	--	--	--	--
66251	Hexanal	µg/kg	1.1E+01	--	--	--	--	--	--	--
107835	Pentane, 2-methyl-	µg/kg	1.1E+01	--	--	--	--	--	--	--
16747323	Pentane, 3-ethyl-2,2-dimethyl-	µg/kg	5.7E+00	--	--	--	--	--	--	--
	TCL SVOCs									
59507	4-Chloro-3-Methylphenol	µg/kg	2.9E+01	--	--	--	--	--	--	--
	SVOC TICs									
301020	(Z)-9-Octadecenamide	µg/kg	3.0E+02	--	--	--	--	--	--	--
7785708	1R-.alpha.-Pinene	µg/kg	7.0E+01	--	--	--	--	--	--	--
1235741	1-Phenanthrenecarboxylicacid, 1,2,3,4,4a	µg/kg	1.2E+02	--	--	--	--	--	--	--
84695	1,2-Benzenedicarboxylicacid, bis(2-methy	µg/kg	5.1E+01	--	--	--	--	--	--	--
497234	2 (5H)-Furanone	µg/kg	6.3E+01	--	--	--	--	--	--	--
22610806	2-Cyclopenten-1-one, 3-methyl-2-(1,3-pen	µg/kg	2.3E+01	--	--	--	--	--	--	--
104767	2-Ethyl-1-Hexanol	µg/kg	2.7E+01	--	--	--	--	--	--	--
403190	2-Fluoro-4-nitrophenol	µg/kg	2.5E+01	--	--	--	--	--	--	--
502692	2-Pentadecanone, 6,10,14-trimethyl-	µg/kg	4.0E+01	--	--	--	--	--	--	--
101371	2,4,6-Triallyloxy-1,3,5-triazine	µg/kg	7.0E+01	--	--	--	--	--	--	--
4602840	2,6,10-Dodecatriene-1-ol,3,7,11-trimethy	µg/kg	4.0E+01	--	--	--	--	--	--	--
4128170	2,6,10-Dodecatrien-1-ol,3,7,11-trimethyl	µg/kg	4.0E+01	--	--	--	--	--	--	--
111024	2,6,10,14,18,22-Tetracosahexaene,2,6,10,	µg/kg	5.5E+01	--	--	--	--	--	--	--
4436753	3-Hexene-2,5-dione	µg/kg	2.1E+02	--	--	--	--	--	--	--
90949534	7-Nonenamide	µg/kg	7.7E+01	--	--	--	--	--	--	--
1000143924	7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,	µg/kg	4.2E+01	--	--	--	--	--	--	--
56862625	10-Methylnonadecane	µg/kg	2.7E+01	--	--	--	--	--	--	--
80568	a-Pinene	µg/kg	2.3E+02	--	--	--	--	--	--	--
127913	beta-Pinene	µg/kg	3.5E+01	--	--	--	--	--	--	--
544854	Ditriacontane	µg/kg	2.4E+01	--	--	--	--	--	--	--
1000163047	Docosa-2,6,10,14,18-pentaen-22-al,2,6,10	µg/kg	4.9E+01	--	--	--	--	--	--	--
629970	Docosane	µg/kg	2.3E+02	--	--	--	--	--	--	--
112958	Eicosane	µg/kg	1.8E+02	--	--	--	--	--	--	--
112845	Erucylamide	µg/kg	5.4E+02	--	--	--	--	--	--	--
629947	Heneicosane	µg/kg	3.9E+01	--	--	--	--	--	--	--
630046	Hentriacontane	µg/kg	2.2E+02	--	--	--	--	--	--	--
593497	Heptacosane	µg/kg	3.1E+01	--	--	--	--	--	--	--
629787	Heptadecane	µg/kg	2.4E+01	--	--	--	--	--	--	--
7225641	Heptadecane, 9-octyl-	µg/kg	3.6E+01	--	--	--	--	--	--	--

Table 5-19
Cumulative HHRS for AOC Q (Total Soil)
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Units	Maximum EPC	C/N	RBC Residential	RBC Industrial	Non Carcinogenic HI (RBC_{Res})	Excess Cancer Risk (RBC_{Res})	Non Carcinogenic HI (RBC_{Ind})	Excess Cancer Risk (RBC_{Ind})
630068	Hexatriacontane	µg/kg	4.2E+01	--	--	--	--	--	--	--
13287246	Nonadecane, 9-methyl-	µg/kg	4.5E+01	--	--	--	--	--	--	--
630024	Octacosane	µg/kg	4.1E+02	--	--	--	--	--	--	--
55282127	Octadecane, 3-ethyl-5-(2-ethylbutyl)-	µg/kg	2.9E+01	--	--	--	--	--	--	--
14167590	Tetratriacontane	µg/kg	4.2E+01	--	--	--	--	--	--	--
						Cumulative Risk	1.E+00	3.E-06	1.E-01	6.E-07

Notes:

CAS = Chemical Abstracts Service
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
TIC = Tentatively Identified Compound

HI = Hazard Index
MDC = Maximum Detected Concentration
RBC = USEPA Region III Risk-Based Concentration
(RBC) values from the October 31, 2006,
RBC Table and October 10, 2006, Alternate RBC Table
C = Carcinogenic per EPA RBC Table (October 2006)
N = Noncarcinogenic per EPA RBC Table (October 2006)

Table 5-20
HHRS SSL Comparison for SWMU 37
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Soil to Groundwater SSL (DAF 20)	COPC Flag (Y/N)	Rationale for Selection or Deletion
	TAL Metals (mg/kg)										
7429905	Aluminum	12,400	17,500	mg/kg	37SB2B	6/6	91.5 - 91.5	17,500	--	Y	NSV
7440360	Antimony	0.17	0.26	mg/kg	37SB3C	6/6	0.0518 - 0.0518	0.26	13.2	N	BSL
7440382	Arsenic	1	2.1	mg/kg	37SB3C	6/6	0.0232 - 0.0232	2.10	0.026	Y	**ASSL**
7440393	Barium	73	132	mg/kg	37SB1B	6/6	0.106 - 5.3	132	6,015.2	N	BSL
7440417	Beryllium	0.34	0.71	mg/kg	37SB1B	6/6	0.0391 - 0.0391	0.71	1,153.7	N	BSL
7440439	Cadmium	0.59	1.60	mg/kg	37SB2B	6/6	0.182 - 0.182	1.60	27.4	N	BSL
7440702	Calcium	1,030	2,610	mg/kg	37SB2B	6/6	16.6 - 16.6	2,610	Nutrient	N	Nutrient
7440473	Chromium[1]	18	20	mg/kg	37SB2B	6/6	0.912 - 0.912	20	42	N	BSL
7440484	Cobalt	6.90	11	mg/kg	37SB2B	6/6	0.208 - 0.208	11	--	Y	NSV
7440508	Copper	7.70	11	mg/kg	37SB2B	6/6	0.368 - 0.368	11	10,517.8	N	BSL
7439896	Iron	17,500	28,200	mg/kg	37SB2B	6/6	106 - 212	28,200	--	Y	NSV
7439921	Lead [2]	7.40	9	mg/kg	37SB3C	6/6	0.0218 - 0.0218	9	--	Y	NSV
7439954	Magnesium	3,170	4,790	mg/kg	37SB2B	6/6	16.05 - 32.1	4,790	Nutrient	N	Nutrient
7439965	Manganese	252	503	mg/kg	37SB1C	6/6	1.32 - 2.64	503	951.9	N	BSL
7440020	Nickel	11.00	14.00	mg/kg	37SB2B	6/6	0.0356 - 0.0356	14	--	Y	NSV
7440097	Potassium	1,480	2,140	mg/kg	37SB2B	6/6	25 - 25	2,140	Nutrient	N	Nutrient
7782492	Selenium	0.42	0.60	mg/kg	37SB1B	6/6	0.0502 - 0.0502	0.60	19	N	BSL
7440224	Silver	0.04	0.06	mg/kg	37SB1B	6/6	0.0044 - 0.0044	0.06	31	N	BSL
7440235	Sodium	67	93	mg/kg	37SB1C	6/6	8.92 - 8.92	93	Nutrient	N	Nutrient
7440280	Thallium	0.13	0.19	mg/kg	37SB2B	6/6	0.027 - 0.027	0.19	3.6	N	BSL
7440622	Vanadium	27	43	mg/kg	37SB2B	6/6	0.207 - 0.207	43	730	N	BSL
7440666	Zinc	38	65	mg/kg	37SB2B	6/6	0.517 - 0.517	65	13,622	N	BSL
	TCL Pesticides/PCBs (µg/kg) *										
60571	Dieldrin	1.1E+01	1.1E+01	µg/kg	37SB1A	1/1	0.494 - 0.494	1.1.E+01	2.2E+00	Y	**ASSL**
11097691	Aroclor-1254 [4]	1.8E+02	1.8E+02	µg/kg	37SB1A	1/1	4.8 - 4.8	1.8.E+02	1.1E+03	N	BSL
	TCL VOCs (µg/kg)										
78933	2-Butanone	1.8E+01	2.4E+01	µg/kg	37SB1B	2/6	5.4 - 6	2.4.E+01	2.9E+04	N	BSL
67641	Acetone	1.6E+01	4.8E+01	µg/kg	37SB1B	6/6	5.4 - 6	4.8.E+01	2.2E+04	N	BSL
156592	cis-1,2-Dichloroethene	1.3E+00	1.3E+00	µg/kg	37SB2B	1/6	0.767 - 0.852	1.3.E+00	--	Y	NSV
108872	Methylcyclohexane	3.0E+00	3.0E+00	µg/kg	37SB3B	1/6	0.913 - 1.01	3.0.E+00	--	Y	NSV
75092	Methylene chloride	4.6E+00	5.3E+00	µg/kg	37SB2B	6/6	3.03 - 3.37	5.3.E+00	1.9E+01	N	BSL
108883	Toluene	1.0E+00	1.0E+00	µg/kg	37SB2B	1/6	0.501 - 0.557	1.0.E+00	2.7E+04	N	BSL
79016	Trichloroethene	6.8E+00	6.3E+01	µg/kg	37SB2C	2/6	0.731 - 0.812	6.3.E+01	2.6E-01	Y	**ASSL**
1330207	Xylenes	7.8E-01	2.0E+00	µg/kg	37SB3B	2/6	0.455 - 0.505	2.0.E+00	3.0E+03	N	BSL
	VOC TICs (µg/kg)										
95636	1,2,4-Trimethylbenzene	3.6E+00	3.6E+00	µg/kg	37SB3B	1/6	0 - 0	3.6.E+00	--	Y	NSV
352207	1,3-Dimethyl-,trans-cyclohexane	5.7E+00	5.7E+00	µg/kg	37SB3B	1/6	0 - 0	5.7.E+00	--	Y	NSV
108678	1,3,5-Trimethylbenzene	1.8E+00	1.8E+00	µg/kg	37SB3B	1/6	0 - 0	1.8.E+00	--	Y	NSV
115117	2-Methyl-1-Propene	8.4E+00	8.4E+00	µg/kg	37SB2C	1/6	0 - 0	8.4.E+00	--	Y	NSV
1678917	Ethyl-cyclohexane	6.4E+00	6.4E+00	µg/kg	37SB3B	1/6	0 - 0	6.4.E+00	--	Y	NSV
592278	Heptane, 2-methyl-	6.5E+00	6.5E+00	µg/kg	37SB3B	1/6	0 - 0	6.5.E+00	--	Y	NSV
111842	Nonane	5.1E+00	5.1E+00	µg/kg	37SB3B	1/6	0 - 0	5.1.E+00	--	Y	NSV
111659	Octane	8.3E+00	8.3E+00	µg/kg	37SB3B	1/6	0 - 0	8.3.E+00	--	Y	NSV
	TCL SVOCs (µg/kg)										
59507	4-Chloro-3-Methylphenol	1.4E+01	2.4E+01	µg/kg	37SB1B	5/6	5.21 - 6.25	2.4.E+01	--	Y	NSV
117817	Bis(2-ethylhexyl)phthalate	4.1E+01	4.7E+01	µg/kg	37SB3B	6/6	2.07 - 2.48	4.7.E+01	2.9E+06	N	BSL
84662	Diethylphthalate	1.1E+01	2.6E+01	µg/kg	37SB1C	5/6	1.9 - 2.28	2.6.E+01	4.5E+05	N	BSL
131113	Dimethylphthalate	3.0E+01	3.0E+01	µg/kg	37SB1B	1/6	3.31 - 3.97	3.0.E+01	--	Y	NSV
84742	Di-n-butylphthalate	1.8E+01	3.3E+01	µg/kg	37SB1B	6/6	3.82 - 4.58	3.3.E+01	5.0E+06	N	BSL
117840	Di-n-octylphthalate	3.8E+01	3.8E+01	µg/kg	37SB3B	1/6	3.1 - 3.72	3.8.E+01	--	Y	NSV

Table 5-20
HHRS SSL Comparison for SWMU 37
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Soil to Groundwater SSL (DAF 20)	COPC Flag (Y/N)	Rationale for Selection or Deletion
	SVOC TICs (µg/kg)										
301020	(Z)-9-Octadecenamide	4.5E+01	1.2E+02	µg/kg	37SB3B	6/6	0 - 0	1.2.E+02	--	Y	NSV
84695	1,2-Benzenedicarboxylicacid, bis(2-methy	2.4E+01	4.5E+01	µg/kg	37SB1B	5/6	0 - 0	4.5.E+01	--	Y	NSV
84640	1,2-Benzenedicarboxylic acid, butyl cycl	2.6E+01	2.6E+01	µg/kg	37SB3B	1/6	0 - 0	2.6.E+01	--	Y	NSV
104767	2-Ethyl-1-Hexanol	2.5E+01	2.5E+01	µg/kg	37SB1C	1/6	0 - 0	2.5.E+01	--	Y	NSV
101371	2,4,6-Triallyloxy-1,3,5-triazine	6.7E+01	1.0E+02	µg/kg	37SB1B	4/6	0 - 0	1.0.E+02	--	Y	NSV
4436753	3-Hexene-2,5-dione	2.0E+02	2.0E+02	µg/kg	37SB1C	1/6	0 - 0	2.0.E+02	--	Y	NSV
1000143924	7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,	2.5E+01	3.9E+01	µg/kg	37SB1C	4/6	0 - 0	3.9.E+01	--	Y	NSV
112845	Erucylamide	1.5E+02	4.5E+02	µg/kg	37SB3C	3/6	0 - 0	4.5.E+02	--	Y	NSV
111068	Hexadecanoic acid, butylester	2.8E+01	2.8E+01	µg/kg	37SB1C	1/6	0 - 0	2.8.E+01	--	Y	NSV
646139	Octadecanoic acid, 2-methylpropyl ester	3.0E+01	3.0E+01	µg/kg	37SB1C	1/6	0 - 0	3.0.E+01	--	Y	NSV
	PAHs (µg/kg)										
129000	Pyrene	1.2E+00	1.2E+00	µg/kg	37SB3C	1/6	0.99 - 1.08	1.2.E+00	6.8E+05	N	BSL
	Cyanide (mg/kg)										
57125	Cyanide	4.0E-02	1.1E-01	mg/kg	37SB1B	3/6	0.0356 - 0.0356	1.1.E-01	1.5E+02	N	BSL

Notes:

CAS = Chemical Abstracts Service
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyls
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
PAH = Polynuclear Aromatic Compound
TIC = Tentatively Identified Compound
[1] = Chromium VI SSL DAF20 value was used
[2] = Lead criteria are Action Levels; see USEPA Region III guidance
[4] = Noncarcinogenic Residential RBC value for Aroclor 1254 was used for screening

DUP AVG = results for duplicate samples averaged
SSL DAF20 = Soil Screening Levels at a Dilution Attenuation Factor of 20 Per (SSL) values from the October 31, 2006, RBC Table

ASSL = Above Soil Screening Level
BSL = Below Soil Screening Levels
NSV = No Screening Value Available
* = Surface Soil Detections used for SSL Screening due to testing of one surface soil sample for PCB/Pesticides/Herbicides

Table 5-21
HHRS SSL Comparison for SWMU 38
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Soil to Groundwater SSL (DAF 20)	COPC Flag (Y/N)	Rationale for Selection or Deletion
	TAL Metals (mg/kg)										
7429905	Aluminum	10,600	22,000	mg/kg	38SB3B	6/6	1.83 - 1.83	22,000	--	Y	NSV
7440382	Arsenic	1.5	2.1	mg/kg	38SB2C	6/6	0.0232 - 0.0232	2.1	0.026	Y	**ASSL**
7440393	Barium	83	138	mg/kg	38SB3B	6/6	0.106 - 0.106	138	6,015	N	BSL
7440417	Beryllium	0.43	0.93	mg/kg	38SB3B	6/6	0.0391 - 0.0391	0.93	1,154	N	BSL
7440439	Cadmium	1.3	1.90	mg/kg	38SB1C	6/6	0.182 - 0.182	1.90	27.4	N	BSL
7440702	Calcium	1,270	3,010	mg/kg	38SB1C	6/6	16.6 - 16.6	3,010	Nutrient	N	Nutrient
7440473	Chromium[1]	20	27	mg/kg	38SB3B	6/6	0.912 - 0.912	27	42.05	N	BSL
7440484	Cobalt	9.00	13	mg/kg	38SB1B	6/6	0.208 - 0.208	13	--	Y	NSV
7440508	Copper	8.80	18	mg/kg	38SB3B	6/6	0.368 - 0.368	18	10,518	N	BSL
7439896	Iron	21,800	32,200	mg/kg	38SB1B	6/6	21.2 - 21.2	32,200	--	Y	NSV
7439921	Lead [2]	7.3	13	mg/kg	38SB3B	6/6	0.0218 - 0.0218	13	--	Y	NSV
7439954	Magnesium	3,420	8,240	mg/kg	38SB1C	6/6	3.21 - 3.21	8,240	Nutrient	N	Nutrient
7439965	Manganese	375	478	mg/kg	38SB3C	6/6	0.264 - 0.264	478	951.9	N	BSL
7439976	Mercury [3]	0.01	0.021	mg/kg	38SB3B	5/6	0.0077 - 0.0077	0.021	--	Y	NSV
7440020	Nickel	11	18	mg/kg	38SB1B	6/6	0.0356 - 0.0356	18	--	Y	NSV
7440097	Potassium	1,520	2,210	mg/kg	38SB1C	6/6	5 - 5	2,210	Nutrient	N	Nutrient
7782492	Selenium	0.43	0.78	mg/kg	38SB3B	6/6	0.0502 - 0.0502	0.78	19	N	BSL
7440224	Silver	0.05	0.08	mg/kg	38SB1C	6/6	0.0044 - 0.0044	0.075	31	N	BSL
7440235	Sodium	49	55	mg/kg	38SB3B	6/6	8.92 - 8.92	55	Nutrient	N	Nutrient
7440280	Thallium	0.12	0.25	mg/kg	38SB1B	6/6	0.027 - 0.027	0.25	3.6	N	BSL
7440622	Vanadium	24	50	mg/kg	38SB1B	6/6	0.207 - 0.207	50	730	N	BSL
7440666	Zinc	47	73	mg/kg	38SB3B	6/6	0.517 - 0.517	73	13,622	N	BSL
	TCL Pesticides/PCBs (µg/kg) *										
11097691	Aroclor 1254 [4]	5.7E+02	5.7E+02	µg/kg	38SB1A	1/1	4.2 - 4.2	5.7E+02	1.1E+03	N	BSL
	TCL VOCs (µg/kg)										
78933	2-Butanone	2.0E+01	2.8E+01	µg/kg	38SB3C	4/6	5.4 - 6.6	2.8E+01	2.9E+04	N	BSL
67641	Acetone	2.8E+01	1.1E+02	µg/kg	38SB3B	6/6	5.4 - 6.6	1.1E+02	2.2E+04	N	BSL
156592	cis-1,2-Dichloroethene	9.7E+00	9.7E+00	µg/kg	38SB2B-AVG DUP	1/6	0.767 - 0.937	9.7E+00	--	Y	NSV
108883	Toluene	4.8E-01	4.8E-01	µg/kg	38SB2B-AVG DUP	1/6	0.501 - 0.612	4.8E-01	2.7E+04	N	BSL
	VOC TICs (µg/kg)										
66251	Hexanal	5.6E+00	5.6E+00	µg/kg	38SB3B	1/6	0 - 0	5.6E+00	--	Y	NSV
	TCL SVOCs (µg/kg)										
59507	4-Chloro-3-Methylphenol	1.3E+01	1.8E+01	µg/kg	38SB1B	5/6	5.73 - 6.77	1.8E+01	--	Y	NSV
117817	Bis(2-ethylhexyl)phthalate	4.8E+01	9.8E+01	µg/kg	38SB3B	6/6	2.28 - 2.69	9.8E+01	2.9E+06	N	BSL
85687	Butylbenzylphthalate	4.1E+01	4.1E+01	µg/kg	38SB3C	1/6	4.93 - 5.82	4.1E+01	1.7E+07	N	BSL
105602	Caprolactam	5.7E+01	1.3E+02	µg/kg	38SB3C	3/6	7.02 - 8.29	1.3E+02	--	Y	NSV
84662	Diethylphthalate	3.0E+00	6.0E+00	µg/kg	38SB1B	6/6	2.09 - 2.47	6.0E+00	4.5E+05	N	BSL
84742	Di-n-butylphthalate	2.3E+01	5.0E+02	µg/kg	38SB3B	6/6	4.2 - 4.97	5.0E+02	5.0E+06	N	BSL
206440	Fluoranthene	9.0E+00	9.0E+00	µg/kg	38SB3B	1/6	2.59 - 3.06	9.0E+00	6.3E+06	N	BSL
86306	N-Nitrosodiphenylamine	1.7E+01	1.7E+01	µg/kg	38SB3B	1/6	5.23 - 6.18	1.7E+01	7.6E+02	N	BSL
85018	Phenanthrene	7.0E+00	7.0E+00	µg/kg	38SB3B	1/6	2.53 - 2.99	7.0E+00	--	Y	NSV
129000	Pyrene	5.0E+00	5.0E+00	µg/kg	38SB3B	1/6	1.63 - 1.92	5.0E+00	6.8E+05	N	BSL

Table 5-21
HHRS SSL Comparison for SWMU 38
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Soil to Groundwater SSL (DAF 20)	COPC Flag (Y/N)	Rationale for Selection or Deletion
	SVOC TICs (µg/kg)										
629969	(M) 1-Eicosanol	4.7E+01	4.7E+01	µg/kg	38SB2B-AVG DUP	1/6	0 - 0	4.7E+01	--	Y	NSV
301020	(Z)-9-Octadecenamide	3.2E+01	1.3E+02	µg/kg	38SB2C	3/6	0 - 0	1.3E+02	--	Y	NSV
506525	1-HEXACOSANOL	6.3E+01	6.3E+01	µg/kg	38SB2B-AVG DUP	1/6	0 - 0	6.3E+01	--	Y	NSV
84695	1,2-Benzenedicarboxylicacid, bis(2-methy	3.1E+01	5.0E+01	µg/kg	38SB1B	5/6	0 - 0	5.0E+01	--	Y	NSV
104767	2-Ethyl-1-Hexanol	2.3E+01	5.2E+01	µg/kg	38SB2C	2/6	0 - 0	5.2E+01	--	Y	NSV
101371	2,4,6-Triallyloxy-1,3,5-triazine	7.0E+01	8.7E+01	µg/kg	38SB1B	3/6	0 - 0	8.7E+01	--	Y	NSV
112845	Erucylamide	5.1E+02	6.3E+02	µg/kg	38SB2C	3/6	0 - 0	6.3E+02	--	Y	NSV
57114	Stearic Acid	1.2E+02	1.2E+02	µg/kg	38SB3C	1/6	0 - 0	1.2E+02	--	Y	NSV
	Cyanide (mg/kg)										
57125	Cyanide	3.0E-02	2.4E-01	mg/kg	38SB3B	5/6	0.0356 - 0.0356	2.4E-01	1.5E+02	N	BSL

Notes:

CAS = Chemical Abstracts Service
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyls
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
PAH = Polynuclear Aromatic Compound
TIC = Tentatively Identified Compound
[1] = Chromium VI SSL DAF20 value was used
[2] = Lead criteria are Action Levels; see USEPA Region III guidance
[3] = Mercuric chloride soil RBC value used
[4] = Noncarcinogenic Residential RBC value for Aroclor 1254 was used for screening

DUP AVG = results for duplicate samples averaged
SSL DAF20 = Soil Screening Levels at a Dilution Attenuation Factor of 20
Per (SSL) values from the October 31, 2006, RBC Table

ASSL = Above Soil Screening Level
BSL = Below Soil Screening Levels
NSV = No Screening Value Available
* = Surface Soil Detections used for SSL Screening due to testing of one surface soil sample for PCB/Pesticides/Herbicides

Table 5-22
HHRS SSL Comparison for AOC Q
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Soil to Groundwater SSL (DAF 20)	COPC Flag (Y/N)	Rationale for Selection or Deletion
	TAL Metals (mg/kg)									
7429905	Aluminum	3,360	14,200	mg/kg	QSB2B	6/6	18.3 - 91.5	--	Y	NSV
7440360	Antimony	0.11	0.28	mg/kg	QSB2B	6/6	0.0518 - 0.0518	13.2	N	BSL
7440382	Arsenic	0.54	0.97	mg/kg	QSB1B	6/6	0.0232 - 0.0232	0.026	Y	**ASSL**
7440393	Barium	27	116	mg/kg	QSB2B	6/6	0.106 - 0.53	6,015.2	N	BSL
7440417	Beryllium	0.18	0.74	mg/kg	QSB2B	6/6	0.0391 - 0.0391	1,153.7	N	BSL
7440439	Cadmium	0.88	1.60	mg/kg	QSB2B	6/6	0.182 - 0.182	27.4	N	BSL
7440702	Calcium	622	2,260	mg/kg	QSB1B	6/6	16.6 - 16.6	Nutrient	N	Nutrient
7440473	Chromium[1]	6	18	mg/kg	QSB1B	6/6	0.912 - 0.912	42	N	BSL
7440484	Cobalt	3.30	8	mg/kg	QSB2B	6/6	0.208 - 0.208	--	Y	NSV
7440508	Copper	1.50	8	mg/kg	QSB2B	6/6	0.368 - 0.368	10,518	N	BSL
7439896	Iron	6,530	20,000	mg/kg	QSB2B	6/6	42.4 - 106	--	Y	NSV
7439921	Lead[2]	2.60	8	mg/kg	QSB2B	6/6	0.0218 - 0.0218	--	Y	NSV
7439954	Magnesium	855	3,370	mg/kg	QSB2B	6/6	3.21 - 16.05	Nutrient	N	Nutrient
7439965	Manganese	81	441	mg/kg	QSB2B	6/6	0.264 - 2.64	951.9	N	BSL
7440020	Nickel	4.40	13.00	mg/kg	QSB1B	6/6	0.0356 - 0.0356	--	Y	NSV
7440097	Potassium	439	1,580	mg/kg	QSB1B	6/6	5 - 25	Nutrient	N	Nutrient
7782492	Selenium	0.24	0.49	mg/kg	QSB1B	6/6	0.0502 - 0.0502	19	N	BSL
7440224	Silver	0.03	0.06	mg/kg	QSB2B	6/6	0.0044 - 0.0044	31	N	BSL
7440235	Sodium	31	67	mg/kg	QSB2B	6/6	8.92 - 8.92	Nutrient	N	Nutrient
7440280	Thallium	0.04	0.15	mg/kg	QSB1B	6/6	0.027 - 0.027	3.6	N	BSL
7440622	Vanadium	8	30	mg/kg	QSB2B	6/6	0.207 - 0.207	730	N	BSL
7440666	Zinc	17	61	mg/kg	BSB2B	6/6	0.517 - 0.517	13,622	N	BSL
	TCL Pesticides/PCBs (µg/kg)									
11097691	Aroclor 1254 [4]	5.2E+01	5.2E+01	µg/kg	QSB1A-AVG DUP	1/1	3.6 - 3.6	1.1E+03	N	BSL
	TCL VOCs (µg/kg)									
78933	2-Butanone	1.7E+01	1.7E+01	µg/kg	QSB1C	1/6	5.4 - 5.95	2.9E+04	N	BSL
67641	Acetone	1.8E+01	3.6E+01	µg/kg	QSB1B	6/6	5.4 - 5.95	2.2E+04	N	BSL
75092	Methylene chloride	4.0E+00	5.6E+00	µg/kg	QSB3C	6/6	3.03 - 3.34	1.9E+01	N	BSL
108883	Toluene	6.5E-01	6.5E-01	µg/kg	QSB2B	1/6	0.501 - 0.552	2.7E+04	N	BSL
	TCL SVOCs (µg/kg)									
59507	4-Chloro-3-Methylphenol	9.0E+00	2.9E+01	µg/kg	QSB1B	6/6	5.73 - 6.25	--	Y	NSV
117817	Bis(2-ethylhexyl)phthalate	4.2E+01	4.9E+01	µg/kg	QSB1B	6/6	2.28 - 2.48	2.9E+06	N	BSL
84662	Diethylphthalate	1.1E+01	1.8E+01	µg/kg	QSB1B	6/6	2.09 - 2.28	4.5E+05	N	BSL
84742	Di-n-butylphthalate	2.3E+01	3.8E+01	µg/kg	QSB1B	6/6	4.2 - 4.58	5.0E+06	N	BSL
	SVOC TICs(µg/kg)									
301020	(Z)-9-Octadecenamide	6.2E+01	1.2E+02	µg/kg	QSB1B	5/6	0 - 0	--	Y	NSV
84695	1,2-Benzenedicarboxylicacid, bis(2-methy	3.0E+01	5.1E+01	µg/kg	QSB1B	6/6	0 - 0	--	Y	NSV
104767	2-Ethyl-1-Hexanol	2.1E+01	2.7E+01	µg/kg	QSB1B	3/6	0 - 0	--	Y	NSV
101371	2,4,6-Triallyloxy-1,3,5-triazine	6.7E+01	7.0E+01	µg/kg	QSB3C	2/6	0 - 0	--	Y	NSV
4602840	2,6,10-Dodecatriene-1-ol,3,7,11-trimethy	4.0E+01	4.0E+01	µg/kg	QSB3B	1/6	0 - 0	--	Y	NSV
4128170	2,6,10-Dodecatrien-1-ol,3,7,11-trimethyl	4.0E+01	4.0E+01	µg/kg	QSB2C	1/6	0 - 0	--	Y	NSV
111024	2,6,10,14,18,22-Tetracosahexaene,2,6,10,	5.5E+01	5.5E+01	µg/kg	QSB1C	1/6	0 - 0	--	Y	NSV
4436753	3-Hexene-2,5-dione	8.5E+01	2.1E+02	µg/kg	QSB1B	2/6	0 - 0	--	Y	NSV
90949534	7-Nonenamide	7.7E+01	7.7E+01	µg/kg	QSB2B	1/6	0 - 0	--	Y	NSV
1000143924	7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,	1.9E+01	4.2E+01	µg/kg	QSB1B	6/6	0 - 0	--	Y	NSV
56862625	10-Methylnonadecane	2.7E+01	2.7E+01	µg/kg	QSB2B	1/6	0 - 0	--	Y	NSV
544854	Ditriacontane	2.3E+01	2.3E+01	µg/kg	QSB3C	1/6	0 - 0	--	Y	NSV
1000163047	Docosa-2,6,10,14,18-pentaen-22-al,2,6,10	4.9E+01	4.9E+01	µg/kg	QSB2B	1/6	0 - 0	--	Y	NSV
629970	Docosane	3.2E+01	3.3E+01	µg/kg	QSB3B	2/6	0 - 0	--	Y	NSV
112958	Eicosane	2.7E+01	2.9E+01	µg/kg	QSB1C	2/6	0 - 0	--	Y	NSV

Table 5-22
HHRS SSL Comparison for AOC Q
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Soil to Groundwater SSL (DAF 20)	COPC Flag (Y/N)	Rationale for Selection or Deletion
112845	Erucylamide	3.1E+02	5.4E+02	µg/kg	QSB1B	5/6	0 - 0	--	Y	NSV
629947	Heneicosane	2.1E+01	3.9E+01	µg/kg	QSB1C	5/6	0 - 0	--	Y	NSV
593497	Heptacosane	3.1E+01	3.1E+01	µg/kg	QSB1C	1/6	0 - 0	--	Y	NSV
629787	Heptadecane	2.4E+01	2.4E+01	µg/kg	QSB2C	1/6	0 - 0	--	Y	NSV
7225641	Heptadecane, 9-octyl-	3.6E+01	3.6E+01	µg/kg	QSB2B	1/6	0 - 0	--	Y	NSV
630068	Hexatriacontane	2.7E+01	4.2E+01	µg/kg	QSB1B	2/6	0 - 0	--	Y	NSV
13287246	Nonadecane, 9-methyl-	2.3E+01	4.5E+01	µg/kg	QSB1C	2/6	0 - 0	--	Y	NSV
630024	Octacosane	3.6E+01	4.5E+01	µg/kg	QSB2B	3/6	0 - 0	--	Y	NSV
55282127	Octadecane, 3-ethyl-5-(2-ethylbutyl)-	2.9E+01	2.9E+01	µg/kg	QSB1B	1/6	0 - 0	--	Y	NSV
14167590	Tetratriacontane	3.1E+01	4.2E+01	µg/kg	QSB2B	4/6	0 - 0	--	Y	NSV
	Cyanide (mg/kg)									
57125	Cyanide	4.0E-02	6.0E-02	mg/kg	QSB2B	2/6	0.0356 - 0.0356	1.5E+02	N	BSL

Notes:

CAS = Chemical Abstracts Service
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyls
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
PAH = Polynuclear Aromatic Compound
TIC = Tentatively Identified Compound
[1] = Chromium VI SSL DAF20 value was used
[2] = Lead criteria are Action Levels; see USEPA Region III guidance
[4] = Noncarcinogenic Residential RBC value for Aroclor 1254 was used for screening

SSL DAF20 = Soil Screening Levels at a Dilution Attenuation Factor of 20
Per (SSL) values from the October 31, 2006, RBC Table

ASSL = Above Soil Screening Level
BSL = Below Soil Screening Levels
NSV = No Screening Value Available
* = Surface Soil Detections used for SSL Screening due to testing of one surface soil sample for PCB/Pesticides/Herbicides

Table 5-23
COPC/Background Comparison for SWMU 37
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Surface Soil COPC/Background Comparison

CAS #	Chemical	Minimum Concentration Surface Soil	Maximum Concentration Surface Soil	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Point Estimate[A]	Background Comparison
	TAL Metals (mg/kg)									
7429905	Aluminum	10,600	17,000	mg/kg	37SB2A	3/3	91.5 - 91.5	17,000	40,041	N
7440382	Arsenic	1	5	mg/kg	37SB2A	3/3	0.0232 - 0.0232	5	16	N
7440473	Chromium	15	114	mg/kg	37SB2A	3/3	0.912 - 4.56	114	65	**Y**
7440484	Cobalt	2.8	5.6	mg/kg	37SB3A	3/3	0.208 - 0.208	6	72	N
7439896	Iron	14,300	19,500	mg/kg	37SB2A	3/3	106 - 212	19,500	50,962	N
7439965	Manganese	147	403	mg/kg	37SB3A	3/3	1.32 - 2.64	403	2,543	N
7440622	Vanadium	16	21	mg/kg	37SB3A	3/3	0.207 - 0.207	21	108	N

Total Soil COPC/Background Comparison

CAS #	Chemical	Minimum Concentration Total Soil	Maximum Concentration Total Soil	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Point Estimate[A]	Background Comparison
	TAL Metals (mg/kg)									
7429905	Aluminum	10,600	17,500	mg/kg	37SB2B	9/9	91.5 - 91.5	17,500	40,041	N
7440382	Arsenic	1	5	mg/kg	37SB2A	9/9	0.0232 - 0.0232	5	16	N
7440473	Chromium	15	114	mg/kg	37SB2A	9/9	0.912 - 4.56	114	65	**Y**
7440484	Cobalt	2.8	11	mg/kg	37SB2B	9/9	0.208 - 0.208	11	72	N
7439896	Iron	14,300	28,200	mg/kg	37SB2B	9/9	106 - 212	28,200	50,962	N
7439965	Manganese	147	503	mg/kg	37SB1C	9/9	1.32 - 2.64	503	2,543	N
7440622	Vanadium	16	43	mg/kg	37SB2B	9/9	0.207 - 0.207	43	108	N

Notes:
CAS = Chemical Abstracts Service
TAL = Target Analyte List
mg/kg = Milligram Per Kilogram
[A] = Facility-Wide Background Point Estimate as Reported in the Facility-Wide Background Study Report (IT 2001a)

Table 5-24
COPC/Background Comparison for SWMU 38
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Surface Soil/COPC Background Comparison

CAS #	Chemical	Minimum Concentration Surface Soil	Maximum Concentration Surface Soil	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Point Estimate[A]	Background Comparison
	TAL Metals (mg/kg)									
7429905	Aluminum	11,100	26,400	mg/kg	38SB3A	3/3	1.83 - 9.15	26,400	40,041	N
7440382	Arsenic	0.8	4.6	mg/kg	38SB3A	3/3	0.0232 - 0.0232	4.6	15.8	N
7440473	Chromium	17	82	mg/kg	38SB3A	3/3	0.912 - 0.912	82	65.3	**Y**
7440484	Cobalt	8	10	mg/kg	38SB3A	3/3	0.208 - 0.208	10	72	N
7439896	Iron	16,600	30,700	mg/kg	38SB3A	3/3	10.6 - 21.2	30,700	50,962	N
7439965	Manganese	400	414	mg/kg	38SB2A	3/3	0.264 - 0.264	414	2,543	N
7440622	Vanadium	24	42	mg/kg	38SB3A	3/3	0.207 - 0.207	42	108	N

Total Soil/COPC Background Comparison

CAS #	Chemical	Minimum Concentration Total Soil	Maximum Concentration Total Soil	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Point Estimate[A]	Background Comparison
	TAL Metals (mg/kg)									
7429905	Aluminum	10,600	26,400	mg/kg	38SB3A	9/9	1.83 - 9.15	26,400	40,041	N
7440382	Arsenic	0.8	4.6	mg/kg	38SB3A	9/9	0.0232 - 0.0232	4.6	15.8	N
7440473	Chromium	17	82	mg/kg	38SB3A	9/9	0.912 - 0.912	82	65.3	**Y**
7440484	Cobalt	7.90	13	mg/kg	38SB1B	9/9	0.208 - 0.208	13	72	N
7439896	Iron	16,600	32,200	mg/kg	38SB1B	9/9	10.6 - 21.2	32,200	50,962	N
7439965	Manganese	375	478	mg/kg	38SB3C	9/9	0.264 - 0.264	478	2,543	N
7440622	Vanadium	24	50	mg/kg	38SB1B	9/9	0.207 - 0.207	50	108	N

Notes:
CAS = Chemical Abstracts Service
TAL = Target Analyte List
mg/kg = Milligram Per Kilogram
[A] = Facility-Wide Background Point Estimate as
Reported in the Facility-Wide Background Study Report (IT 2001a)

Table 5-25
COPC/Background Comparison for AOC Q
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Surface Soil COPC/Background Comparison

CAS #	Chemical	Minimum Concentration Surface Soil	Maximum Concentration Surface Soil	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Point Estimates[A]	Background Comparison
	TAL Metals (mg/kg)									
7429905	Aluminum	7,820	14,500	mg/kg	QSB3A	3/3	45.8 - 91.5	14,500	40,041	N
7440382	Arsenic	0.64	1.4	mg/kg	QSB1A-AVG DUP	3/3	0.0232 - 0.0232	1.4	16	N
7440484	Cobalt	6	8	mg/kg	QSB3A	3/3	0.208 - 0.208	8	72	N
7439896	Iron	12,700	20,600	mg/kg	QSB3A	3/3	106 - 212	20,600	50,962	N
7439965	Manganese	319	511	mg/kg	QSB3A	3/3	1.32 - 2.64	511	2,543	N
7440622	Vanadium	17	28	mg/kg	QSB3A	3/3	0.207 - 0.207	28	108	N

Total Soil COPC/Background Comparison

CAS #	Chemical	Minimum Concentration Total Soil	Maximum Concentration Total Soil	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Point Estimates[A]	Background Comparison
	TAL Metals (mg/kg)									
7429905	Aluminum	3,360	14,500	mg/kg	QSB3A	9/9	18.3 - 91.5	14,500	40,041	N
7440382	Arsenic	0.54	1.4	mg/kg	QSB1A-AVG DUP	9/9	0.0232 - 0.0232	1.4	16	N
7440484	Cobalt	3.30	8	mg/kg	QSB2B	9/9	0.208 - 0.208	8	72	N
7439896	Iron	6,530	20,600	mg/kg	QSB3A	9/9	42.4 - 212	20,600	50,962	N
7439965	Manganese	81	511	mg/kg	QSB3A	9/9	0.264 - 2.64	511	2,543	N
7440622	Vanadium	8.3	30	mg/kg	QSB2B	9/9	0.207 - 0.207	30	108	N

Notes:
CAS = Chemical Abstracts Service
TAL = Target Analyte List
mg/kg = Milligram Per Kilogram
[A] = Facility-Wide Background Point Estimate as
Reported in the Facility-Wide Background Study Report (IT 2001a)
DUP AVG = results for duplicate samples averaged

Table 5-26
Detected Chemicals Occurence for SWMU 37
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening
	TAL Metals (mg/kg)							
7429905	Aluminum	10,600	17,000	mg/kg	37SB2A	3/3	91.5 - 91.5	17,000
7440360	Antimony	0.18	1.20	mg/kg	37SB2A	3/3	0.0518 - 0.0518	1.20
7440382	Arsenic	1.00	5.00	mg/kg	37SB2A	3/3	0.0232 - 0.0232	5.00
7440393	Barium	50	103	mg/kg	37SB3A	3/3	0.106 - 0.53	103
7440417	Beryllium	0.48	0.72	mg/kg	37SB2A	3/3	0.0391 - 0.0391	0.72
7440439	Cadmium	1.10	1.90	mg/kg	37SB1A	3/3	0.182 - 0.182	1.90
7440702	Calcium	1,480	106,000	mg/kg	37SB2A	3/3	16.6 - 4150	106,000
7440473	Chromium	15	114	mg/kg	37SB2A	3/3	0.912 - 4.56	114
7440484	Cobalt	3	6	mg/kg	37SB3A	3/3	0.208 - 0.208	6
7440508	Copper	7	193	mg/kg	37SB2A	3/3	0.368 - 1.84	193
7439896	Iron	14,300	19,500	mg/kg	37SB2A	3/3	106 - 212	19,500
7439921	Lead	15	277	mg/kg	37SB2A	3/3	0.0218 - 1.09	277
7439954	Magnesium	2,600	3,780	mg/kg	37SB2A	3/3	16.05 - 16.1	3,780
7439965	Manganese	147	403	mg/kg	37SB3A	3/3	1.32 - 2.64	403
7439976	Mercury	0.01	0.60	mg/kg	37SB2A	3/3	0.0077 - 0.0077	0.60
7440020	Nickel	8	50	mg/kg	37SB2A	3/3	0.0356 - 0.356	50
7440097	Potassium	677	1,290	mg/kg	37SB3A	3/3	5 - 25	1,290
7782492	Selenium	0.42	0.47	mg/kg	37SB1A	3/3	0.0502 - 0.0502	0.47
7440224	Silver	0.05	0.24	mg/kg	37SB2A	3/3	0.0044 - 0.0044	0.24
7440235	Sodium	70	87	mg/kg	37SB2A	3/3	8.92 - 8.92	87
7440280	Thallium	0.06	0.12	mg/kg	37SB3A	3/3	0.027 - 0.027	0.12
7440622	Vanadium	16	21	mg/kg	37SB3A	3/3	0.207 - 0.207	21
7440666	Zinc	67	129	mg/kg	37SB2A	3/3	0.517 - 2.585	129
	TCL Pesticides/PCBs (µg/kg)							
60571	Dieldrin	1.1E+01	1.1E+01	µg/kg	37SB1A	1/1	0.494 - 0.494	1.1E+01
11097691	Aroclor 1254	1.8E+02	1.8E+02	µg/kg	37SB1A	1/1	4.8 - 4.8	1.8E+02
	TCL VOCs (µg/kg)							
78933	2-Butanone	2.4E+01	2.4E+01	µg/kg	37SB3A	1/3	5.7 - 8.2	2.4E+01
67641	Acetone	3.7E+01	1.1E+02	µg/kg	37SB1A	3/3	5.7 - 8.2	1.1E+02
75092	Methylene chloride	4.5E+00	1.0E+01	µg/kg	37SB2A	2/3	3.2 - 4.61	1.0E+01
	TCL SVOCs[1] (µg/kg)							
59507	4-Chloro-3-Methylphenol	1.2E+01	1.2E+01	µg/kg	37SB3A	1/3	5.73 - 125	1.2E+01
117817	Bis(2-ethylhexyl)phthalate	4.6E+01	1.0E+03	µg/kg	37SB2A	3/3	2.28 - 49.7	1.0E+03
84662	Diethylphthalate	1.8E+01	1.2E+02	µg/kg	37SB2A	2/3	2.09 - 45.6	1.2E+02
84742	Di-n-butylphthalate	5.9E+01	2.6E+04	µg/kg	37SB2A	3/3	4.2 - 91.7	2.6E+04
86306	N-Nitrosodiphenylamine	3.0E+02	4.5E+02	µg/kg	37SB1A	2/3	5.23 - 114	4.5E+02

Table 5-26
Detected Chemicals Occurence for SWMU 37
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Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening
	PAHs[2] (µg/kg)							
120127	Anthracene	2.4E+00	2.4E+00	µg/kg	37SB2A	1/3	0.77 - 1.15	2.4E+00
205992	Benzo(b)fluoranthene	7.6E+00	7.6E+00	µg/kg	37SB2A	1/3	1.43 - 2.13	7.6E+00
207089	Benzo(k)fluoranthene	5.5E+00	5.5E+00	µg/kg	37SB2A	1/3	1.1 - 1.64	5.5E+00
218019	Chrysene	1.2E+01	1.2E+01	µg/kg	37SB2A	1/3	1.32 - 1.97	1.2E+01
206440	Fluoranthene	2.2E+00	7.3E+01	µg/kg	37SB1A	3/3	1.87 - 2.79	7.3E+01
193395	Indeno(1,2,3-cd)pyrene	8.1E+00	8.1E+00	µg/kg	37SB2A	1/3	0.77 - 1.15	8.1E+00
85018	Phenanthrene	1.5E+01	1.8E+01	µg/kg	37SB2A	2/3	0.66 - 0.984	1.8E+01
129000	Pyrene	1.8E+00	5.9E+01	µg/kg	37SB2A	3/3	0.99 - 1.48	5.9E+01
	Explosives[3] (mg/kg)							
121142	2,4-Dinitrotoluene	2.7E-01	6.3E-01	mg/kg	37SB2A	2/3	0.142 - 0.142	6.3E-01
	Cyanide (mg/kg)							
57125	Cyanide	5.0E-01	8.0E-01	mg/kg	37SB1A	2/3	0.0356 - 0.0356	8.0E-01

Notes:
CAS = Chemical Abstracts Sevice
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
[1] = SVOCs analyzed by USEPA SW-846 8270 Method 8270C
[2] = PAHs analyzed by USEPA SW-846 Method8310
[3] = Explosives analyzed by USEPA SW-846 Method 8330

Table 5-27
Non-detected Chemicals for SWMU 37
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Parameter Name	Units	Number of Samples	Minimum MDL	Maximum MDL	TSV	Maximum Detection Limit Exceeds TSV
Inorganics							
57125	Cyanide	mg/kg	1	0.0356	0.0356	0.005	**Y**
Pesticides/Herbicides							
72548	4,4'-DDD	µg/kg	1	0.381	0.381	--	NS
72559	4,4'-DDE	µg/kg	1	0.28	0.28	100	N
50293	4,4'-DDT	µg/kg	1	0.288	0.288	100	N
309002	Aldrin	µg/kg	1	0.486	0.486	100	N
319846	alpha-BHC	µg/kg	1	0.485	0.485	100	N
5103719	alpha-Chlordane	µg/kg	1	0.694	0.694	100	N
319857	beta-BHC	µg/kg	1	1.81	1.81	100	N
319868	delta-BHC	µg/kg	1	1.31	1.31	100	N
959988	Endosulfan I	µg/kg	1	1.46	1.46	--	NS
33213659	Endosulfan II	µg/kg	1	0.342	0.342	--	NS
1031078	Endosulfan Sulfate	µg/kg	1	0.805	0.805	--	NS
72208	Endrin	µg/kg	1	0.477	0.477	100	N
7421934	Endrin aldehyde	µg/kg	1	1.78	1.78	--	NS
53494705	Endrin ketone	µg/kg	1	0.44	0.44	--	NS
58899	gamma-BHC (Lindane)	µg/kg	1	0.31	0.31	100	N
5103742	gamma-Chlordane	µg/kg	1	1.12	1.12	100	N
76448	Heptachlor	µg/kg	1	1.13	1.13	--	NS
1024573	Heptachlor epoxide	µg/kg	1	0.728	0.728	100	N
72435	Methoxychlor	µg/kg	1	0.448	0.448	100	N
8001352	Toxaphene	µg/kg	1	37.3	37.3	--	NS
93765	2,4,5-T	µg/kg	1	32	32	--	NS
93721	2,4,5-TP (Silvex)	µg/kg	1	64	64	--	NS
94757	2,4-D	µg/kg	1	256	256	--	NS
94826	2,4-DB	µg/kg	1	992	992	--	NS
75990	Dalapon	µg/kg	1	912	912	--	NS
1918009	Dicamba	µg/kg	1	32	32	--	NS
120365	Dichlorprop	µg/kg	1	272	272	--	NS
88857	Dinoseb	µg/kg	1	21	21	--	NS
94746	MCPA	µg/kg	1	22300	22300	--	NS
93652	MCPP	µg/kg	1	80900	80900	--	NS
PCBs							
12674112	Aroclor 1016	µg/kg	1	25.6	25.6	--	NS
11104282	Aroclor 1221	µg/kg	1	3.2	3.2	--	NS
11141165	Aroclor 1232	µg/kg	1	8	8	--	NS
53469219	Aroclor 1242	µg/kg	1	4.8	4.8	--	NS
12672296	Aroclor 1248	µg/kg	1	8	8	--	NS
11096825	Aroclor 1260	µg/kg	1	11.2	11.2	371	N
VOCs							
71556	1,1,1-Trichloroethane	µg/kg	3	0.486	0.699	300	N
79345	1,1,2,2-Tetrachloroethane	µg/kg	3	0.744	1.07	300	N
76131	1,1,2-Trichloro-1,2,2-trifluoroethane	µg/kg	3	0.865	1.24	--	NS
79005	1,1,2-Trichloroethane	µg/kg	3	0.676	0.973	300	N
75343	1,1-Dichloroethane	µg/kg	3	0.825	1.19	300	N
75354	1,1-Dichloroethene	µg/kg	3	0.836	1.2	--	NS
87616	1,2,3-Trichlorobenzene	µg/kg	3	0.62	0.892	--	NS
120821	1,2,4-Trichlorobenzene	µg/kg	3	0.467	0.672	100	N
96128	1,2-Dibromo-3-chloropropane	µg/kg	3	2.37	3.41	--	NS
106934	1,2-Dibromoethane	µg/kg	3	0.781	1.12	--	NS
95501	1,2-Dichlorobenzene	µg/kg	3	0.552	0.794	100	N
107062	1,2-Dichloroethane	µg/kg	3	0.491	0.707	870,000	N
78875	1,2-Dichloropropane	µg/kg	3	0.668	0.961	700,000	N
541731	1,3-Dichlorobenzene	µg/kg	3	0.306	0.44	--	NS
106467	1,4-Dichlorobenzene	µg/kg	3	0.809	1.16	100	N

Table 5-27
Non-detected Chemicals for SWMU 37
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CAS #	Parameter Name	Units	Number of Samples	Minimum MDL	Maximum MDL	TSV	Maximum Detection Limit Exceeds TSV
78933	2-Butanone	µg/kg	2	7.95	8.2	--	NS
591786	2-Hexanone	µg/kg	3	2.58	3.71	--	NS
108101	4-Methyl-2-pentanone	µg/kg	3	1.66	2.39	--	NS
71432	Benzene	µg/kg	3	0.601	0.864	100	N
74975	Bromochloromethane	µg/kg	3	0.868	1.25	--	NS
75274	Bromodichloromethane	µg/kg	3	0.571	0.822	450,000	N
75252	Bromoform	µg/kg	3	0.659	0.948	--	NS
74839	Bromomethane	µg/kg	3	1.71	2.46	--	NS
75150	Carbon disulfide	µg/kg	3	1.65	2.38	--	NS
56235	Carbon tetrachloride	µg/kg	3	0.531	0.764	300	N
108907	Chlorobenzene	µg/kg	3	0.754	1.08	100	N
75003	Chloroethane	µg/kg	3	1.54	2.21	--	NS
67663	Chloroform	µg/kg	3	0.508	0.731	300	N
74873	Chloromethane	µg/kg	3	0.951	1.37	--	NS
156592	cis-1,2-Dichloroethene	µg/kg	3	0.809	1.16	300	N
10061015	cis-1,3-Dichloropropene	µg/kg	3	0.56	0.805	--	NS
110827	Cyclohexane	µg/kg	3	0.36	0.518	--	NS
124481	Dibromochloromethane	µg/kg	3	0.589	0.848	--	NS
75718	Dichlorodifluoromethane	µg/kg	3	0.762	1.1	--	NS
100414	Ethylbenzene	µg/kg	3	0.482	0.694	100	**Y**
98828	Isopropylbenzene	µg/kg	3	0.622	0.895	--	NS
79209	Methyl acetate	µg/kg	3	3.96	5.69	--	NS
1634044	methyl tert-Butyl ether	µg/kg	3	0.731	1.05	--	NS
108872	Methylcyclohexane	µg/kg	3	0.963	1.39	--	NS
75092	Methylene chloride	µg/kg	1	4.61	4.61	300	N
100425	Styrene	µg/kg	3	0.504	0.725	100	N
127184	Tetrachloroethene	µg/kg	3	0.699	1.01	300	N
108883	Toluene	µg/kg	3	0.529	0.761	100	N
156605	trans-1,2-Dichloroethene	µg/kg	3	0.801	1.15	300	N
10061026	trans-1,3-Dichloropropene	µg/kg	3	0.594	0.854	--	NS
79016	Trichloroethene	µg/kg	3	0.772	1.11	300	N
75694	Trichlorofluoromethane	µg/kg	3	0.847	1.22	--	NS
75014	Vinyl Chloride	µg/kg	3	0.422	0.607	300	N
1330207	Xylenes	µg/kg	3	0.48	0.69	100	N
SVOCs							
92524	1,1'-Biphenyl	µg/kg	3	2.71	59	--	NS
95943	1,2,4,5-Tetrachlorobenzene	µg/kg	3	31.6	689	--	NS
108601	2,2'-oxybis(1-Chloropropane)	µg/kg	3	1.45	31.7	--	NS
95954	2,4,5-Trichlorophenol	µg/kg	3	3.67	80.2	100	**Y**
88062	2,4,6-Trichlorophenol	µg/kg	3	2.88	62.9	100	**Y**
120832	2,4-Dichlorophenol	µg/kg	3	3.87	84.5	100	**Y**
105679	2,4-Dimethylphenol	µg/kg	3	8.73	191	100	**Y**
51285	2,4-Dinitrophenol	µg/kg	3	3.52	76.8	20,000	N
121142	2,4-Dinitrotoluene	µg/kg	1	3.47	3.47	--	NS
606202	2,6-Dinitrotoluene	µg/kg	3	30.5	665	--	NS
91587	2-Chloronaphthalene	µg/kg	3	2.53	55.2	--	NS
95578	2-Chlorophenol	µg/kg	3	2.21	48.2	100	**Y**
91576	2-Methylnaphthalene	µg/kg	3	3.01	65.8	--	NS
95487	2-Methylphenol	µg/kg	3	5.32	116	100	**Y**
88744	2-Nitroaniline	µg/kg	3	5.06	110	--	NS
88755	2-Nitrophenol	µg/kg	3	1.87	40.8	--	NS
91941	3,3'-Dichlorobenzidine	µg/kg	3	73.4	1600	--	NS
99092	3-Nitroaniline	µg/kg	3	36.6	799	--	NS
534521	4,6-Dinitro-2-methylphenol	µg/kg	3	4.96	108	--	NS
101553	4-Bromophenyl-phenylether	µg/kg	3	3.72	81.1	--	NS
59507	4-Chloro-3-Methylphenol	µg/kg	2	83.4	125	--	NS

Table 5-27
Non-detected Chemicals for SWMU 37
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CAS #	Parameter Name	Units	Number of Samples	Minimum MDL	Maximum MDL	TSV	Maximum Detection Limit Exceeds TSV
106478	4-Chloroaniline	µg/kg	3	1.39	30.2	--	NS
7005723	4-Chlorophenyl-phenylether	µg/kg	3	3.6	78.5	--	NS
106445	4-Methylphenol	µg/kg	3	7.01	153	100	N
100016	4-Nitroaniline	µg/kg	3	7.98	174	--	NS
100027	4-Nitrophenol	µg/kg	3	3.11	67.9	100	**Y**
83329	Acenaphthene	µg/kg	3	1.89	41.3	100	N
208968	Acenaphthylene	µg/kg	3	1.65	36	100	N
98862	Acetophenone	µg/kg	3	2.09	45.6	--	NS
120127	Anthracene	µg/kg	3	5.08	111	100	N
1912249	Atrazine	µg/kg	3	7.57	165	--	NS
100527	Benzaldehyde	µg/kg	3	4.46	97.2	--	NS
56553	Benzo(a)anthracene	µg/kg	3	14.6	319	100	N
50328	Benzo(a)pyrene	µg/kg	3	6.28	1370	100	N
205992	Benzo(b)fluoranthene	µg/kg	3	10.7	2340	100	N
191242	Benzo(g,h,i)perylene	µg/kg	3	9.59	2090	100	N
207089	Benzo(k)fluoranthene	µg/kg	3	14.7	3220	100	N
111911	Bis(2-chloroethoxy)methane	µg/kg	3	3.45	75.4	--	NS
111444	Bis(2-chloroethyl)ether	µg/kg	3	1.9	41.5	--	NS
85687	Butylbenzylphthalate	µg/kg	3	4.93	108	--	NS
105602	Caprolactam	µg/kg	3	7.02	153	--	NS
86748	Carbazole	µg/kg	3	6.71	146	--	NS
218019	Chrysene	µg/kg	3	11.2	245	100	N
53703	Dibenz(a,h)anthracene	µg/kg	3	6.49	1420	100	N
132649	Dibenzofuran	µg/kg	3	3.48	75.8	--	NS
84662	Diethylphthalate	µg/kg	1	30.4	30.4	100,000	N
131113	Dimethylphthalate	µg/kg	3	3.64	79.4	200,000	N
117840	Di-n-octylphthalate	µg/kg	3	3.41	74.4	--	NS
206440	Fluoranthene	µg/kg	1	2.59	2.59	100	N
86737	Fluorene	µg/kg	3	1.85	40.3	100	N
118741	Hexachlorobenzene	µg/kg	3	2.76	60.2	1,000,000	N
87683	Hexachlorobutadiene	µg/kg	3	4.26	92.9	--	NS
77474	Hexachlorocyclopentadiene	µg/kg	3	2.18	47.5	10,000	N
67721	Hexachloroethane	µg/kg	3	2.57	56	--	NS
193395	Indeno(1,2,3-cd)pyrene	µg/kg	3	4.31	941	100	N
78591	Isophorone	µg/kg	3	1.9	41.5	--	NS
91203	Naphthalene	µg/kg	3	3.03	66	100	N
98953	Nitrobenzene	µg/kg	3	3.52	76.8	40,000	N
621647	N-Nitrosodi-n-propylamine	µg/kg	3	3.62	79	--	NS
86306	N-Nitrosodiphenylamine	µg/kg	1	5.23	5.23	20,000	N
87865	Pentachlorophenol	µg/kg	3	4.83	105	100	N
85018	Phenanthrene	µg/kg	2	2.53	55.2	100	N
108952	Phenol	µg/kg	3	4.36	95	100	N
129000	Pyrene	µg/kg	1	1.63	1.63	100	N
PAHs							
83329	Acenaphthene	µg/kg	3	10.3	15.4	100	N
208968	Acenaphthylene	µg/kg	3	12.8	19	100	N
120127	Anthracene	µg/kg	1	1.15	1.15	100	N
120127	Anthracene	µg/kg	2	0.77	1.15	100	N
56553	Benzo(a)anthracene	µg/kg	3	0.88	1.31	100	N
50328	Benzo(a)pyrene	µg/kg	3	1.1	1.64	100	N
205992	Benzo(b)fluoranthene	µg/kg	2	1.43	2.13	100	N
191242	Benzo(g,h,i)perylene	µg/kg	3	13.8	20.5	100	N
207089	Benzo(k)fluoranthene	µg/kg	2	1.1	1.64	100	N
218019	Chrysene	µg/kg	2	1.32	1.97	100	N
53703	Dibenz(a,h)anthracene	µg/kg	3	1.54	2.3	100	N
86737	Fluorene	µg/kg	3	1.43	2.13	100	N

Table 5-27
Non-detected Chemicals for SWMU 37
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CAS #	Parameter Name	Units	Number of Samples	Minimum MDL	Maximum MDL	TSV	Maximum Detection Limit Exceeds TSV
193395	Indeno(1,2,3-cd)pyrene	µg/kg	2	0.77	1.15	100	N
91203	Naphthalene	µg/kg	3	8.69	13	100	N
85018	Phenanthrene	µg/kg	1	0.66	0.66	100	N
Explosives							
99354	1,3,5-Trinitrobenzene	mg/kg	3	0.14	0.14	--	NS
99650	1,3-Dinitrobenzene	mg/kg	3	0.159	0.159	--	NS
118967	2,4,6-Trinitrotoluene	mg/kg	3	0.167	0.167	--	NS
121142	2,4-Dinitrotoluene	mg/kg	1	0.142	0.142	--	NS
606202	2,6-Dinitrotoluene	mg/kg	3	0.25	0.25	--	NS
35572782	2-Amino-4,6-dinitrotoluene	mg/kg	3	0.151	0.151	--	NS
88722	2-Nitrotoluene	mg/kg	3	0.266	0.266	--	NS
99081	3-Nitrotoluene	mg/kg	3	0.184	0.184	--	NS
1946510	4-Amino-2,6-dinitrotoluene	mg/kg	3	0.162	0.162	--	NS
99990	4-Nitrotoluene	mg/kg	3	0.251	0.251	--	NS
2691410	HMX (Octahydro-1,3,5,7-tetranitro-1,3,5,	mg/kg	3	0.229	0.229	--	NS
98953	Nitrobenzene	mg/kg	3	0.102	0.102	40,000	N
121824	RDX (Hexahydro-1,3,5-trinitro-1,3,5-tria	mg/kg	3	0.131	0.131	--	NS
Nitroglycerin/PETN							
628966	Nitroglycerin	mg/kg	3	0.183	0.372	--	NS
78115	PETN	mg/kg	3	0.253	0.511	--	NS

Notes:
CAS = Chemical Abstracts Service
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
NS = No screening value
TSV = Toxicity Screening Value
MDL = Method Detection Limit

Table 5-28
Detected Chemicals Occurrence for SWMU 38
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening
	TAL Metals (mg/kg)							
7429905	Aluminum	11,100	26,400	mg/kg	38SB3A	3/3	1.83 - 9.15	26,400
7440360	Antimony	0.26	0.31	mg/kg	38SB1A	2/3	0.0518 - 0.0518	0.31
7440382	Arsenic	0.80	4.60	mg/kg	38SB3A	3/3	0.0232 - 0.0232	4.60
7440393	Barium	94	116	mg/kg	38SB3A	3/3	0.106 - 0.106	116
7440417	Beryllium	0.60	0.91	mg/kg	38SB3A	3/3	0.0391 - 0.0391	0.91
7440439	Cadmium	1.40	1.90	mg/kg	38SB3A	3/3	0.182 - 0.182	1.90
7440702	Calcium	1,150	27,600	mg/kg	38SB1A	3/3	16.6 - 16.6	27,600
7440473	Chromium	17	82	mg/kg	38SB3A	3/3	0.912 - 0.912	82
7440484	Cobalt	8	10	mg/kg	38SB3A	3/3	0.208 - 0.208	10
7440508	Copper	7	85	mg/kg	38SB3A	3/3	0.368 - 0.368	85
7439896	Iron	16,600	30,700	mg/kg	38SB3A	3/3	10.6 - 21.2	30,700
7439921	Lead	10	52	mg/kg	38SB1A	3/3	0.0218 - 0.218	52
7439954	Magnesium	2,840	5,590	mg/kg	38SB3A	3/3	3.21 - 3.21	5,590
7439965	Manganese	400	414	mg/kg	38SB2A	3/3	0.264 - 0.264	414
7439976	Mercury	0.01	0.16	mg/kg	38SB1A	3/3	0.0077 - 0.0077	0.16
7440020	Nickel	11	35	mg/kg	38SB3A	3/3	0.0356 - 0.0356	35
7440097	Potassium	1,600	2,410	mg/kg	38SB3A	3/3	5 - 5	2,410
7782492	Selenium	0.55	0.64	mg/kg	38SB3A	3/3	0.0502 - 0.0502	0.64
7440224	Silver	0.06	0.14	mg/kg	38SB3A	3/3	0.0044 - 0.0044	0.14
7440235	Sodium	38	55	mg/kg	38SB1A	3/3	8.92 - 8.92	55
7440280	Thallium	0.15	0.19	mg/kg	38SB3A	3/3	0.027 - 0.027	0.19
7440622	Vanadium	24	42	mg/kg	38SB3A	3/3	0.207 - 0.207	42
7440666	Zinc	55	100	mg/kg	38SB3A	3/3	0.517 - 0.517	100
	TCL Pesticides/PCBs (µg/kg)							
11097691	Aroclor 1254	5.7E+02	5.7E+02	µg/kg	38SB1A	1/1	4.2 - 4.2	5.7E+02
	TCL VOCs (µg/kg)							
78933	2-Butanone	2.6E+01	2.6E+01	µg/kg	38SB2A	1/3	5.8 - 8.9	2.6E+01
67641	Acetone	1.0E+02	2.0E+02	µg/kg	38SB2A	3/3	5.8 - 8.9	2.0E+02
108883	Toluene	3.0E+00	3.0E+00	µg/kg	38SB2A	1/3	0.538 - 0.826	3.0E+00
	TCL SVOCs[1] (µg/kg)							
121142	2,4-Dinitrotoluene	1.2E+02	1.2E+02	µg/kg	38SB1A	1/3	3.78 - 56.7	1.2E+02
59507	4-Chloro-3-Methylphenol	2.5E+01	2.5E+01	µg/kg	38SB2A	1/3	6.25 - 93.8	2.5E+01
117817	Bis(2-ethylhexyl)phthalate	4.6E+01	1.3E+03	µg/kg	38SB3A	3/3	2.48 - 37.3	1.3E+03
85687	Butylbenzylphthalate	5.2E+01	5.2E+01	µg/kg	38SB2A	1/3	5.38 - 80.6	5.2E+01
84662	Diethylphthalate	4.0E+00	4.0E+00	µg/kg	38SB2A	1/3	2.28 - 34.2	4.0E+00
84742	Di-n-butylphthalate	4.2E+01	1.4E+04	µg/kg	38SB1A	3/3	4.58 - 68.8	1.4E+04
86306	N-Nitrosodiphenylamine	1.5E+02	1.6E+02	µg/kg	38SB3A	2/3	5.7 - 85.5	1.6E+02

Table 5-28
Detected Chemicals Occurrence for SWMU 38
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening
	PAHs[2] (µg/kg)							
120127	Anthracene	6.6E+00	1.3E+01	µg/kg	38SB3A	2/3	0.84 - 1.26	1.3E+01
56553	Benzo(a)anthracene	8.2E+01	8.2E+01	µg/kg	38SB3A	1/3	0.96 - 1.44	8.2E+01
205992	Benzo(b)fluoranthene	1.5E+01	2.3E+01	µg/kg	38SB1A	2/3	1.56 - 2.34	2.3E+01
207089	Benzo(k)fluoranthene	7.5E+00	7.5E+00	µg/kg	38SB3A	1/3	1.2 - 1.8	7.5E+00
218019	Chrysene	2.8E+01	2.9E+01	µg/kg	38SB1A	2/3	1.44 - 2.16	2.9E+01
206440	Fluoranthene	1.1E+02	1.8E+02	µg/kg	38SB3A	2/3	2.04 - 3.06	1.8E+02
86737	Fluorene	4.6E+00	8.9E+00	µg/kg	38SB3A	2/3	1.56 - 2.34	8.9E+00
85018	Phenanthrene	4.6E+01	1.0E+02	µg/kg	38SB3A	2/3	0.72 - 1.08	1.0E+02
129000	Pyrene	5.6E+01	9.8E+01	µg/kg	38SB3A	2/3	1.08 - 1.62	9.8E+01
	Cyanide (mg/kg)							
57125	Cyanide	3.0E-01	5.7E-01	mg/kg	38SB3A	2/3	0.0356 - 0.0356	5.7E-01

Notes:

CAS = Chemical Abstracts Sevice
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
[1] = SVOCs analyzed by USEPA SW-846 8270 Method 8270C
[2] = PAHs analyzed by USEPA SW-846 Method8310

Table 5-29
Non-detected Chemical for SWMU 38
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Parameter Name	Units	Number of Samples	Minimum MDL	Maximum MDL	TSV	Maximum Detection Limit Exceeds TSV
Inorganics							
7440360	Antimony	mg/kg	1	0.0518	0.0518	5	**Y**
57125	Cyanide	mg/kg	1	0.0356	0.0356	0.005	**Y**
Pesticides/Herbicides							
72548	4,4'-DDD	µg/kg	1	0.333	0.333	--	NS
72559	4,4'-DDE	µg/kg	1	0.245	0.245	100	**Y**
50293	4,4'-DDT	µg/kg	1	0.252	0.252	100	N
309002	Aldrin	µg/kg	1	0.426	0.426	100	N
319846	alpha-BHC	µg/kg	1	0.424	0.424	100	N
5103719	alpha-Chlordane	µg/kg	1	0.608	0.608	100	N
319857	beta-BHC	µg/kg	1	1.58	1.58	100	N
319868	delta-BHC	µg/kg	1	1.15	1.15	100	N
60571	Dieldrin	µg/kg	1	0.433	0.433	100	N
959988	Endosulfan I	µg/kg	1	1.27	1.27	--	NS
33213659	Endosulfan II	µg/kg	1	0.3	0.3	--	NS
1031078	Endosulfan Sulfate	µg/kg	1	0.704	0.704	--	NS
72208	Endrin	µg/kg	1	0.417	0.417	100	N
7421934	Endrin aldehyde	µg/kg	1	1.55	1.55	--	NS
53494705	Endrin ketone	µg/kg	1	0.385	0.385	--	NS
58899	gamma-BHC (Lindane)	µg/kg	1	0.272	0.272	100	N
5103742	gamma-Chlordane	µg/kg	1	0.984	0.984	100	N
76448	Heptachlor	µg/kg	1	0.987	0.987	--	NS
1024573	Heptachlor epoxide	µg/kg	1	0.637	0.637	100	N
72435	Methoxychlor	µg/kg	1	0.392	0.392	100	N
8001352	Toxaphene	µg/kg	1	32.6	32.6	--	NS
93765	2,4,5-T	µg/kg	1	28	28	--	NS
93721	2,4,5-TP (Silvex)	µg/kg	1	56	56	--	NS
94757	2,4-D	µg/kg	1	224	224	--	NS
94826	2,4-DB	µg/kg	1	868	868	--	NS
75990	Dalapon	µg/kg	1	798	798	--	NS
1918009	Dicamba	µg/kg	1	28	28	--	NS
120365	Dichlorprop	µg/kg	1	238	238	--	NS
88857	Dinoseb	µg/kg	1	29.4	29.4	--	NS
94746	MCPA	µg/kg	1	19500	19500	--	NS
93652	MCPP	µg/kg	1	70800	70800	--	NS
PCBs							
12674112	Aroclor 1016	µg/kg	1	22.4	22.4	--	NS
11104282	Aroclor 1221	µg/kg	1	2.8	2.8	--	NS
11141165	Aroclor 1232	µg/kg	1	7	7	--	NS
53469219	Aroclor 1242	µg/kg	1	4.2	4.2	--	NS
12672296	Aroclor 1248	µg/kg	1	7	7	--	NS
11096825	Aroclor 1260	µg/kg	1	9.8	9.8	371	N
VOCs							
71556	1,1,1-Trichloroethane	µg/kg	3	0.494	0.758	300	N
79345	1,1,2,2-Tetrachloroethane	µg/kg	3	0.757	1.16	300	N
76131	1,1,2-Trichloro-1,2,2-trifluoroethane	µg/kg	3	0.88	1.35	--	NS
79005	1,1,2-Trichloroethane	µg/kg	3	0.688	1.06	300	N
75343	1,1-Dichloroethane	µg/kg	3	0.84	1.29	300	N
75354	1,1-Dichloroethene	µg/kg	3	0.85	1.3	--	NS
87616	1,2,3-Trichlorobenzene	µg/kg	3	0.631	0.968	--	NS
120821	1,2,4-Trichlorobenzene	µg/kg	3	0.476	0.73	100	N
96128	1,2-Dibromo-3-chloropropane	µg/kg	3	2.41	3.7	--	NS
106934	1,2-Dibromoethane	µg/kg	3	0.795	1.22	--	NS
95501	1,2-Dichlorobenzene	µg/kg	3	0.561	0.862	100	N
107062	1,2-Dichloroethane	µg/kg	3	0.5	0.767	870,000	N
78875	1,2-Dichloropropane	µg/kg	3	0.68	1.04	700,000	N

Table 5-29
Non-detected Chemical for SWMU 38
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Parameter Name	Units	Number of Samples	Minimum MDL	Maximum MDL	TSV	Maximum Detection Limit Exceeds TSV
541731	1,3-Dichlorobenzene	µg/kg	3	0.311	0.477	--	NS
106467	1,4-Dichlorobenzene	µg/kg	3	0.824	1.26	100	N
78933	2-Butanone	µg/kg	2	7.15	8.9	--	NS
591786	2-Hexanone	µg/kg	3	2.62	4.02	--	NS
108101	4-Methyl-2-pentanone	µg/kg	3	1.69	2.6	--	NS
71432	Benzene	µg/kg	3	0.611	0.938	100	N
74975	Bromochloromethane	µg/kg	3	0.883	1.35	--	NS
75274	Bromodichloromethane	µg/kg	3	0.581	0.892	450,000	N
75252	Bromoform	µg/kg	3	0.67	1.03	--	NS
74839	Bromomethane	µg/kg	3	1.74	2.67	--	NS
75150	Carbon disulfide	µg/kg	3	1.68	2.58	--	NS
56235	Carbon tetrachloride	µg/kg	3	0.541	0.829	300	N
108907	Chlorobenzene	µg/kg	3	0.767	1.18	100	N
75003	Chloroethane	µg/kg	3	1.57	2.4	--	NS
67663	Chloroform	µg/kg	3	0.517	0.794	300	N
74873	Chloromethane	µg/kg	3	0.967	1.48	--	NS
156592	cis-1,2-Dichloroethene	µg/kg	3	0.824	1.26	300	N
10061015	cis-1,3-Dichloropropene	µg/kg	3	0.57	0.874	--	NS
110827	Cyclohexane	µg/kg	3	0.367	0.562	--	NS
124481	Dibromochloromethane	µg/kg	3	0.6	0.92	--	NS
75718	Dichlorodifluoromethane	µg/kg	3	0.775	1.19	--	NS
100414	Ethylbenzene	µg/kg	3	0.491	0.753	100	N
98828	Isopropylbenzene	µg/kg	3	0.633	0.972	--	NS
79209	Methyl acetate	µg/kg	3	4.03	6.18	--	NS
1634044	methyl tert-Butyl ether	µg/kg	3	0.744	1.14	--	NS
108872	Methylcyclohexane	µg/kg	3	0.98	1.5	--	NS
75092	Methylene chloride	µg/kg	3	3.26	5	300	N
100425	Styrene	µg/kg	3	0.513	0.787	100	N
127184	Tetrachloroethene	µg/kg	3	0.711	1.09	300	N
108883	Toluene	µg/kg	2	0.664	0.826	100	N
156605	trans-1,2-Dichloroethene	µg/kg	3	0.815	1.25	300	N
10061026	trans-1,3-Dichloropropene	µg/kg	3	0.604	0.927	--	NS
79016	Trichloroethene	µg/kg	3	0.785	1.21	300	N
75694	Trichlorofluoromethane	µg/kg	3	0.862	1.32	--	NS
75014	Vinyl Chloride	µg/kg	3	0.429	0.659	300	N
1330207	Xylenes	µg/kg	3	0.488	0.749	100	N
SVOCs							
92524	1,1'-Biphenyl	µg/kg	3	2.95	44.3	--	NS
95943	1,2,4,5-Tetrachlorobenzene	µg/kg	3	34.4	517	--	NS
108601	2,2'-oxybis(1-Chloropropane)	µg/kg	3	1.58	23.8	--	NS
95954	2,4,5-Trichlorophenol	µg/kg	3	4.01	60.1	100	**Y**
88062	2,4,6-Trichlorophenol	µg/kg	3	3.14	47.2	100	**Y**
120832	2,4-Dichlorophenol	µg/kg	3	4.22	63.4	100	**Y**
105679	2,4-Dimethylphenol	µg/kg	3	9.53	143	100	**Y**
51285	2,4-Dinitrophenol	µg/kg	3	3.84	57.6	20,000	N
121142	2,4-Dinitrotoluene	µg/kg	2	3.78	56.7	--	NS
606202	2,6-Dinitrotoluene	µg/kg	3	33.2	499	--	NS
91587	2-Chloronaphthalene	µg/kg	3	2.76	41.4	--	NS
95578	2-Chlorophenol	µg/kg	3	2.41	36.2	100	**Y**
91576	2-Methylnaphthalene	µg/kg	3	3.29	49.3	--	NS
95487	2-Methylphenol	µg/kg	3	5.81	87.1	100	**Y**
88744	2-Nitroaniline	µg/kg	3	5.52	82.8	--	NS
88755	2-Nitrophenol	µg/kg	3	2.04	30.6	--	NS
91941	3,3'-Dichlorobenzidine	µg/kg	3	80	1200	--	NS
99092	3-Nitroaniline	µg/kg	3	40	599	--	NS
534521	4,6-Dinitro-2-methylphenol	µg/kg	3	5.41	81.2	--	NS

Table 5-29
Non-detected Chemical for SWMU 38
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Parameter Name	Units	Number of Samples	Minimum MDL	Maximum MDL	TSV	Maximum Detection Limit Exceeds TSV
101553	4-Bromophenyl-phenylether	µg/kg	3	4.06	60.8	--	NS
59507	4-Chloro-3-Methylphenol	µg/kg	2	72.9	93.8	--	NS
106478	4-Chloroaniline	µg/kg	3	1.51	22.7	--	NS
7005723	4-Chlorophenyl-phenylether	µg/kg	3	3.92	58.9	--	NS
106445	4-Methylphenol	µg/kg	3	7.64	115	100	N
100016	4-Nitroaniline	µg/kg	3	8.7	131	--	NS
100027	4-Nitrophenol	µg/kg	3	3.4	50.9	100	**Y**
83329	Acenaphthene	µg/kg	3	2.06	31	100	N
208968	Acenaphthylene	µg/kg	3	1.8	27	100	N
98862	Acetophenone	µg/kg	3	2.28	34.2	--	NS
120127	Anthracene	µg/kg	3	5.54	83.2	100	N
1912249	Atrazine	µg/kg	3	8.26	124	--	NS
100527	Benzaldehyde	µg/kg	3	4.86	72.9	--	NS
56553	Benzo(a)anthracene	µg/kg	3	16	239	100	N
50328	Benzo(a)pyrene	µg/kg	3	6.85	508	100	N
205992	Benzo(b)fluoranthene	µg/kg	3	11.7	869	100	N
191242	Benzo(g,h,i)perylene	µg/kg	3	10.5	776	100	N
207089	Benzo(k)fluoranthene	µg/kg	3	16.1	1190	100	N
111911	Bis(2-chloroethoxy)methane	µg/kg	3	3.77	56.5	--	NS
111444	Bis(2-chloroethyl)ether	µg/kg	3	2.08	31.1	--	NS
85687	Butylbenzylphthalate	µg/kg	2	62.7	80.6	--	NS
105602	Caprolactam	µg/kg	3	7.66	115	--	NS
86748	Carbazole	µg/kg	3	7.32	110	--	NS
218019	Chrysene	µg/kg	3	12.2	184	100	N
53703	Dibenz(a,h)anthracene	µg/kg	3	7.08	525	100	N
132649	Dibenzofuran	µg/kg	3	3.79	56.9	--	NS
84662	Diethylphthalate	µg/kg	2	26.6	34.2	100,000	N
131113	Dimethylphthalate	µg/kg	3	3.97	59.6	200,000	N
117840	Di-n-octylphthalate	µg/kg	3	3.72	55.8	--	NS
206440	Fluoranthene	µg/kg	1	2.82	2.82	100	N
86737	Fluorene	µg/kg	3	2.02	30.2	100	N
118741	Hexachlorobenzene	µg/kg	3	3.01	45.2	1,000,000	N
87683	Hexachlorobutadiene	µg/kg	3	4.64	69.7	--	NS
77474	Hexachlorocyclopentadiene	µg/kg	3	2.38	35.6	10,000	N
67721	Hexachloroethane	µg/kg	3	2.8	42	--	NS
193395	Indeno(1,2,3-cd)pyrene	µg/kg	3	4.7	349	100	N
78591	Isophorone	µg/kg	3	2.08	31.1	--	NS
91203	Naphthalene	µg/kg	3	3.3	49.5	100	N
98953	Nitrobenzene	µg/kg	3	3.84	57.6	40,000	N
621647	N-Nitrosodi-n-propylamine	µg/kg	3	3.95	59.2	--	NS
86306	N-Nitrosodiphenylamine	µg/kg	1	5.7	5.7	20,000	N
87865	Pentachlorophenol	µg/kg	3	5.27	79	100	N
85018	Phenanthrene	µg/kg	1	2.76	2.76	100	N
108952	Phenol	µg/kg	3	4.75	71.3	100	N
129000	Pyrene	µg/kg	1	1.78	1.78	100	N
PAHs							
83329	Acenaphthene	µg/kg	3	11.3	16.9	100	N
208968	Acenaphthylene	µg/kg	3	13.9	20.9	100	N
120127	Anthracene	µg/kg	1	0.84	0.84	100	N
56553	Benzo(a)anthracene	µg/kg	2	0.96	1.12	100	N
50328	Benzo(a)pyrene	µg/kg	3	1.2	1.8	100	N
205992	Benzo(b)fluoranthene	µg/kg	1	1.56	1.56	100	N
191242	Benzo(g,h,i)perylene	µg/kg	3	15	22.5	100	N
207089	Benzo(k)fluoranthene	µg/kg	2	1.2	1.4	100	N
218019	Chrysene	µg/kg	1	1.44	1.44	100	N
53703	Dibenz(a,h)anthracene	µg/kg	3	1.68	2.52	100	N

Table 5-29
Non-detected Chemical for SWMU 38
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Parameter Name	Units	Number of Samples	Minimum MDL	Maximum MDL	TSV	Maximum Detection Limit Exceeds TSV
206440	Fluoranthene	µg/kg	1	2.04	2.04	100	N
86737	Fluorene	µg/kg	1	1.56	1.56	100	N
193395	Indeno(1,2,3-cd)pyrene	µg/kg	3	0.84	1.26	100	N
91203	Naphthalene	µg/kg	3	9.48	14.2	100	N
85018	Phenanthrene	µg/kg	1	0.72	0.72	100	N
129000	Pyrene	µg/kg	1	1.08	1.08	100	N
Explosives							
99354	1,3,5-Trinitrobenzene	mg/kg	3	0.14	0.14	--	NS
99650	1,3-Dinitrobenzene	mg/kg	3	0.159	0.159	--	NS
118967	2,4,6-Trinitrotoluene	mg/kg	3	0.167	0.167	--	NS
121142	2,4-Dinitrotoluene	mg/kg	3	0.142	0.142	--	NS
606202	2,6-Dinitrotoluene	mg/kg	3	0.25	0.25	--	NS
35572782	2-Amino-4,6-dinitrotoluene	mg/kg	3	0.151	0.151	--	NS
88722	2-Nitrotoluene	mg/kg	3	0.266	0.266	--	NS
99081	3-Nitrotoluene	mg/kg	3	0.184	0.184	--	NS
1946510	4-Amino-2,6-dinitrotoluene	mg/kg	3	0.162	0.162	--	NS
99990	4-Nitrotoluene	mg/kg	3	0.251	0.251	--	NS
2691410	HMX (Octahydro-1,3,5,7-tetranitro-1,3,5,	mg/kg	3	0.229	0.229	--	NS
98953	Nitrobenzene	mg/kg	3	0.102	0.102	40,000	N
121824	RDX (Hexahydro-1,3,5-trinitro-1,3,5-tria	mg/kg	3	0.131	0.131	--	NS
Nitroglycerin/PETN							
628966	Nitroglycerin	mg/kg	3	0.188	0.241	--	NS
78115	PETN	mg/kg	3	0.259	0.332	--	NS

Notes:
CAS = Chemical Abstracts Service
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
NS = No screening value
TSV = Toxicity Screening Value
MDL = Method Detection Limit

Table 5-30
Detected Chemicals Occurrence for AOC Q
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening
	TAL Metals (mg/kg)							
7429905	Aluminum	7,820	16,000	mg/kg	QSB1A	3/3	45.8 - 91.5	16,000
7440360	Antimony	0.13	0.19	mg/kg	QSB1A	3/3	0.0518 - 0.0518	0.19
7440382	Arsenic	0.64	1.4	mg/kg	QSB3A	3/3	0.0232 - 0.0232	1.40
7440393	Barium	96	148	mg/kg	QSB1A	3/3	0.106 - 0.53	148
7440417	Beryllium	0.58	0.89	mg/kg	QSB3A	3/3	0.0391 - 0.0391	0.89
7440439	Cadmium	0.88	1.6	mg/kg	QSB3A	3/3	0.182 - 0.182	1.60
7440702	Calcium	943	25,600	mg/kg	QSB3A	3/3	16.6 - 166	25,600
7440473	Chromium	12	21	mg/kg	QSB1A	3/3	0.912 - 0.912	21
7440484	Cobalt	5.9	8.4	mg/kg	QSB3A	3/3	0.208 - 0.208	8
7440508	Copper	6	12	mg/kg	QSB3A	3/3	0.368 - 0.368	12
7439896	Iron	12,700	22,600	mg/kg	QSB1A	3/3	106 - 212	22,600
7439921	Lead	9.6	21	mg/kg	QSB3A	3/3	0.0218 - 0.0218	21
7439954	Magnesium	2,220	3,530	mg/kg	QSB1A	3/3	6.05 - 16.05	3,530
7439965	Manganese	319	519	mg/kg	QSB1A	3/3	1.32 - 2.64	519
7439976	Mercury	0.015	0.019	mg/kg	QSB3A	2/3	0.0077 - 0.0077	0.02
7440020	Nickel	8.5	15	mg/kg	QSB3A	3/3	0.0356 - 0.0356	15
7440097	Potassium	1,070	2,180	mg/kg	QSB1A	3/3	25 - 25	2,180
7782492	Selenium	0.35	0.7	mg/kg	QSB3A	3/3	0.0502 - 0.0502	0.67
7440224	Silver	0.04	0.07	mg/kg	QSB1A	3/3	0.0044 - 0.0044	0.07
7440235	Sodium	60	64	mg/kg	QSB1A	3/3	8.92 - 8.92	64
7440280	Thallium	0.10	0.16	mg/kg	QSB3A	3/3	0.027 - 0.027	0.16
7440622	Vanadium	17	29	mg/kg	QSB1A	3/3	0.207 - 0.207	29
7440666	Zinc	58	67	mg/kg	QSB1A	3/3	0.517 - 0.517	67
	TCL Pesticides/PCBs (µg/kg)							
11097691	Aroclor 1254	5.3E+01	5.3E+01	µg/kg	QSB1A	1/3	3.6 - 3.6	5.3E+01
	TCL VOCs (µg/kg)							
78933	2-Butanone	2.3E+01	2.5E+01	µg/kg	QSB1A	2/3	5.9 - 6.4	2.5E+01
67641	Acetone	4.2E+01	1.1E+02	µg/kg	QSB1A	3/3	5.9 - 6.4	1.1E+02
110827	Cyclohexane	9.0E-01	9.0E-01	µg/kg	QSB1A	1/3	0.373 - 0.404	9.0E-01
100414	Ethylbenzene	7.5E-01	7.5E-01	µg/kg	QSB1A	1/3	0.499 - 0.541	7.5E-01
108872	Methylcyclohexane	4.2E+00	4.2E+00	µg/kg	QSB1A	1/3	0.997 - 1.08	4.2E+00
75092	Methylene chloride	4.2E+00	6.8E+00	µg/kg	QSB3A	3/3	3.32 - 3.6	6.8E+00
1330207	Xylenes	4.1E+00	4.1E+00	µg/kg	QSB1A	1/3	0.497 - 0.539	4.1E+00

Table 5-30
Detected Chemicals Occurrence for AOC Q
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening
	TCL SVOCs[2] (µg/kg)							
59507	4-Chloro-3-Methylphenol	1.5E+01	1.8E+01	µg/kg	QSB1A	2/3	6.25 - 6.77	1.8E+01
117817	Bis(2-ethylhexyl)phthalate	4.6E+01	2.9E+02	µg/kg	QSB3A	3/3	2.48 - 2.69	2.9E+02
85687	Butylbenzylphthalate	4.4E+01	4.4E+01	µg/kg	QSB3A	1/3	5.38 - 5.82	4.4E+01
84662	Diethylphthalate	1.4E+01	2.1E+01	µg/kg	QSB1A	3/3	2.28 - 2.47	2.1E+01
84742	Di-n-butylphthalate	2.6E+01	1.7E+03	µg/kg	QSB3A	3/3	2.82 - 4.97	1.7E+03
86306	N-Nitrosodiphenylamine	2.1E+01	3.2E+01	µg/kg	QSB3A	2/3	2.76 - 6.18	3.2E+01
	PAHs[3] (µg/kg)							
206440	Fluoranthene	6.4E+00	7.8E+00	µg/kg	QSB1A	2/3	2.04 - 2.21	7.8E+00
85018	Phenanthrene	1.6E+00	1.6E+00	µg/kg	QSB1A	1/3	0.72 - 0.78	1.6E+00
129000	Pyrene	3.0E+00	3.8E+00	µg/kg	QSB1A	2/3	1.08 - 1.17	3.8E+00
	Explosives[3] (mg/kg)							
121142	2,4-Dinitrotoluene	3.1E-01	3.1E-01	mg/kg	QSB1A	1/3	0.142 - 0.142	3.1E-01
	Cyanide (mg/kg)							
57125	Cyanide	8.1E-01	2.2E+00	mg/kg	QSB3A	2/3	0.0356 - 0.0356	2.2E+00

Notes:

CAS = Chemical Abstracts Sevice
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
[1] = SVOCs analyzed by USEPA SW-846 8270 Method 8270C
[2] = PAHs analyzed by USEPA SW-846 Method8310
[3] = Explosives analyzed by USEPA SW-846 Method 8330

Table 5-31
Non-detected Chemicals for AOC Q
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Parameter Name	Units	Number of Samples	Minimum MDL	Maximum MDL	TSV	Maximum Detection Limit Exceeds TSV
Inorganics							
7439976	Mercury	mg/kg	1	0.0077	0.0077	0.058	**Y**
57125	Cyanide	mg/kg	1	0.0356	0.0356	0.005	**Y**
Pesticides/Herbicides							
72548	4,4'-DDD	ug/kg	1	0.286	0.286	--	NS
72559	4,4'-DDE	ug/kg	1	0.21	0.21	100	**Y**
50293	4,4'-DDT	ug/kg	1	0.216	0.216	100	N
309002	Aldrin	ug/kg	1	0.365	0.365	100	N
319846	alpha-BHC	ug/kg	1	0.364	0.364	100	N
5103719	alpha-Chlordane	ug/kg	1	0.521	0.521	100	N
319857	beta-BHC	ug/kg	1	1.36	1.36	100	N
319868	delta-BHC	ug/kg	1	0.982	0.982	100	N
60571	Dieldrin	ug/kg	1	0.371	0.371	100	N
959988	Endosulfan I	ug/kg	1	1.09	1.09	--	NS
33213659	Endosulfan II	ug/kg	1	0.257	0.257	--	NS
1031078	Endosulfan Sulfate	ug/kg	1	0.604	0.604	--	NS
72208	Endrin	ug/kg	1	0.358	0.358	100	N
7421934	Endrin aldehyde	ug/kg	1	1.33	1.33	--	NS
53494705	Endrin ketone	ug/kg	1	0.33	0.33	--	NS
58899	gamma-BHC (Lindane)	ug/kg	1	0.233	0.233	100	N
5103742	gamma-Chlordane	ug/kg	1	0.844	0.844	100	N
76448	Heptachlor	ug/kg	1	0.846	0.846	--	NS
1024573	Heptachlor epoxide	ug/kg	1	0.546	0.546	100	N
72435	Methoxychlor	ug/kg	1	0.336	0.336	100	N
8001352	Toxaphene	ug/kg	1	28	28	--	NS
93765	2,4,5-T	ug/kg	1	2.4	2.4	--	NS
93721	2,4,5-TP (Silvex)	ug/kg	1	4.8	4.8	--	NS
94757	2,4-D	ug/kg	1	19.2	19.2	--	NS
94826	2,4-DB	ug/kg	1	74.4	74.4	--	NS
75990	Dalapon	ug/kg	1	68.4	68.4	--	NS
1918009	Dicamba	ug/kg	1	2.4	2.4	--	NS
120365	Dichlorprop	ug/kg	1	20.4	20.4	--	NS
88857	Dinoseb	ug/kg	1	25.2	25.2	--	NS
94746	MCPA	ug/kg	1	1680	1680	--	NS
93652	MCPP	ug/kg	1	6070	6070	--	NS
PCBs							
12674112	Aroclor 1016	ug/kg	1	19.2	19.2	--	NS
11104282	Aroclor 1221	ug/kg	1	2.4	2.4	--	NS
11141165	Aroclor 1232	ug/kg	1	6	6	--	NS
53469219	Aroclor 1242	ug/kg	1	3.6	3.6	--	NS
12672296	Aroclor 1248	ug/kg	1	6	6	--	NS
11096825	Aroclor 1260	ug/kg	1	8.4	8.4	371	N
VOCs							
71556	1,1,1-Trichloroethane	ug/kg	3	0.503	0.545	300	N
79345	1,1,2,2-Tetrachloroethane	ug/kg	3	0.771	0.836	300	N
76131	1,1,2-Trichloro-1,2,2-trifluoroethane	ug/kg	3	0.896	0.972	--	NS
79005	1,1,2-Trichloroethane	ug/kg	3	0.7	0.759	300	N
75343	1,1-Dichloroethane	ug/kg	3	0.854	0.927	300	N
75354	1,1-Dichloroethene	ug/kg	3	0.865	0.938	--	NS
87616	1,2,3-Trichlorobenzene	ug/kg	3	0.642	0.696	--	NS
120821	1,2,4-Trichlorobenzene	ug/kg	3	0.484	0.525	100	N
96128	1,2-Dibromo-3-chloropropane	ug/kg	3	2.45	2.66	--	NS
106934	1,2-Dibromoethane	ug/kg	3	0.808	0.877	--	NS
95501	1,2-Dichlorobenzene	ug/kg	3	0.571	0.62	100	N
107062	1,2-Dichloroethane	ug/kg	3	0.509	0.552	870,000	N
78875	1,2-Dichloropropane	ug/kg	3	0.691	0.75	700,000	N

Table 5-31
Non-detected Chemicals for AOC Q
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Parameter Name	Units	Number of Samples	Minimum MDL	Maximum MDL	TSV	Maximum Detection Limit Exceeds TSV
541731	1,3-Dichlorobenzene	ug/kg	3	0.316	0.343	--	NS
106467	1,4-Dichlorobenzene	ug/kg	3	0.838	0.909	100	N
78933	2-Butanone	ug/kg	1	5.9	5.9	--	NS
591786	2-Hexanone	ug/kg	3	2.67	2.89	--	NS
108101	4-Methyl-2-pentanone	ug/kg	3	1.72	1.87	--	NS
71432	Benzene	ug/kg	3	0.622	0.675	100	N
74975	Bromochloromethane	ug/kg	3	0.898	0.974	--	NS
75274	Bromodichloromethane	ug/kg	3	0.591	0.641	450,000	N
75252	Bromoform	ug/kg	3	0.682	0.74	--	NS
74839	Bromomethane	ug/kg	3	1.77	1.92	--	NS
75150	Carbon disulfide	ug/kg	3	1.71	1.86	--	NS
56235	Carbon tetrachloride	ug/kg	3	0.55	0.596	300	N
108907	Chlorobenzene	ug/kg	3	0.78	0.846	100	N
75003	Chloroethane	ug/kg	3	1.59	1.73	--	NS
67663	Chloroform	ug/kg	3	0.526	0.571	300	N
74873	Chloromethane	ug/kg	3	0.984	1.07	--	NS
156592	cis-1,2-Dichloroethene	ug/kg	3	0.838	0.909	300	N
10061015	cis-1,3-Dichloropropene	ug/kg	3	0.579	0.628	--	NS
110827	Cyclohexane	ug/kg	2	0.373	0.404	--	NS
124481	Dibromochloromethane	ug/kg	3	0.61	0.662	--	NS
75718	Dichlorodifluoromethane	ug/kg	3	0.788	0.855	--	NS
100414	Ethylbenzene	ug/kg	2	0.499	0.541	100	N
98828	Isopropylbenzene	ug/kg	3	0.644	0.699	--	NS
79209	Methyl acetate	ug/kg	3	4.09	4.44	--	NS
1634044	methyl tert-Butyl ether	ug/kg	3	0.756	0.82	--	NS
100425	Styrene	ug/kg	3	0.522	0.566	100	N
127184	Tetrachloroethene	ug/kg	3	0.723	0.785	300	N
108883	Toluene	ug/kg	3	0.548	0.594	100	N
156605	trans-1,2-Dichloroethene	ug/kg	3	0.83	0.9	300	N
10061026	trans-1,3-Dichloropropene	ug/kg	3	0.615	0.667	--	NS
79016	Trichloroethene	ug/kg	3	0.799	0.867	300	N
75694	Trichlorofluoromethane	ug/kg	3	0.877	0.951	--	NS
75014	Vinyl Chloride	ug/kg	3	0.437	0.474	300	N
1330207	Xylenes	ug/kg	2	0.497	0.539	100	N
SVOCs							
92524	1,1'-Biphenyl	ug/kg	3	2.95	3.2	--	NS
95943	1,2,4,5-Tetrachlorobenzene	ug/kg	3	34.4	37.3	--	NS
108601	2,2'-oxybis(1-Chloropropane)	ug/kg	3	1.58	1.72	--	NS
95954	2,4,5-Trichlorophenol	ug/kg	3	4.01	4.34	100	N
88062	2,4,6-Trichlorophenol	ug/kg	3	3.14	3.41	100	N
120832	2,4-Dichlorophenol	ug/kg	3	4.22	4.58	100	N
105679	2,4-Dimethylphenol	ug/kg	3	9.53	10.3	100	N
51285	2,4-Dinitrophenol	ug/kg	3	3.84	4.16	20,000	N
121142	2,4-Dinitrotoluene	ug/kg	1	3.78	3.78	--	NS
606202	2,6-Dinitrotoluene	ug/kg	3	33.2	36	--	NS
91587	2-Chloronaphthalene	ug/kg	3	2.76	2.99	--	NS
95578	2-Chlorophenol	ug/kg	3	2.41	2.61	100	N
91576	2-Methylnaphthalene	ug/kg	3	3.29	3.56	--	NS
95487	2-Methylphenol	ug/kg	3	5.81	6.29	100	N
88744	2-Nitroaniline	ug/kg	3	5.52	5.98	--	NS
88755	2-Nitrophenol	ug/kg	3	2.04	2.21	--	NS
91941	3,3'-Dichlorobenzidine	ug/kg	3	80	86.7	--	NS
99092	3-Nitroaniline	ug/kg	3	40	43.3	--	NS
534521	4,6-Dinitro-2-methylphenol	ug/kg	3	5.41	5.86	--	NS
101553	4-Bromophenyl-phenylether	ug/kg	3	4.06	4.39	--	NS
59507	4-Chloro-3-Methylphenol	ug/kg	1	6.77	6.77	--	NS

Table 5-31
Non-detected Chemicals for AOC Q
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Parameter Name	Units	Number of Samples	Minimum MDL	Maximum MDL	TSV	Maximum Detection Limit Exceeds TSV
106478	4-Chloroaniline	ug/kg	3	1.51	1.64	--	NS
7005723	4-Chlorophenyl-phenylether	ug/kg	3	3.92	4.25	--	NS
106445	4-Methylphenol	ug/kg	3	7.64	8.28	100	N
100016	4-Nitroaniline	ug/kg	3	8.7	9.43	--	NS
100027	4-Nitrophenol	ug/kg	3	3.4	3.68	100	N
83329	Acenaphthene	ug/kg	3	2.06	2.24	100	N
208968	Acenaphthylene	ug/kg	3	1.8	1.95	100	N
98862	Acetophenone	ug/kg	3	2.28	2.47	--	NS
120127	Anthracene	ug/kg	3	5.54	6.01	100	N
1912249	Atrazine	ug/kg	3	8.26	8.94	--	NS
100527	Benzaldehyde	ug/kg	3	4.86	5.27	--	NS
56553	Benzo(a)anthracene	ug/kg	3	16	17.3	100	N
50328	Benzo(a)pyrene	ug/kg	3	6.85	36.5	100	N
205992	Benzo(b)fluoranthene	ug/kg	3	11.7	62.5	100	N
191242	Benzo(g,h,i)perylene	ug/kg	3	10.5	55.8	100	N
207089	Benzo(k)fluoranthene	ug/kg	3	16.1	85.8	100	N
111911	Bis(2-chloroethoxy)methane	ug/kg	3	3.77	4.08	--	NS
111444	Bis(2-chloroethyl)ether	ug/kg	3	2.08	2.25	--	NS
85687	Butylbenzylphthalate	ug/kg	2	5.38	5.38	--	NS
105602	Caprolactam	ug/kg	3	7.66	8.29	--	NS
86748	Carbazole	ug/kg	3	7.32	7.93	--	NS
218019	Chrysene	ug/kg	3	12.2	13.3	100	N
53703	Dibenz(a,h)anthracene	ug/kg	3	7.08	37.8	100	N
132649	Dibenzofuran	ug/kg	3	3.79	4.11	--	NS
131113	Dimethylphthalate	ug/kg	3	3.97	4.3	200,000	N
117840	Di-n-octylphthalate	ug/kg	3	3.72	4.03	--	NS
206440	Fluoranthene	ug/kg	1	2.82	2.82	100	N
86737	Fluorene	ug/kg	3	2.02	2.18	100	N
118741	Hexachlorobenzene	ug/kg	3	3.01	3.26	1,000,000	N
87683	Hexachlorobutadiene	ug/kg	3	4.64	5.03	--	NS
77474	Hexachlorocyclopentadiene	ug/kg	3	2.38	2.57	10,000	N
67721	Hexachloroethane	ug/kg	3	2.8	3.03	--	NS
193395	Indeno(1,2,3-cd)pyrene	ug/kg	3	4.7	25.1	100	N
78591	Isophorone	ug/kg	3	2.08	2.25	--	NS
91203	Naphthalene	ug/kg	3	3.3	3.58	100	N
98953	Nitrobenzene	ug/kg	3	3.84	4.16	40,000	N
621647	N-Nitrosodi-n-propylamine	ug/kg	3	3.95	4.28	--	NS
86306	N-Nitrosodiphenylamine	ug/kg	1	5.7	5.7	20,000	N
87865	Pentachlorophenol	ug/kg	3	5.27	5.71	100	N
85018	Phenanthrene	ug/kg	2	2.76	2.76	100	N
108952	Phenol	ug/kg	3	4.75	5.15	100	N
129000	Pyrene	ug/kg	1	1.78	1.78	100	N
PAHs							
83329	Acenaphthene	ug/kg	3	11.3	12.2	100	N
208968	Acenaphthylene	ug/kg	3	13.9	15.1	100	N
120127	Anthracene	ug/kg	3	0.84	0.91	100	N
56553	Benzo(a)anthracene	ug/kg	3	0.96	1.04	100	N
50328	Benzo(a)pyrene	ug/kg	3	1.2	1.3	100	N
205992	Benzo(b)fluoranthene	ug/kg	3	1.56	1.69	100	N
191242	Benzo(g,h,i)perylene	ug/kg	3	15	16.3	100	N
207089	Benzo(k)fluoranthene	ug/kg	3	1.2	1.3	100	N
218019	Chrysene	ug/kg	3	1.44	1.56	100	N
53703	Dibenz(a,h)anthracene	ug/kg	3	1.68	1.82	100	N
206440	Fluoranthene	ug/kg	2	2.04	2.04	100	N
86737	Fluorene	ug/kg	3	1.56	1.69	100	N

Table 5-31
Non-detected Chemicals for AOC Q
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Parameter Name	Units	Number of Samples	Minimum MDL	Maximum MDL	TSV	Maximum Detection Limit Exceeds TSV
193395	Indeno(1,2,3-cd)pyrene	ug/kg	3	0.84	0.91	100	N
91203	Naphthalene	ug/kg	3	9.48	10.3	100	N
85018	Phenanthrene	ug/kg	3	0.72	0.78	100	N
129000	Pyrene	ug/kg	2	1.08	1.08	100	N
Explosives							
99354	1,3,5-Trinitrobenzene	mg/kg	3	0.14	0.14	--	NS
99650	1,3-Dinitrobenzene	mg/kg	3	0.159	0.159	--	NS
118967	2,4,6-Trinitrotoluene	mg/kg	3	0.167	0.167	--	NS
121142	2,4-Dinitrotoluene	mg/kg	2	0.142	0.142	--	NS
606202	2,6-Dinitrotoluene	mg/kg	3	0.25	0.25	--	NS
35572782	2-Amino-4,6-dinitrotoluene	mg/kg	3	0.151	0.151	--	NS
88722	2-Nitrotoluene	mg/kg	3	0.266	0.266	--	NS
99081	3-Nitrotoluene	mg/kg	3	0.184	0.184	--	NS
1946510	4-Amino-2,6-dinitrotoluene	mg/kg	3	0.162	0.162	--	NS
99990	4-Nitrotoluene	mg/kg	3	0.251	0.251	--	NS
2691410	HMX (Octahydro-1,3,5,7-tetranitro-1,3,5,	mg/kg	3	0.229	0.229	--	NS
98953	Nitrobenzene	mg/kg	3	0.102	0.102	40,000	N
121824	RDX (Hexahydro-1,3,5-trinitro-1,3,5-tria	mg/kg	3	0.131	0.131	--	NS
Nitroglycerin/PETN							
628966	Nitroglycerin	mg/kg	3	0.189	0.216	--	NS
78115	PETN	mg/kg	3	0.26	0.297	--	NS

Notes:
CAS = Chemical Abstracts Service
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
NS = No screening value
TSV = Toxicity Screening Value
MDL = Method Detection Limit

Table 5-32
Preliminary Soil Invertebrate Risk Characterization for SWMU 37
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Chemicals	CAS #	MDC for Surface Soil	Direct Contact TRV	TRV Source[A]	HQ
TAL Metals (mg/kg)					
Aluminum	7429-90-5	17,000	1	BTAG 1995	**17,000**
Antimony	7440-36-0	1.2	78	ECO SSL 2005	<1
Arsenic	7440-38-2	5	328	BTAG 1995	<1
Barium	7440-39-3	103	330	ECO SSL 2005	<1
Beryllium	7440-41-7	0.72	40	ECO SSL 2005	<1
Cadmium	7440-43-9	1.9	140	ECO SSL 2005	<1
Chromium	7440-47-3	114	0.0075	BTAG 1995	**15,200**
Cobalt	7440-48-4	5.6	200	BTAG 1995	<1
Copper	7440-50-8	193	50	ORNL 1997a	**4**
Iron	7439-89-6	19,500	12	BTAG 1995	**1,625**
Lead	7439-92-1	277	1,700	ECO SSL 2005	<1
Manganese	7439-96-5	403	330	BTAG 1995	**1.2**
Mercury	7439-97-6	0.60	0.058	BTAG 1995	**10**
Nickel	7440-02-0	50	100	ORNL 1997a	<1
Selenium	7782-49-2	0.47	1.8	BTAG 1995	<1
Silver	7440-22-4	0.24	20	CCME 2004	<1
Thallium	7440-28-0	0.12	1	CCME 2004	<1
Vanadium	7440-62-2	21	58	BTAG 1995	<1
Zinc	7440-66-6	129	100	ORNL 1997a	**1.3**
TCL Pesticides/PCBs (µg/kg)					
Dieldrin	60-57-1	11	100	BTAG 1995	<1
Aroclor 1254	11097-69-1	180	500	CCME 2004	<1
TCL VOCs (µg/kg)					
2-Butanone	78-93-3	24	NV	--	NC
Acetone	67-64-1	110	NV	--	NC
Methylene chloride	75-09-2	10	300	BTAG 1995	<1
TCL SVOCs (µg/kg)					
4-Chloro-3-Methylphenol	59-50-7	12	NV	--	NC
Bis(2-ethylhexyl)phthalate	117-81-7	1,000	NV	--	NC
Diethylphthalate	84-66-2	120	NV	--	NC
Di-n-butylphthalate	84-74-2	26,000	NV	--	NC
N-Nitrosodiphenylamine	86-30-6	450	NV	--	NC
PAHs (µg/kg)					
Anthracene	120-12-7	2.4	100	BTAG 1995	<1
Benzo(b)fluoranthene	205-99-2	7.6	100	BTAG 1995	<1
Benzo(k)fluoranthene	207-08-9	5.5	100	BTAG 1995	<1
Chrysene	218-01-9	12	100	BTAG 1995	<1
Fluoranthene	206-44-0	73	100	BTAG 1995	<1
Indeno(1,2,3-cd)pyrene	193-39-5	8.1	100	BTAG 1995	<1
Phenanthrene	85-01-8	18	100	BTAG 1995	<1
Pyrene	129-00-0	59	100	BTAG 1995	<1
Explosives (mg/kg)					
2,4-Dinitrotoluene	121-14-2	0.63	NV	--	NC
Cyanide (mg/kg)					
Cyanide	57-12-5	0.80	0.005	BTAG 1995	**160**

Notes:

CAS = Chemical Abstracts Service
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
MDC = Maximum Detected Concentration
TRV = Toxicity Reference Value
NV = No value
HQ = Hazard Quotient
NC = Not Calculated no TRV available
BTAG = Biological Technical Assistance Group Screening Level, Draft 1995
[A] =
Region III BTAG (USEPA 1995)
Oak Ridge National Laboratory (Efroymson et al. 1997a)
USEPA Ecological SSL (ECO-SSL 2005)
Canadian Environmental Quality Guidelines (CCME 2004)

Table 5-33
Preliminary Soil Invertebrate Risk Characterization for SWMU 38
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Chemicals	CAS #	MDC for Surface Soil	Direct Contact TRV	TRV Source[A]	HQ
TAL Metals (mg/kg)					
Aluminum	7429-90-5	26,400	1	BTAG 1995	**26,400**
Antimony	7440-36-0	0.31	78	ECO SSL 2005	<1
Arsenic	7440-38-2	4.6	328	BTAG 1995	<1
Barium	7440-39-3	116	330	ECO SSL 2005	<1
Beryllium	7440-41-7	0.91	40	ECO SSL 2005	<1
Cadmium	7440-43-9	1.9	140	ECO SSL 2005	<1
Chromium	7440-47-3	82	0.0075	BTAG 1995	**10,933**
Cobalt	7440-48-4	9.8	200	BTAG 1995	<1
Copper	7440-50-8	85	50	ORNL 1997a	**2**
Iron	7439-89-6	30,700	12	BTAG 1995	**2,558**
Lead	7439-92-1	52	1,700	ECO SSL 2005	<1
Manganese	7439-96-5	414	330	BTAG 1995	**1.3**
Mercury	7439-97-6	0.16	0.058	BTAG 1995	**3**
Nickel	7440-02-0	35	100	ORNL 1997a	<1
Selenium	7782-49-2	0.64	1.8	BTAG 1995	<1
Silver	7440-22-4	0.14	20	CCME 2004	<1
Thallium	7440-28-0	0.19	1	CCME 2004	<1
Vanadium	7440-62-2	42	58	BTAG 1995	<1
Zinc	7440-66-6	100	100	ORNL 1997a	<1
TCL Pesticides/PCBs (µg/kg)					
Aroclor 1254	11097-69-1	570	500	CCME 2004	**1.1**
TCL VOCs (µg/kg)					
2-Butanone	78-93-3	26	NV	--	NC
Acetone	67-64-1	200	NV	--	NC
Toluene	108-88-3	3	100	BTAG 1995	<1
TCL SVOCs (µg/kg)					
2,4-Dinitrotoluene	121-14-2	120	NV	--	NC
4-Chloro-3-Methylphenol	59-50-7	25	NV	--	NC
Bis(2-ethylhexyl)phthalate	117-81-7	1300	NV	--	NC
Butylbenzylphthalate	85-68-7	52	NV	--	NC
Diethylphthalate	84-66-2	4	NV	--	NC
Di-n-butylphthalate	84-74-2	14000	NV	--	NC
N-Nitrosodiphenylamine	86-30-6	160	NV	--	NC
PAHs (µg/kg)					
Anthracene	120-12-7	13	100	BTAG 1995	<1
Benzo(a)anthracene	56-55-3	82	100	BTAG 1995	<1
Benzo(b)fluoranthene	205-99-2	23	100	BTAG 1995	<1
Benzo(k)fluoranthene	207-08-9	7.5	100	BTAG 1995	<1
Chrysene	218-01-9	29	100	BTAG 1995	<1
Fluoranthene	206-44-0	180	100	BTAG 1995	**2**
Fluorene	86-73-7	8.9	100	BTAG 1995	<1
Phenanthrene	85-01-8	100	100	BTAG 1995	<1
Pyrene	129-00-0	98	100	BTAG 1995	<1
Cyanide (mg/kg)					
Cyanide	57-12-5	0.57	0.005	BTAG 1995	**114**

Notes:

CAS = Chemical Abstracts Service
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
MDC = Maximum Detected Concentration
TRV = Toxicity Reference Value
NV = No value
HQ = Hazard Quotient
NC = Not Calculated no TRV available
BTAG = Biological Technical Assistance Group Screening Level, Draft 1995
[A] =
Region III BTAG (USEPA 1995)
Oak Ridge National Laboratory (Efroymson et al. 1997a)
USEPA Ecological SSL (ECO-SSL 2005)
Canadian Environmental Quality Guidelines (CCME 2004)

Table 5-34
Preliminary Soil Invertebrate Risk Characterization for AOC Q
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Chemicals	CAS #	MDC for Surface Soil	Direct Contact TRV	TRV Source[A]	HQ
TAL Metals (mg/kg)					
Aluminum	7429-90-5	16,000	1	BTAG 1995	**16,000**
Antimony	7440-36-0	0.19	78	ECO SSL 2005	<1
Arsenic	7440-38-2	1.40	328	BTAG 1995	<1
Barium	7440-39-3	148	330	ECO SSL 2005	<1
Beryllium	7440-41-7	0.89	40	ECO SSL 2005	<1
Cadmium	7440-43-9	1.60	140	ECO SSL 2005	<1
Chromium	7440-47-3	21	0.0075	BTAG 1995	**2,800**
Cobalt	7440-48-4	8	200	BTAG 1995	<1
Copper	7440-50-8	12	50	ORNL 1997a	<1
Iron	7439-89-6	22,600	12	BTAG 1995	**1,883**
Lead	7439-92-1	21	1,700	ECO SSL 2005	<1
Manganese	7439-96-5	519	330	BTAG 1995	**2**
Mercury	7439-97-6	0.02	0.058	BTAG 1995	<1
Nickel	7440-02-0	15	100	ORNL 1997a	<1
Selenium	7782-49-2	0.67	1.8	BTAG 1995	<1
Silver	7440-22-4	0.07	20	CCME 2004	<1
Thallium	7440-28-0	0.16	1	CCME 2004	<1
Vanadium	7440-62-2	29	58	BTAG 1995	<1
Zinc	7440-66-6	67	100	ORNL 1997a	<1
TCL Pesticides/PCBs (µg/kg)					
Aroclor 1254	11097-69-1	53	500	CCME 2004	<1
TCL VOCs (µg/kg)					
2-Butanone	78-93-3	25	NV	--	NC
Acetone	67-64-1	110	NV	--	NC
Cyclohexane	110-82-7	0.9	NV	--	NC
Ethylbenzene	100-41-4	0.75	100	BTAG 1995	<1
Methylcyclohexane	108-87-2	4.2	NV	--	NC
Methylene chloride	75-09-2	6.8	300	BTAG 1995	<1
Xylenes	1330-20-7	4.1	100	BTAG 1995	<1
TCL SVOCs (µg/kg)					
4-Chloro-3-Methylphenol	59-50-7	18	NV	--	NC
Bis(2-ethylhexyl)phthalate	117-81-7	290	NV	--	NC
Butylbenzylphthalate	85-68-7	44	NV	--	NC
Diethylphthalate	84-66-2	21	NV	--	NC
Di-n-butylphthalate	84-74-2	1,700	NV	--	NC
N-Nitrosodiphenylamine	86-30-6	32	NV	--	NC
PAHs (µg/kg)					
Fluoranthene	206-44-0	7.8	100	BTAG 1995	<1
Phenanthrene	85-01-8	1.6	100	BTAG 1995	<1
Pyrene	129-00-0	3.8	100	BTAG 1995	<1
Explosives (mg/kg)					
2,4-Dinitrotoluene	121-14-2	0.31	NV	--	NC
Cyanide (mg/kg)					
Cyanide	57-12-5	2.2	0.005	BTAG 1995	**440**

Notes:

CAS = Chemical Abstracts Service
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
MDC = Maximum Detected Concentration
TRV = Toxicity Reference Value
NV = No value
HQ = Hazard Quotient
NC = Not Calculated no TRV available
BTAG = Biological Technical Assistance Group Screening Level, Draft 1995
[A] =
Region III BTAG (USEPA 1995)
Oak Ridge National Laboratory (Efroymson et al. 1997a)
USEPA Ecological SSL (ECO-SSL 2005)
Canadian Environmental Quality Guidelines (CCME 2004)

Table 5-35
Inorganic COPEC/Background Comparison for SWMU 37
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Measured Analytes	CAS-Number	MDC for Surface Soil	Background Point Estimate [A]	Maximum Concentration Exceeds Background Point Estimate
TAL METALS (mg/kg)				
ALUMINUM	7429-90-5	17,000	40,041	N
ARSENIC	7440-38-2	5.00	16	N
CADMIUM	7440-43-9	1.90	0.69	**Y**
CHROMIUM	7440-47-3	114	65	**Y**
COPPER	7440-50-8	193	54	**Y**
IRON	7439-89-6	19,500	50,962	N
LEAD	7439-92-1	277	27	**Y**
MANGANESE	7439-96-5	403	2,543	N
MERCURY	7439-97-6	0.60	0.13	**Y**
NICKEL	7440-02-0	50	63	N
SELENIUM	7782-49-2	0.47	--	N
ZINC	7440-66-6	129	202	N

Notes:
CAS = Chemical Abstracts Service
mg/kg = Milligram Per Kilogram
MDC = Maximum Detected Concentration
[A] = Facility-Wide Background Point Estimate as
Reported in the Facility-Wide Background Study Report (IT 2001a)

Table 5-36
Inorganic COPEC/Background Comparison for SWMU 38
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Measured Analytes	CAS-Number	MDC for Surface Soil	Background Point Estimate [A]	Maximum Concentration Exceeds Background Point Estimate
TAL METALS (mg/kg)				
ALUMINUM	7429-90-5	26,400	40,041	N
ARSENIC	7440-38-2	4.60	16	N
CADMIUM	7440-43-9	1.90	0.69	**Y**
CHROMIUM	7440-47-3	82	65	**Y**
COPPER	7440-50-8	85	54	**Y**
IRON	7439-89-6	30,700	50,962	N
LEAD	7439-92-1	52	27	**Y**
MANGANESE	7439-96-5	414	2,543	N
MERCURY	7439-97-6	0.16	0.13	**Y**
NICKEL	7440-02-0	35	63	N
SELENIUM	7782-49-2	0.64	--	N
ZINC	7440-66-6	100	202	N

Notes:
CAS = Chemical Abstracts Service
mg/kg = Milligram Per Kilogram
MDC = Maximum Detected Concentration
[A] = Facility-Wide Background Point Estimate as
Reported in the Facility-Wide Background Study Report (IT 2001a)

Table 5-37
Inorganic COPEC/Background Comparison for AOC Q
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Measured Analytes	CAS-Number	MDC for Surface Soil	Background Point Estimate [A]	Maximum Concentration Exceeds Background Point Estimate
TAL METALS (mg/kg)				
ALUMINUM	7429-90-5	16,000	40,041	N
ARSENIC	7440-38-2	1.40	16	N
CADMIUM	7440-43-9	1.60	0.69	**Y**
CHROMIUM	7440-47-3	21	65	N
COPPER	7440-50-8	12	54	N
IRON	7439-89-6	22,600	50,962	N
LEAD	7439-92-1	21	27	N
MANGANESE	7439-96-5	519	519	N
MERCURY	7439-97-6	0.02	0.13	N
NICKEL	7440-02-0	15	63	N
SELENIUM	7782-49-2	0.70	--	N
ZINC	7440-66-6	67	202	N

Notes:
CAS = Chemical Abstracts Service
mg/kg = Milligram Per Kilogram
MDC = Maximum Detected Concentration
[A] = Facility-Wide Background Point Estimate as Reported in the Facility-Wide Background Study Report (IT 2001a)

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Table 5-38
Preliminary/Refined Wildlife Risk Characterization
Screening Level Ecological Risk Assessment
SSP Report - SWMU 37
Radford Army Ammunition Plant, Radford, Virginia

Preliminary Assessment

Parameter	Maximum Soil Concentration (mg/kg)	Wildlife TRV-Based Soil Concentrations																			
		American Robin				Red-tailed Hawk				Meadow Vole				Red Fox				Short-tailed Shrew			
		NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ
Metals																					
ARSENIC	5.0	1.39E+01	<1	3.46E+01	<1	3.89E+02	<1	9.71E+02	<1	8.99E+00	<1	8.99E+01	<1	1.34E+00	3.7	1.34E+01	<1	3.02E-01	16.6	3.02E+00	1.7
CADMIUM	1.9	6.75E-01	2.8	9.31E+00	<1	3.91E+02	<1	5.40E+03	<1	1.50E+01	<1	1.50E+02	<1	1.48E+01	<1	1.48E+02	<1	1.16E+00	1.6	1.16E+01	<1
CHROMIUM	114	5.27E+00	21.6	2.64E+01	4.3	2.70E+01	4.2	1.35E+02	<1	8.65E+05	<1	8.65E+06	<1	2.38E+04	<1	2.38E+05	<1	1.78E+04	<1	1.78E+05	<1
COPPER	193	1.38E+02	1.4	1.82E+02	1.1	7.11E+02	<1	9.33E+02	<1	8.34E+02	<1	1.10E+03	<1	7.43E+01	2.6	9.78E+01	2.0	9.57E+01	2.0	1.26E+02	1.5
LEAD	277	5.18E+00	53.4	5.18E+01	5.3	5.69E+02	<1	5.69E+03	<1	1.05E+03	<1	1.05E+04	<1	4.97E+02	<1	4.97E+03	<1	5.45E+01	5.1	5.45E+02	<1
MERCURY	0.6	6.08E-01	<1	1.22E+00	<1	2.62E-01	2.3	5.23E-01	1.1	4.27E-01	1.4	1.74E+00	<1	3.93E-03	152.7	1.60E-02	37.4	8.31E-02	7.2	3.39E-01	1.8
NICKEL	50	3.86E+02	<1	5.33E+02	<1	1.95E+03	<1	2.70E+03	<1	5.54E+03	<1	1.11E+04	<1	3.23E+02	<1	6.46E+02	<1	2.86E+02	<1	5.71E+02	<1
SELENIUM	0.47	3.13E-01	1.5	6.27E-01	<1	4.03E+00	<1	8.06E+00	<1	2.73E+00	<1	4.50E+00	<1	6.09E-01	<1	1.00E+00	<1	5.27E-01	<1	8.70E-01	<1
SILVER	0.24	2.31E+01	<1	1.73E+02	<1	8.34E+02	<1	6.26E+03	<1	1.72E+03	<1	1.72E+04	<1	2.89E+02	<1	2.89E+03	<1	5.85E+01	<1	5.85E+02	<1
ZINC	129	1.40E+01	9.2	1.26E+02	1.0	2.19E+01	5.9	1.98E+02	<1	3.38E+03	<1	6.75E+03	<1	8.28E+01	1.6	1.66E+02	<1	4.22E+02	<1	8.44E+02	<1
Pesticides																					
DIELDRIN	0.011	4.39E-02	<1	4.39E-01	<1	8.24E+00	<1	8.24E+01	<1	5.36E+00	<1	5.36E+01	<1	3.22E-01	<1	3.22E+00	<1	2.08E-02	<1	2.08E-01	<1
PCBs																					
AROCLOR 1254	0.18	8.69E-03	20.7	8.69E-02	2.1	1.53E+00	<1	1.53E+01	<1	1.17E+01	<1	1.17E+02	<1	5.33E-02	3.4	5.33E-01	<1	3.42E-03	52.6	3.42E-02	5.3
SVOCs/PAHs																					
ANTHRACENE	0.0024	NC		NC		NC		NC		5.23E+04	<1	5.23E+05	<1	2.14E+04	<1	2.14E+05	<1	2.20E+03	<1	2.20E+04	<1
BENZO(B)FLUORANTHENE	0.0076	NC		NC		NC		NC		1.68E+02	<1	1.68E+03	<1	2.87E+00	<1	2.87E+01	<1	5.12E+00	<1	5.12E+01	<1
BENZO(K)FLUORANTHENE	0.0055	NC		NC		NC		NC		1.85E+03	<1	1.85E+04	<1	3.16E+01	<1	3.16E+02	<1	5.65E+01	<1	5.65E+02	<1
CHRYSENE	0.012	NC		NC		NC		NC		2.37E+03	<1	2.37E+04	<1	1.24E+02	<1	1.24E+03	<1	5.65E+01	<1	5.65E+02	<1
FLUORANTHENE	0.073	NC		NC		NC		NC		4.11E+03	<1	2.05E+04	<1	7.02E+02	<1	3.51E+03	<1	1.24E+02	<1	6.22E+02	<1
INDENO(1,2,3-CD)PYRENE	0.0081	NC		NC		NC		NC		1.92E+03	<1	1.92E+04	<1	1.15E+01	<1	1.15E+02	<1	4.26E+01	<1	4.26E+02	<1
PHENANTHRENE	0.018	8.17E+00	<1	4.08E+01	<1	7.63E+02	<1	3.81E+03	<1	7.32E+02	<1	3.66E+03	<1	2.98E+02	<1	1.49E+03	<1	3.22E+01	<1	1.61E+02	<1
PYRENE	0.059	NC		NC		NC		NC		1.07E+03	<1	5.35E+03	<1	1.85E+02	<1	9.25E+02	<1	3.17E+01	<1	1.58E+02	<1

Refined Assessment

Parameter	Maximum Soil Concentration (mg/kg)	Wildlife TRV-Based Soil Concentrations																			
		American Robin				Red-tailed Hawk				Meadow Vole				Red Fox				Short-tailed Shrew			
		NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ
Metals																					
ARSENIC	5	2.94E+01	<1	7.34E+01	<1	3.93E+05	<1	9.83E+05	<1	1.65E+01	<1	1.65E+02	<1	4.00E+02	<1	4.00E+03	<1	5.01E-01	10.0	5.01E+00	<1
CADMIUM	1.9	1.50E+00	1.3	2.07E+01	<1	3.96E+05	<1	5.47E+06	<1	2.75E+01	<1	2.75E+02	<1	4.84E+03	<1	4.84E+04	<1	1.98E+00	<1	1.98E+01	<1
CHROMIUM	114	1.06E+01	10.8	5.29E+01	2.2	2.73E+04	<1	1.37E+05	<1	1.59E+06	<1	1.59E+07	<1	7.04E+06	<1	7.04E+07	<1	2.91E+04	<1	2.91E+05	<1
COPPER	193	2.92E+02	<1	3.83E+02	<1	7.20E+05	<1	9.45E+05	<1	1.53E+03	<1	2.01E+03	<1	2.22E+04	<1	2.92E+04	<1	1.57E+02	1.2	2.06E+02	<1
LEAD	277	1.06E+01	26.2	1.06E+02	2.6	5.77E+05	<1	5.77E+06	<1	1.92E+03	<1	1.92E+04	<1	1.52E+05	<1	1.52E+06	<1	8.89E+01	3.1	8.89E+02	<1
MERCURY	0.6	1.32E+00	<1	2.65E+00	<1	2.65E+02	<1	5.30E+02	<1	7.83E-01	<1	3.20E+00	<1	1.17E+00	<1	4.76E+00	<1	1.38E-01	4.3	5.64E-01	1.1
SELENIUM	0.47	6.91E-01	<1	1.38E+00	<1	4.08E+03	<1	8.17E+03	<1	5.00E+00	<1	8.25E+00	<1	1.84E+02	<1	3.04E+02	<1	8.88E-01	<1	1.46E+00	<1
ZINC	129	3.08E+01	4.2	2.78E+02	<1	2.22E+04	<1	2.01E+05	<1	6.19E+03	<1	1.24E+04	<1	2.46E+04	<1	4.92E+04	<1	7.10E+02	<1	1.42E+03	<1
PCBs																					
Aroclor 1254	0.18	1.95E-02	9.2	1.95E-01	<1	1.55E+03	<1	1.55E+04	<1	2.14E+01	<1	2.14E+02	<1	1.58E+01	<1	1.58E+02	<1	5.87E-03	30.7	5.87E-02	3.1

Notes:
NC = Not Calculated no TRV available
TRV = Toxicity Reference Value
HQ = Hazard Quotient
LOAEL = Lowest observable adverse effects level
NOAEL = No observable adverse effects level
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
PCB = Polychlorinated Biphenyls
SVOC = Semi-Volatile Organic Compound
PAH = Poly-Aromatic Hydrocarbon

= Indicate HQs greater than 1.0

Refer to Appendix I for detailed description of model parameters and results

Table 5-39
Preliminary/Refined Wildlife Risk Characterization
Screening Level Ecological Risk Assessment
SSP Report - SWMU 38
Radford Army Ammunition Plant, Radford, Virginia

Preliminary Assessment

Parameter	Maximum Soil Concentration (mg/kg)	Wildlife TRV-Based Soil Concentrations																			
		American Robin				Red-tailed Hawk				Meadow Vole				Red Fox				Short-tailed Shrew			
		NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ
Metals																					
ARSENIC	4.6	1.39E+01	<1	3.46E+01	<1	3.89E+02	<1	9.71E+02	<1	8.99E+00	<1	8.99E+01	<1	1.34E+00	3.4	1.34E+01	<1	3.02E-01	15.3	3.02E+00	1.5
CADMIUM	1.9	6.75E-01	2.8	9.31E+00	<1	3.91E+02	<1	5.40E+03	<1	1.50E+01	<1	1.50E+02	<1	1.48E+01	<1	1.48E+02	<1	1.16E+00	1.6	1.16E+01	<1
CHROMIUM	82	5.27E+00	15.6	2.64E+01	3.1	2.70E+01	3.0	1.35E+02	<1	8.65E+05	<1	8.65E+06	<1	2.38E+04	<1	2.38E+05	<1	1.78E+04	<1	1.78E+05	<1
COPPER	85	1.38E+02	<1	1.82E+02	<1	7.11E+02	<1	9.33E+02	<1	8.34E+02	<1	1.10E+03	<1	7.43E+01	1.1	9.78E+01	<1	9.57E+01	<1	1.26E+02	<1
LEAD	52	5.18E+00	10.0	5.18E+01	1.0	5.69E+02	<1	5.69E+03	<1	1.05E+03	<1	1.05E+04	<1	4.97E+02	<1	4.97E+03	<1	5.45E+01	<1	5.45E+02	<1
MERCURY	0.16	6.08E-01	<1	1.22E+00	<1	2.62E-01	<1	5.23E-01	<1	4.27E-01	<1	1.74E+00	<1	3.93E-03	40.7	1.60E-02	10.0	8.31E-02	1.9	3.39E-01	<1
NICKEL	35	3.86E+02	<1	5.33E+02	<1	1.95E+03	<1	2.70E+03	<1	5.54E+03	<1	1.11E+04	<1	3.23E+02	<1	6.46E+02	<1	2.86E+02	<1	5.71E+02	<1
SELENIUM	0.64	3.13E-01	2.0	6.27E-01	1.0	4.03E+00	<1	8.06E+00	<1	2.73E+00	<1	4.50E+00	<1	6.09E-01	1.1	1.00E+00	<1	5.27E-01	1.2	8.70E-01	<1
SILVER	0.14	2.31E+01	<1	1.73E+02	<1	8.34E+02	<1	6.26E+03	<1	1.72E+03	<1	1.72E+04	<1	2.89E+02	<1	2.89E+03	<1	5.85E+01	<1	5.85E+02	<1
ZINC	100	1.40E+01	7.1	1.26E+02	<1	2.19E+01	4.6	1.98E+02	<1	3.38E+03	<1	6.75E+03	<1	8.28E+01	1.2	1.66E+02	<1	4.22E+02	<1	8.44E+02	<1
PCBs																					
Aroclor 1254	0.57	8.69E-03	65.6	8.69E-02	6.6	1.53E+00	<1	1.53E+01	<1	1.17E+01	<1	1.17E+05	<1	5.33E-02	10.7	5.33E-01	1.1	3.42E-03	166.6	3.42E-02	16.7
SVOCs/PAHs																					
ANTHRACENE	0.013	NC		NC		NC		NC		5.23E+04	<1	5.23E+05	<1	2.14E+04	<1	2.14E+05	<1	2.20E+03	<1	2.20E+04	<1
BENZO(A)ANTHRACENE	0.082	NC		NC		NC		NC		4.78E+01	<1	4.78E+02	<1	2.55E+00	<1	2.55E+01	<1	1.43E+00	<1	1.43E+01	<1
BENZO(B)FLUORANTHENE	0.023	NC		NC		NC		NC		1.68E+02	<1	1.68E+03	<1	2.87E+00	<1	2.87E+01	<1	5.12E+00	<1	5.12E+01	<1
BENZO(K)FLUORANTHENE	0.0075	NC		NC		NC		NC		1.85E+03	<1	1.85E+04	<1	3.16E+01	<1	3.16E+02	<1	5.65E+01	<1	5.65E+02	<1
CHRYSENE	0.029	NC		NC		NC		NC		2.37E+03	<1	2.37E+04	<1	1.24E+02	<1	1.24E+03	<1	5.65E+01	<1	5.65E+02	<1
FLUORANTHENE	0.18	NC		NC		NC		NC		4.11E+03	<1	2.05E+04	<1	7.02E+02	<1	3.51E+03	<1	1.24E+02	<1	6.22E+02	<1
FLUORENE	0.0089	6.55E+00	<1	3.28E+01	<1	1.56E+03	<1	7.81E+03	<1	4.15E+01	<1	2.07E+02	<1	2.48E+01	<1	1.24E+02	<1	2.27E+00	<1	1.13E+01	<1
PHENANTHRENE	0.1	8.17E+00	<1	4.08E+01	<1	7.63E+02	<1	3.81E+03	<1	7.32E+02	<1	3.66E+03	<1	2.98E+02	<1	1.49E+03	<1	3.22E+01	<1	1.61E+02	<1
PYRENE	0.098	NC		NC		NC		NC		1.07E+03	<1	5.35E+03	<1	1.85E+02	<1	9.25E+02	<1	3.17E+01	<1	1.58E+02	<1

Refined Assessment

Parameter	Maximum Soil Concentration (mg/kg)	Wildlife TRV-Based Soil Concentrations																			
		American Robin				Red-tailed Hawk				Meadow Vole				Red Fox				Short-tailed Shrew			
		NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ
Metals																					
ARSENIC	4.6	2.94E+01	<1	7.34E+01	<1	3.93E+05	<1	9.83E+05	<1	1.65E+01	<1	1.65E+02	<1	4.00E+02	<1	4.00E+03	<1	5.01E-01	9.2	5.01E+00	<1
CADMIUM	1.9	1.50E+00	1.3	2.07E+01	<1	3.96E+05	<1	5.47E+06	<1	2.75E+01	<1	2.75E+02	<1	4.84E+03	<1	4.84E+04	<1	1.98E+00	<1	1.98E+01	<1
CHROMIUM	82	1.06E+01	7.7	5.29E+01	1.5	2.73E+04	<1	1.37E+05	<1	1.59E+06	<1	1.59E+07	<1	7.04E+06	<1	7.04E+07	<1	2.91E+04	<1	2.91E+05	<1
LEAD	52	1.06E+01	4.9	1.06E+02	<1	5.77E+05	<1	5.77E+06	<1	1.92E+03	<1	1.92E+04	<1	1.52E+05	<1	1.52E+06	<1	8.89E+01	<1	8.89E+02	<1
MERCURY	0.16	1.32E+00	<1	2.65E+00	<1	2.65E+02	<1	5.30E+02	<1	7.83E-01	<1	3.20E+00	<1	1.17E+00	<1	4.76E+00	<1	1.38E-01	1.2	5.64E-01	<1
SELENIUM	0.64	6.91E-01	<1	1.38E+00	<1	4.08E+03	<1	8.17E+03	<1	5.00E+00	<1	8.25E+00	<1	1.84E+02	<1	3.04E+02	<1	8.88E-01	<1	1.46E+00	<1
ZINC	100	3.08E+01	3.3	2.78E+02	<1	2.22E+04	<1	2.01E+05	<1	6.19E+03	<1	1.24E+04	<1	2.46E+04	<1	4.92E+04	<1	7.10E+02	<1	1.42E+03	<1
PCBs																					
Aroclor 1254	0.57	1.95E-02	29.3	1.95E-01	2.9	1.55E+03	<1	1.55E+04	<1	2.14E+01	<1	2.14E+02	<1	1.58E+01	<1	1.58E+02	<1	5.87E-03	97.1	5.87E-02	9.7

Notes:
NC = Not Calculated no TRV available
TRV = Toxicity Reference Value
HQ = Hazard Quotient
LOAEL = Lowest observable adverse effects level
NOAEL = No observable adverse effects level
mg/kg = Milligram Per Kilogram
PCB = Polychlorinated Biphenyls
SVOC = Semi-Volatile Organic Compound
PAH = Poly-Aromatic Hydrocarbon

= Indicate HQs greater than 1.0

Refer to Appendix I for detailed description of model parameters and results

Table 5-40
Preliminary/Refined Wildlife Risk Characterization
Screening Level Ecological Risk Assessment
SSP Report - Area Q
Radford Army Ammunition Plant, Radford, Virginia

Preliminary Assessment

Parameter	Maximum Soil Concentration (mg/kg)	Wildlife TRV-Based Soil Concentrations																			
		American Robin				Red-tailed Hawk				Meadow Vole				Red Fox				Short-tailed Shrew			
		NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ
Metals																					
ARSENIC	1.4	1.39E+01	<1	3.46E+01	<1	3.89E+02	<1	9.71E+02	<1	8.99E+00	<1	8.99E+01	<1	1.34E+00	1.0	1.34E+01	<1	3.02E-01	4.6	3.02E+00	<1
CADMIUM	1.6	6.75E-01	2.4	9.31E+00	<1	3.91E+02	<1	5.40E+03	<1	1.50E+01	<1	1.50E+02	<1	1.48E+01	<1	1.48E+02	<1	1.16E+00	1.4	1.16E+01	<1
CHROMIUM	21	5.27E+00	4.0	2.64E+01	<1	2.70E+01	<1	1.35E+02	<1	8.65E+05	<1	8.65E+06	<1	2.38E+04	<1	2.38E+05	<1	1.78E+04	<1	1.78E+05	<1
COPPER	12	1.38E+02	<1	1.82E+02	<1	7.11E+02	<1	9.33E+02	<1	8.34E+02	<1	1.10E+03	<1	7.43E+01	<1	9.78E+01	<1	9.57E+01	<1	1.26E+02	<1
LEAD	21	5.18E+00	4.1	5.18E+01	<1	5.69E+02	<1	5.69E+03	<1	1.05E+03	<1	1.05E+04	<1	4.97E+02	<1	4.97E+03	<1	5.45E+01	<1	5.45E+02	<1
MERCURY	0.02	6.08E-01	<1	1.22E+00	<1	2.62E-01	<1	5.23E-01	<1	4.27E-01	<1	1.74E+00	<1	3.93E-03	5.1	1.60E-02	1.2	8.31E-02	<1	3.39E-01	<1
NICKEL	15	3.86E+02	<1	5.33E+02	<1	1.95E+03	<1	2.70E+03	<1	5.54E+03	<1	1.11E+04	<1	3.23E+02	<1	6.46E+02	<1	2.86E+02	<1	5.71E+02	<1
SELENIUM	0.67	3.13E-01	2.1	6.27E-01	1.1	4.03E+00	<1	8.06E+00	<1	2.73E+00	<1	4.50E+00	<1	6.09E-01	1.1	1.00E+00	<1	5.27E-01	1.3	8.70E-01	<1
SILVER	0.07	2.31E+01	<1	1.73E+02	<1	8.34E+02	<1	6.26E+03	<1	1.72E+03	<1	1.72E+04	<1	2.89E+02	<1	2.89E+03	<1	5.85E+01	<1	5.85E+02	<1
ZINC	67	1.40E+01	4.8	1.26E+02	<1	2.19E+01	3.1	1.98E+02	<1	3.38E+03	<1	6.75E+03	<1	8.28E+01	<1	1.66E+02	<1	4.22E+02	<1	8.44E+02	<1
PCBs																					
Aroclor 1254	0.053	8.69E-03	6.1	8.69E-02	<1	1.53E+00	<1	1.53E+01	<1	1.17E+01	<1	1.17E+02	<1	5.33E-02	<1	5.33E-01	<1	3.42E-03	15.5	3.42E-02	1.5
SVOCs/PAHs																					
FLUORANTHENE	0.008	NC		NC		NC		NC		4.11E+03	<1	2.05E+04	<1	7.02E+02	<1	3.51E+03	<1	1.24E+02	<1	6.22E+02	<1
PHENANTHRENE	0.0016	8.17E+00	<1	4.08E+01	<1	7.63E+02	<1	3.81E+03	<1	7.32E+02	<1	3.66E+03	<1	2.98E+02	<1	1.49E+03	<1	3.22E+01	<1	1.61E+02	<1
PYRENE	0.0038	NC		NC		NC		NC		1.07E+03	<1	5.35E+03	<1	1.85E+02	<1	9.25E+02	<1	3.17E+01	<1	1.58E+02	<1

Refined Assessment

Parameter	Maximum Soil Concentration (mg/kg)	Wildlife TRV-Based Soil Concentrations																			
		American Robin				Red-tailed Hawk				Meadow Vole				Red Fox				Short-tailed Shrew			
		NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ
Metals																					
ARSENIC	1.4	2.94E+01	<1	7.34E+01	<1	3.93E+05	<1	9.83E+05	<1	1.65E+01	<1	1.65E+02	<1	4.00E+02	<1	4.00E+03	<1	5.01E-01	2.8	5.01E+00	<1
CADMIUM	1.6	1.50E+00	1.1	2.07E+01	<1	3.96E+05	<1	5.47E+06	<1	2.75E+01	<1	2.75E+02	<1	4.84E+03	<1	4.84E+04	<1	1.98E+00	<1	1.98E+01	<1
CHROMIUM	21	1.06E+01	2.0	5.29E+01	<1	2.73E+04	<1	1.37E+05	<1	1.59E+06	<1	1.59E+07	<1	7.04E+06	<1	7.04E+07	<1	2.91E+04	<1	2.91E+05	<1
LEAD	21	1.06E+01	2.0	1.06E+02	<1	5.77E+05	<1	5.77E+06	<1	1.92E+03	<1	1.92E+04	<1	1.52E+05	<1	1.52E+06	<1	8.89E+01	<1	8.89E+02	<1
MERCURY	0.02	1.32E+00	<1	2.65E+00	<1	2.65E+02	<1	5.30E+02	<1	7.83E-01	<1	3.20E+00	<1	1.17E+00	<1	4.76E+00	<1	1.38E-01	<1	5.64E-01	<1
SELENIUM	0.67	6.91E-01	<1	1.38E+00	<1	4.08E+03	<1	8.17E+03	<1	5.00E+00	<1	8.25E+00	<1	1.84E+02	<1	3.04E+02	<1	8.88E-01	<1	1.46E+00	<1
ZINC	67	3.08E+01	2.2	2.78E+02	<1	2.22E+04	<1	2.01E+05	<1	6.19E+03	<1	1.24E+04	<1	2.46E+04	<1	4.92E+04	<1	7.10E+02	<1	1.42E+03	<1
PCBs																					
Aroclor 1254	0.053	1.95E-02	2.7	1.95E-01	<1	1.55E+03	<1	1.55E+04	<1	2.14E+01	<1	2.14E+02	<1	1.58E+01	<1	1.58E+02	<1	5.87E-03	9.0	5.87E-02	<1

Notes:
NC = Not Calculated no TRV available
TRV = Toxicity Reference Value
HQ = Hazard Quotient
LOAEL = Lowest observable adverse effects level
NOAEL = No observable adverse effects level
mg/kg = Milligram Per Kilogram
PCB = Polychlorinated Biphenyls
SVOC = Semi-Volatile Organic Compound
PAH = Poly-Aromatic Hydrocarbon

= Indicate HQs greater than 1.0

Refer to Appendix I for detailed description of model parameters and results

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6.0 SWMU 46 – PROPELLANT BURIAL AREA

6.1 SITE BACKGROUND – ENVIRONMENTAL SETTING

Physiography

SWMU 46 is an approximate 0.024-acre (1,251 ft^2) maintained grass area located in the northwest section of the MMA approximately 240 ft southeast of the New River. The site is an enclosed depression at an elevation of approximately 1,720 ft msl. The area surrounding the site is relatively flat with a moderate slope to the northwest towards the New River (Figure 6-1).

A "BURIED EXPLOSIVE WASTE" sign is located at site. RFAAP personnel verified that the sign was originally placed in the area where the propellant waste was reportedly buried (Dames and Moore 1992b).

The immediate site area is a localized depression between the railroad tracks to the southeast and the asphalt roadway and parking area to the northwest (Figure 6-1).



SWMU 46 – August 2002 – Looking Southeast

Tanks and Structures

A non-related building is located immediately to the northwest of the site across an asphalt road and parking area. A boundary fence exists to the east and west of the site, in addition to the railroad tracks located approximately 20 ft southwest of the site area. Other tanks or structures are not located in or near the site.

Surface Water

The New River is the nearest naturally occurring perennial surface water body and is located 240 ft northwest of SWMU 46. Proximate to and within the depressed area comprising the site, precipitation and overland flow would infiltrate into the subsurface soil. Outside of this area, surface water drainage likely occurs away from the site across maintained grass areas toward the New River (northeast and northwest). The actual size of SWMU 46 is unknown; however, based on the waste quantity reportedly disposed of, the site is likely limited to the observed depression with limited outward drainage. Manholes, catch basins, storm drains, or other well-defined drainage pathways have not been observed in the site area.

Soil and Geology

SWMU 46 is underlain by Unison-Urban Land complex soil. This soil has moderate permeability and medium-to-strong acidity (IT 2001a). SSP borings 46SB1 and 46SB2 completed to refusal (on presumed bedrock) indicate that the site is underlain by approximately 16.5 to 17.5 ft of unconsolidated soil overlying carbonate bedrock of the Elbrook Formation. This soil consists of 10 to 15 ft of micaceous silty or clayey sand (SM or SC), alluvial deposits, with some silt and gravelly layers. The alluvial deposits overlie clayey and sandy saprolitic soil with gravel and claystone lenses. Physical soil testing of two representative soil samples at the site indicated acidic CL and CH soil, with organic content in the range of 1.8 to 2.2%, and a vertical hydraulic conductivity of 3.0E-08 cm/sec for the SC sample (Table 3-1).

Groundwater

An unconfined aquifer occurs near the soil/bedrock interface at the site and in underlying bedrock. Groundwater was encountered in boring 46SB2 at a depth of 17 ft bgs within 0.5 ft of boring refusal. The static water measured in monitoring well 46MW1 also was approximately 17 ft bgs prior to groundwater sampling. Based on surface topography and proximity to the New River, groundwater flow in the site area is toward the New River (north or northwest).

6.2 SITE BACKGROUND - HISTORY

Approximately one ton of propellants and propellant-contaminated soil was reportedly buried at this location as the result of a railcar spill. Other activities have not been associated with the SWMU 46 area.

6.3 PREVIOUS INVESTIGATIONS

6.3.1 Verification Investigation (VI) – 1992

Dames and Moore conducted a VI at SWMU 46 in October 1991 to "evaluate whether soil contamination exists from the one-time release of waste propellants." Four, 3 ft by 3 ft by 5 ft test pits were excavated in the area identified as the buried explosives waste area. Visual evidence of contamination or disturbed soil was not encountered (Dames and Moore 1992b). Soil samples 46SS1 and 46SS2 were collected at a depth of approximately 1 ft from separate test pits and analyzed for TAL metals and explosives (Figure 6-2).

Explosives were not detected in samples 46SS1 and 46SS2. TAL metal results were below background point estimates and R-RBCs, except for thallium in sample 46SS2. Thallium was detected in sample 46SS2 at a concentration above the adjusted I-RBC (Table 6-1).

6.3.2 Relative Risk Site Evaluation – 1997

In 1997, the United States Army Center for Health Promotion and Preventive Medicine (USACHPPM) conducted a Relative Risk Site Evaluation in the SWMU 46 area. A Geoprobe® was used to advance eleven borings to a depth of 5 to 9 ft bgs at three areas thought to represent a potential burial site (USACHPPM 1997). Evidence of propellant was not reported in the borings and the soil was reported to appear undisturbed (USACHPPM 1997). Five subsurface soil samples were collected from three borings (S466, S467, and S468; Figure 6-2). The area in which these samples were collected does not correspond to the SSP sampling area for SWMU 46. Additional samples for chemical analysis were not collected from other soil boring locations (S469, S4610, and S4611; Figure 6-2) in the SWMU 46 area during the Relative Risk Site Evaluation.

6.4 WORK PLAN DATA GAP ANALYSIS

The data gap analysis presented in Section 1.3.5 of WPA 016 indicated that limited soil sampling and analyses had occurred at SWMU 46 (URS 2003b). The following data gaps were identified:

- TCL VOCs - surface and subsurface soil;
- TCL SVOCs/PAHs - surface and subsurface soil;
- TCL PCBs and TCL pesticides - surface soil;
- Explosives - surface and subsurface soil;
- TAL inorganics - surface and subsurface soil; and
- Site-specific physical soil testing data.

6.5 SSP FIELD ACTIVITIES

Soil borings 46SB1 and 46SB2 were advanced at the site to evaluate the presence or absence of chemicals in surface soil and subsurface soil. Boring 46SB1 was advanced inside the presumed boundary of SWMU 46 and boring 46SB2 was advanced outside (downgradient) of the SWMU 46 boundary (Figure 6-1). Each boring was advanced to refusal using a tractor mounted, direct-push Geoprobe® unit. Discrete samples were collected from surface, intermediate, and terminal intervals for the two borings as summarized below.

SWMU 46 SSP Sample and Boring Information

Boring ID	Total Depth of Boring (ft bgs)	Surface Sample ID	Sample Depth (ft)	Intermediate Sample ID	Sample Depth (ft)	Terminal Sample ID	Sample Depth (ft)
46SB1	16.6	46SB1A	0.0 - 1.0	46SB1B	8.0 - 10.0	46SB1C	14.0 - 16.0
46SB2	17.5	46SB2A	0.0 - 1.0	46SB2B	10.0 – 12.0	46SB2C	14.0 - 16.0

Soil samples were analyzed for TCL VOCs, TCL SVOCs, PAHs, explosives (including nitroglycerin and PETN), and TAL inorganics. Surface soil sample 46SB2A was also analyzed for TCL pesticides, TCL PCBs, and TCL herbicides. SSP analytical results (detected chemicals) are summarized in Table 6-2.

Two soil samples were collected from 46SB1 (14.5 ft bgs) and 46SB2 (9.5-10 ft bgs) for physical testing including: percent moisture, grain size, pH, TOC, specific gravity, and bulk density. Additional testing was conducted on sample 46SB1 including: Atterberg limits, hydrometer analysis, and hydraulic conductivity. Analytical results for these samples are summarized in Table 3-1 and complete results are provided in Appendix E.

One monitoring well (46MW1) was installed at the site (on April 18, 2006) to evaluate potential leaching of TCE to groundwater due to a detected concentration in soil slightly above the calculated site-specific SSL for the soil-to-groundwater migration pathway (Figure 6-1). Monitoring well 46MW1 was installed to a depth of 32 ft bgs and screened in the uppermost portion of aquifer across the soil/bedrock interface. One groundwater sample was collected from monitoring well 46MW1 for analysis of TCE and associated degradation products. Analytical results for this sample are provided in Appendix K and discussed in Section 6.6.1.2.

Deviations to the SSP field program outlined in WPA 016 were not required to adjust to field conditions at the site.

6.6 HUMAN HEALTH RISK SCREENING

6.6.1 Identification of COPCs

6.6.1.1 Soil

Table 6-3 and 6-4 present the results of the COPC evaluations for surface soil and total soil, respectively. COPCs identified for surface soil and total soil included:

- *TAL metals;* aluminum (NSV), arsenic, chromium, cobalt (NSV), iron, manganese, and vanadium;
- *VOC TICs:* 2 compounds (NSVs);
- *TCL SVOCs:* 4-chloro-3-methylphenol (NSV); and
- *SVOC TICs:* 8 compounds (NSVs) for surface soil and 17 compounds (NSVs) for total soil.

6.6.1.2 Groundwater

TCE, PCE, and degradation products were not detected in the groundwater sample collected from monitoring well 46MW-1, and therefore, COPCs were not identified for groundwater. Table K-1 in Appendix K summarizes the analytical results for this sample.

6.6.2 Cumulative Risk Screen

Table 6-5 presents the results of the cumulative risk screening for surface soil. Tables 6-6 and 6-7 present the results of the cumulative risk screening for total soil. A summary of the screening results for SWMU 46 is presented below.

Cumulative Human Health Risk Screening Results for SWMU 46

	Surface Soil			Total Soil		
Residential Excess Cancer Risk	Pass	5.E-06	--	Fail	1.E-05	Arsenic
Industrial Excess Cancer Risk	Pass	1.E-06	--	Pass	2.E-06	--
Residential Noncarcinogenic	Fail	3	As, Cr, Fe, Mn, V	Fail	3	As, Cr, Fe, Mn, V
Industrial Noncarcinogenic	Pass	0.2	--	Pass	0.2	--

The residential cumulative human health risk screens failed for surface soil (noncarcinogenic) and total soil (carcinogenic and noncarcinogenic). Cumulative risk screenings passed for industrial scenarios.

Noncarcinogenic residential cumulative risk screenings for surface soil and total soil resulted in HIs of 3 and 4, respectively, which exceeded the EPA target HI of 1. Due to multiple chemicals contributing to an HI greater than 1, the HIs have been segregated based on the primary target organs for chronic exposure. The following tables present the results of the HI segregation using data obtained from Oak Ridge National Laboratory's RAIS, which includes data from various sources such as USEPA and the ATSDR.

HI Segregation for Target Organs – SWMU 46 - Surface Soil

Target Organ	As	Cr	Fe	Mn	V	Total HI
Skin	0.1	--	--	--	--	0.1
CNS	0.1	--	--	0.4	--	***0.5***
CV	0.1	--	2	--	--	***2***
Blood	--	--	--	--	0.7	***0.7***
Liver	--	--	2	--	--	***2***
Kidney	--	--	2	--	0.7	***3***
GI	--	0.1	--	--	0.7	***0.8***
Reproductive	--	--	--	0.4	--	0.4

HI segregation for surface soil resulted in values equal to or higher than the cumulative SSP HI threshold of 0.5 for a target organs including: the CNS, CV, blood, liver, kidney, and GI.

HI Segregation for Target Organs – SWMU 46 - Total Soil

Target Organ	As	Cr	Fe	Mn	V	Total HI
Skin	0.2	--	--	--	--	0.2
CNS	0.2	--	--	0.3	--	***0.5***
CV	0.2	--	2	--	--	***2***
Blood	--	--	--	--	0.8	***0.8***
Liver	--	--	2	--	--	***2***
Kidney	--	--	2	--	0.8	***3***
GI	--	0.1	--	--	0.8	***1***
Reproductive	--	--	--	0.3	--	0.3

HI segregation for total soil resulted in values equal to or higher than the cumulative SSP HI threshold of 0.5 for a target organs including: including: the CNS, CV, blood, liver, kidney, and GI.

6.6.3 Lead and Iron Screening

The MDC for lead at the site (16 mg/kg) was below the lead screening level of 400 mg/kg, and therefore, further characterization for lead was not required.

Iron concentrations at the site for surface soil and total soil resulted in HQs greater than the iron SSP threshold HQ of 0.5 for the residential scenario, and therefore, the site required further characterization for iron through a margin of exposure evaluation. Appendix H presents the margin of exposure evaluation for surface soil and total soil. A summary of the results for SWMU 46 is presented below.

Iron Margin of Exposure Evaluation – Future Child Resident

	Surface Soil			Total Soil		
		Estimated Site Intake	Exposure Screening Level		Estimated Site Intake	Exposure Screening Level
RDA Screen (mg/day)	Pass	6.9	10	Pass	7.3	10
Provisional Reference Dose (RfD) Screen (mg/kg-day)	Pass	0.46	0.66	Pass	0.49	0.66

The site passed the margin of exposure evaluation for iron in soil. In addition, the MDCs for iron in surface soil and total soil were below the background point estimate.

6.6.4 Comparison to Generic SSLs

The MDC comparisons to generic SSLs (DAF 20) for detected chemicals indicate that arsenic and TCE exceeded their SSLs (Table 6-8). The MDC for arsenic was below the facility background point estimate (Table 6-9).

6.6.5 Comparison to Site-Specific SSLs

The MDC for TCE (3.4 µg/kg) is slightly above the site-specific SSL of 1.8 µg/kg calculated using the average TOC value from the physical sample collected at the site during the SSP (Appendix F). The soil-to-groundwater migration pathway for this SSL exceedance was evaluated by installing monitoring well 46MW1 at the site and collecting a groundwater sample for analysis of TCE, tetrachloroethene and degradation products 1,1-dichloroethene, cis-1,2-dichloroethene, trans-1,2-dichloethene, and vinyl chloride.

6.6.6 Comparison to Background

MDCs for metal COPCs in surface soil and total soil were below their background point estimates except for aluminum in total soil (Table 6-9).

6.6.7 Human Health Risk Screening Summary

COPCs with available screening value were limited to metals in soil. The residential cumulative human health risk screens failed for surface soil (noncarcinogenic) and total soil (carcinogenic and noncarcinogenic). Cumulative risk screenings passed for industrial scenarios. COPCs were not identified in groundwater.

Carcinogenic residential risk screening failed for total soil due to arsenic concentrations below the background point estimate. This screening result is not a concern given that the MDC for arsenic is below the background point estimate.

Noncarcinogenic residential risk screening failed for surface soil due to metals concentrations below background point estimates. This screening result is not a concern given that the elevated HI (>1) is due to background levels of metals in soil.

Noncarcinogenic residential risk screening failed for total soil due to metals concentrations below background point estimates. This screening result is not a concern given that the elevated HI (>1) is due to background levels of metals in soil.

The site passed the lead screening for soil. Iron concentrations in surface soil and total soil required a margin of exposure evaluation. Surface soil and total soil passed the margin of exposure evaluation for iron.

Generic SSL exceedances were limited to arsenic and TCE (one intermediate depth sample). The arsenic MDC is below its background point estimate, and therefore, it is not of concern at the site. TCE also slightly exceeded its calculated site-specific SSL (using the T-RBC as the target leachate concentration) in one intermediate depth sample. The groundwater sample collected from monitoring well 46MW-1 did not indicate leaching of TCE or degradation products to groundwater.

6.7 ECOLOGICAL RISK SCREENING

6.7.1 Problem Formulation

6.7.1.1 Ecological Site Characterization

An overview of the site physiography, water resources, soil, and geology for SWMU 46 is presented in Section 6.1. SWMU 46 is an approximate 0.024-acre (1,251 ft^2) maintained grass area that provides minimal habitat value to wildlife potentially occurring in the area. The site is bordered to the east by railroad tracks and to the south and west by an asphalt driveway. A building is located approximately 100 ft to the north of the site.

Observations made during the site reconnaissance indicate that a viable herbaceous vegetation community occurs at the site (photograph on page 6-1). Signs of chemical vegetative stress were not observed during the reconnaissance. Based on information from the Installation-Wide Biological Survey and observations made during the site reconnaissance, the grassland vegetative community at the site is typical of other meadow-grassed areas that are regularly maintained at RFAAP.

The habitat could support some ecological use (i.e., shelter and foraging) by some smaller common species in the area. Given its limited size, proximity to railroad tracks, asphalt roads, and buildings, and its frequent disturbance by facility operations, few individuals would be expected to utilize the area for a lengthy period.

Threatened, rare, or endangered species were not observed during the site reconnaissance. These species are not likely to be present within the boundaries of the site. Threatened, rare, and endangered species information for RFAAP is discussed in Section 3.3.3.

6.7.2 Ecological Conceptual Site Model

The ECSM for SWMU 46 (and other terrestrial sites for the SSP) is presented on Figure 3-1. Since the site is an exclusively upland habitat that lacks wetlands or significant drainage features, surface soil is the potential exposure medium of concern. Based on the site characterization and data, the following complete exposure pathway exists: terrestrial receptor exposure to surface soil.

Detected chemical occurrence and distribution table is presented in Table 6-10. In addition, Table 6-11 summarizes the nondetected chemicals for SWMU 46. Potential ecological receptors may be exposed to COPECs in soil through the following exposure routes:

- Direct contact/absorption from soil;
- Direct ingestion of soil;
- Incidental ingestion of soil; and
- Direct ingestion of biota with accumulated COPECs.

Receptors of concern selected for SWMU 46 include:

- Plants;
- Soil invertebrate/microbial community;
- Omnivorous birds (American Robin; *Turdus migratorius*);
- Carnivorous birds (Red-Tailed Hawk; *Buteo jamaicensis*);
- Herbivorous mammals (Meadow Vole; *Microtus pennsylvanicus*;);

- Carnivorous mammals (Short-Tailed Shrew; *Blarina brevicauda*); and
- Omnivorous mammals (Red Fox; *Vulpes vulpes*).

Relevant assessment and measurement endpoints for the identified terrestrial receptors are presented in Section 3.3.6.1.

6.7.3 Preliminary Exposure Estimate and Risk Characterization

The preliminary exposure estimate and ecological effects evaluation considers the most conservative risk scenario. Highly conservative assumptions are used to estimate COPEC exposure to terrestrial receptors for pathways to be quantitatively evaluated. Conservative TRVs are used to evaluate the ecological effects of exposure using the two approaches discussed below.

6.7.3.1 Preliminary Exposure Estimate and Ecological Effects Evaluation

Direct Contact Approach

The MDCs for detected chemicals in soil are used as the preliminary exposure concentrations to develop a conservative risk scenario for the direct contact pathway to soil invertebrates. Table 6-12 presents the preliminary exposure estimates for the direct contact approach.

Dose Rate Modeling Approach

In the dose rate modeling approach, the detected bioaccumulative chemical MDCs, along with assumptions of maximum ingestion rate, minimum body weight, 100% area use, and 100% bioavailability are used in the conservative risk scenario as the preliminary exposure estimate for soil and compared to the calculated TRVs. The MDCs used in the preliminary exposure estimate for detected chemicals are presented in Table 6-10.

6.7.3.2 Background Concentrations of Metals

Background point estimates for metals were incorporated in the ecological screening to assess site soil concentrations in the context of facility-wide background levels (IT 2001a). Essential nutrients, including calcium, magnesium, potassium, and sodium were not considered COPECs in the risk screening in accordance with the SSP (USEPA 2001a) and the MWP (URS 2003b). The results of the background comparison for the site are provided in Table 6-13. The results of this comparison have been incorporated into the risk management decision and ecological summary.

6.7.3.3 Preliminary Risk Characterization

Terrestrial Plants

Qualitative characterization of vegetative communities common to grassed areas at RFAAP is provided in Section 3.3.7.4. Stressed or dead vegetation was not observed during the site reconnaissance, which could be attributed to chemical stress. Reduced plant density is likely due to poor physical substrate quality and not a response to COPEC concentrations in surface soil.

Soil Invertebrates and Microbial Communities

Direct contact HQs calculated for soil invertebrates and microbial communities are presented in Table 6-12. Other potentially complete exposure pathways to soil invertebrate and microbial communities include direct ingestion of soil and biota. However, there is insufficient information to quantify these pathways, and while these pathways exist, they are likely secondary to the direct contact/absorption pathway and should not substantially alter the risk characterization.

Of the detected chemicals for which ecological screening values were available, the concentrations of aluminum, chromium, iron, manganese resulted in HQ values that were greater than 1 (Table 6-12). However, MDCs for these metals were below their background point estimates (Table 6-13).

Terrestrial Wildlife

Quantitative risk characterization for terrestrial wildlife is limited to direct ingestion of biota and incidental ingestion of soil. The ECSM identifies a potentially complete direct contact exposure pathway to herbivorous and omnivorous mammals; however, there is insufficient information to quantify this pathway. This pathway is likely secondary to the direct ingestion pathway; therefore, it should not substantially alter the risk characterization.

The risk to each potential wildlife receptor at the site is presented in Table 6-14 and summarized as follows:

Receptor	NOAEL Only Exceedances	NOAEL and LOAEL Exceedances
American Robin	cadmium, chromium, lead, zinc	selenium
Red-tailed Hawk	zinc	none
Meadow Vole	none	none
Red Fox	arsenic, selenium	mercury
Short-tailed Shrew	arsenic, cadmium, selenium	none

6.7.4 Refined Exposure Estimate, Ecological Effects Evaluation, and Risk Characterization

6.7.4.1 Refined Exposure Estimate and Ecological Effects Evaluation - Dose Modeling

The conservative assumptions used in the preliminary exposure estimate and ecological effects evaluation were replaced with more environmentally realistic assumptions resulting in a more realistic estimate of potential risk.

Refined exposure estimates and ecological effects were not developed for soil invertebrates and microbial communities because an appropriate 95% UCL could not be calculated using the surface soil data.

The refined exposure estimates and ecological effects were developed for wildlife receptors having complete exposure pathways to be quantitatively evaluated (i.e. omnivorous birds and mammals, carnivorous birds and mammals, and herbivorous mammals). In the refined model, a realistic area use factor ($AF_{refined}$) was calculated as the ratio of the site area to the average home range of the receptor (Appendix I, Table I-16).

6.7.4.2 Refined Risk Characterization -Terrestrial Wildlife

Based on the refined risk characterization of wildlife ingestion, the HQs for the receptors are less than 1 (Table 6-14).

6.7.4.3 Exposure and Risk Uncertainty Analysis

Potential risk and exposure uncertainty is discussed in Section 3.3.9. While factors such as lack of TSV and wildlife profile assumptions may create limited uncertainty, the very small size and negligible habitat quality of the site in combination with these limited uncertainties has produced a conservative assessment of potential ecological risks associated with the site.

6.7.5 Ecological Risk Screening Summary

The maximum surface soil concentrations for aluminum, chromium, iron, lead, and manganese exceed their respective direct contact TRVs and therefore, may pose risk to soil invertebrates and microbes; although concentrations of the metals are below their background point estimates. The refined risk characterization for wildlife ingestion resulted in HQs of less than 1 for the receptors

Therefore, there is adequate information to conclude that ecological risks are negligible and there is no need for further action at SWMU 46 on the basis of ecological risk.

6.8 CONCEPTUAL SITE MODEL

A refined CSM for SWMU 46 is presented on Figure 6-3. The site is a small depression surrounded by relatively flat land with a gentle slope towards the steep banks of the New River. Subsurface geology consists of alluvial deposits overlying carbonate bedrock of the Elbrook Formation. Groundwater is present at or close to the soil/bedrock interface and in the underlying bedrock. Based on local topography, groundwater flow in the site area is toward the New River (north or northeast).

The site consists of a depressed area where precipitation and overland flow infiltrate into subsurface soil. Surface water and sediment are not associated with the site. Potentially affected media include surface soil, subsurface soil, and groundwater. COPCs identified in soil with screening values included metals. SSP or previous chemical sampling did not indicate the presence of explosives; thus, the investigations did not reveal evidence of a propellant release at the site.

Although current and likely future land-use scenarios are limited to industrial operations, residential and industrial scenarios are evaluated. The site is enclosed by the Installation perimeter fence, and, therefore, potential receptors are limited to site workers (more conservative than trespasser scenario), future construction workers, and terrestrial biota. Direct deposition via previous disposal of waste is considered a potential release mechanism to surface soil. Site workers, construction workers, and terrestrial biota could contact surface soil. Leaching of chemicals is considered a potential release mechanism to subsurface soil that may be contacted by potential future construction workers. The lack of exceedances and single slight exceedance of the refined site-specific SSL indicates that leaching of chemicals to groundwater at levels of concern is unlikely.

6.9 RECOMMENDATION FOR FUTURE ACTION

No further action is recommended for SWMU 46 based on the following results of the SSP screening:

- Cumulative risk and hazard screenings for industrial scenarios passed;
- Site-related cumulative risk and hazard screenings for residential scenarios passed;
- The MDC for lead is below the SSP screening level of 400 mg/kg;
- Surface soil and total soil passed the margin of exposure evaluation for iron;
- Generic SSL exceedances were limited to arsenic and TCE. The arsenic SSL exceedance is not a concern because the MDC is below its background point estimate. Evaluation of the soil-to-groundwater migration pathway for TCE and related degradation products did not indicate detectable concentrations of these VOCs in groundwater.

- Evidence of propellant disposal or release is lacking based on the results of the SSP and previous investigations (explosives were not detected and test pits did not indicate the presence of waste); and
- There is adequate information to conclude that ecological risks are negligible and therefore there is no need for further action at SWMU 46 based on ecological risk.

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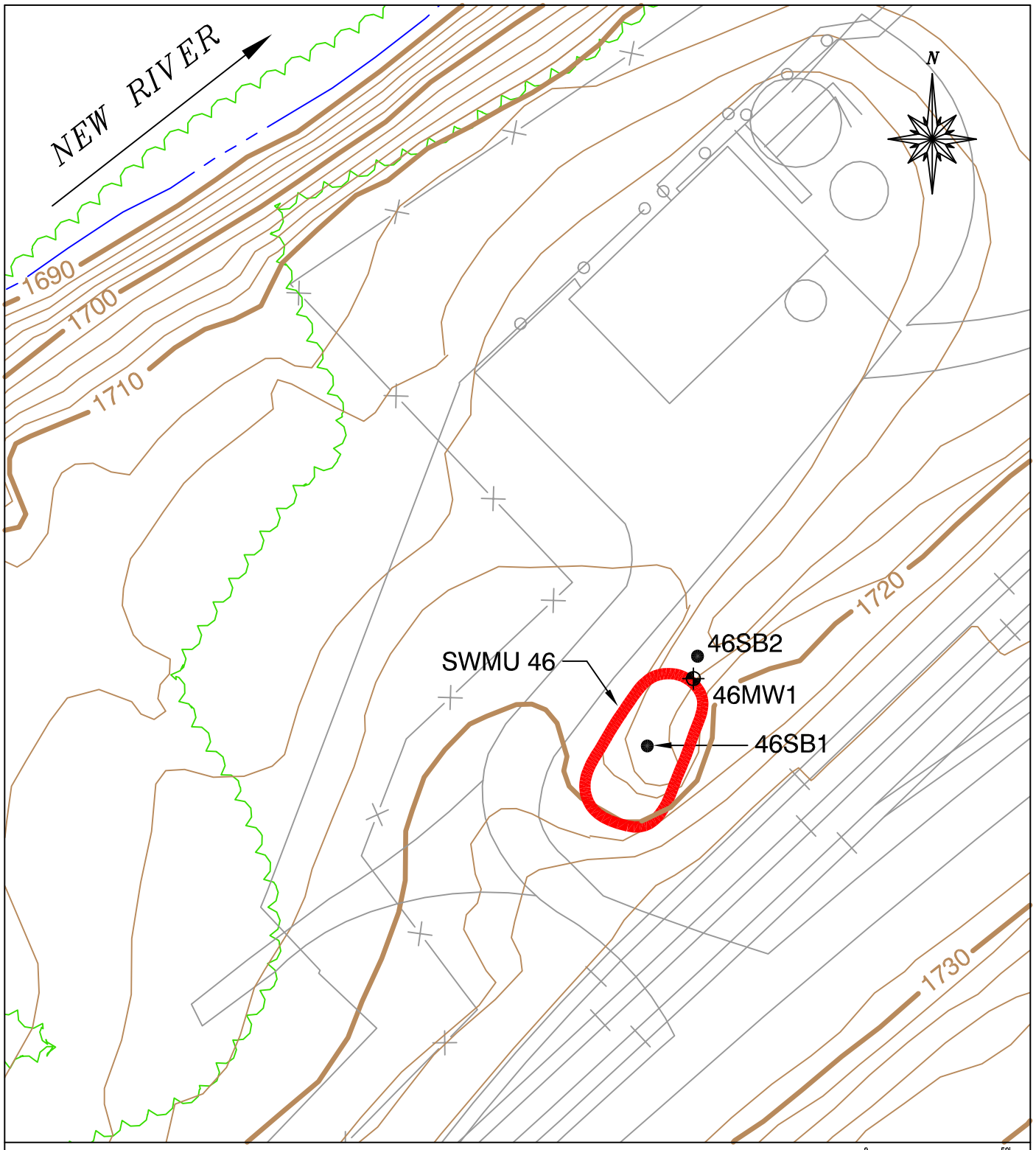


(SOURCE: MODIFIED FROM HERCULES, INC., 1992)

Legend

- Soil Sampling Location
- Monitoring Well
- SWMU 46 Approximate Boundary
- Vegetation
- Water

RFAAP

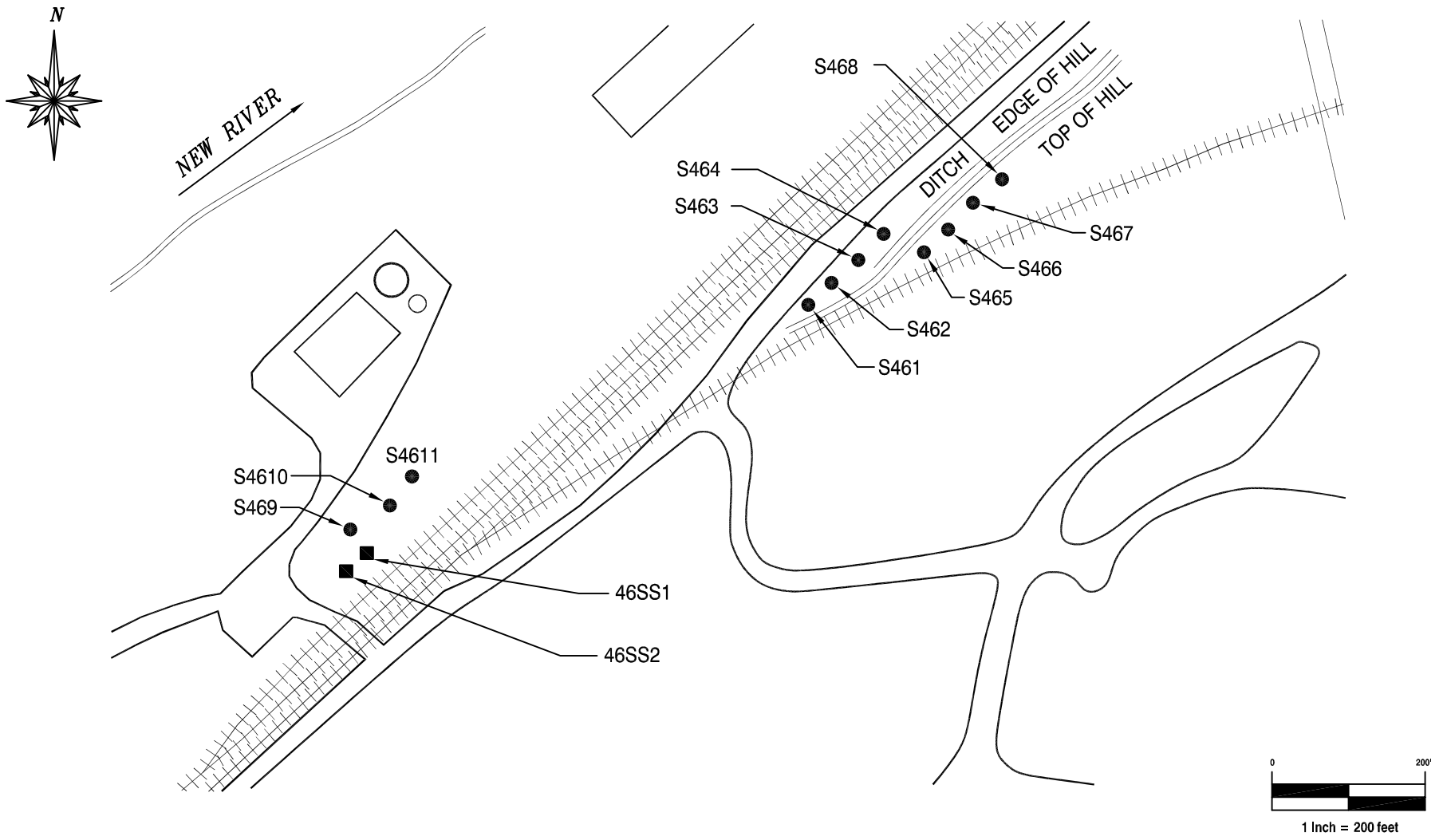
SSP REPORT

Date:	Prepared By:
December 2006	*CD/DC*
Scale:	**File Name:**
1"=50'	*11656628*

FIGURE 6-1

SSP SAMPLING LOCATION MAP

SWMU 46



Legend

- Soil Sampling Location (1997)
- Soil Sampling Location (1992)

(SOURCE: MODIFIED FROM USACHPPM, 1997)

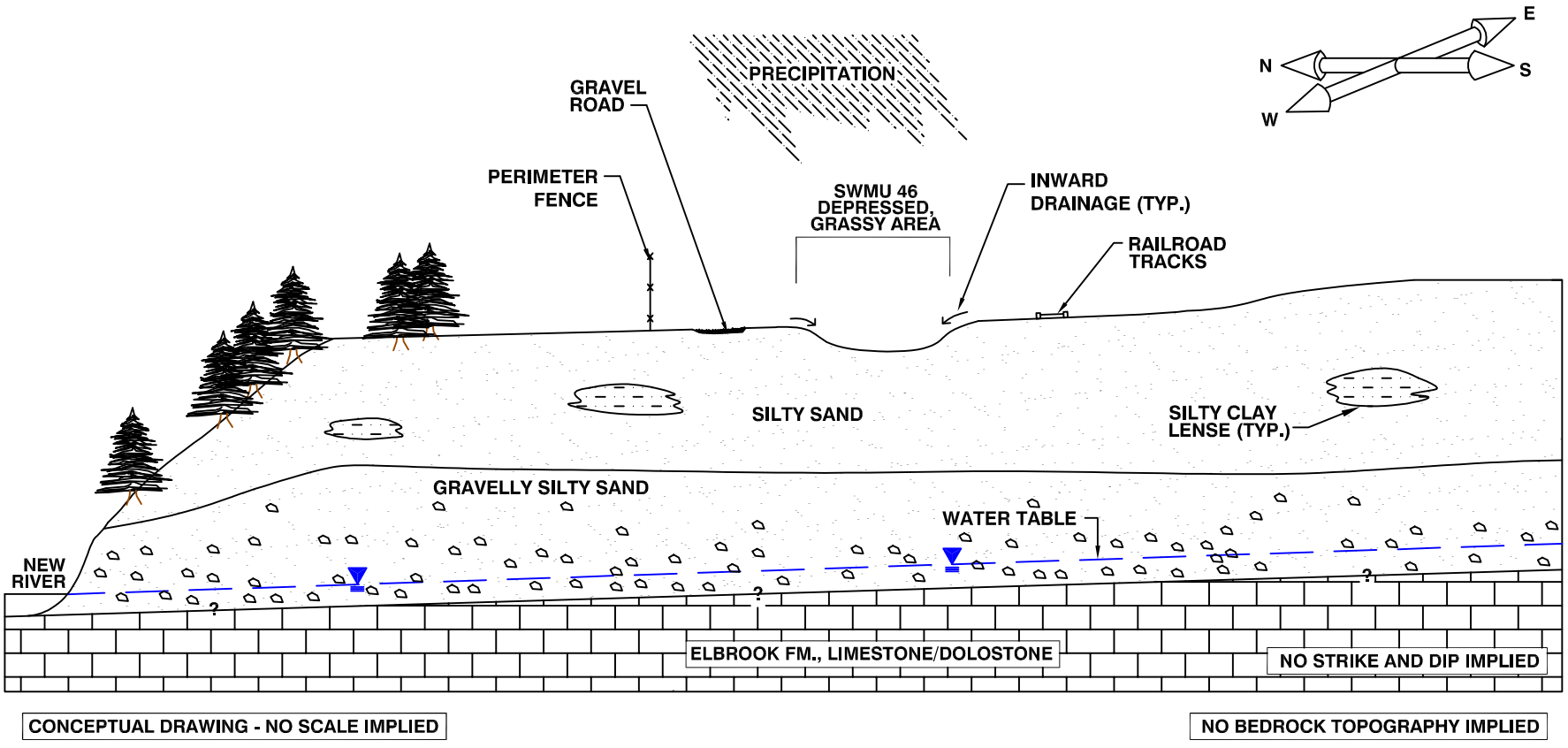
RFAAP

SSP REPORT

Date:	Prepared By:
June 2004	*KDC/TDH*
Scale:	**File Name:**
1"=200'	*15900619*

FIGURE 6-2

PREVIOUS INVESTIGATION SAMPLING LOCATIONS SWMU 46



RFAAP

SSP REPORT

Date:	Prepared By:
June 2004	*KDC/TDH*
Scale:	**File Name:**
Not to Scale	*15900619*

FIGURE 6-3

CONCEPTUAL SITE MODEL
SWMU 46

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Table 6-1
Summary of Analytical Data for Soil Samples Collected at SWMU 46
Modified from Dames and Moore Verification Investigation Report
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

SITE ID FIELD ID SAMPLE DATE DEPTH (ft bgs) MATRIX UNITS	PQLs mg/kg	46SS1 RVFS*47 29-Oct-91 1.0 CSO mg/kg	46SS2 RVFS*48 29-Oct-91 1.0 CSO mg/kg	Adjusted Soil Industrial RBC mg/kg	Adjusted Soil Residential RBC mg/kg	Draft BTAG Screening Level mg/kg	Facility-Wide Background Point Estimates [A] mg/kg
TAL Metals							
Aluminum	14.1	17,100	21,100	102,200	7,821	1	40,041
Arsenic	30	**2.13B**	**3.57**	1.91	0.43	328	15.8
Barium	1	108	119	7,154	548	440	209
Beryllium	0.2	0.842	0.832	204	16	0.02	1.02
Calcium	100	2,700B	1,170B	--	--	--	--
Chromium[1]	4	31.7B	38.3	307	23	0.0075	65.3
Cobalt	3	15.6	19	2,044	156	100	72.3
Copper	7	12.6	16.5	4,088	313	15	53.5
Iron	1,000	28,400	**34,000**	30,660	2,346	12	50,962
Magnesium	50	6,360B	5,180B	--	--	4,400	--
Manganese[2]	0.275	653	671	2,044	156	330	2,543
Nickel	3	16	20.7	2,044	156	2	62.8
Potassium	37.5	1,520B	2,170	--	--	--	--
Silver	4	<0.589	0.788	511	39	0.0000098	--
Sodium	150	215B	233B	--	--	--	--
Thallium	20	<6.62	**<u>12.6</u>**	7.15	0.547	0.001	2.11
Vanadium	0.775	**57.4**	**70.5**	102	7.8	0.5	108
Zinc	30.2	67.3	82.8	30,660	2,346	10	202

<u>Notes:</u>

B = Analyte was detected in corresponding method blank; values are flagged if the sample concentration is less than ten (10) times the method blank concentration for common laboratory constituents and five (5) times for all other constituents

BTAG = USEPA Region III Draft, Biological Technical Assistance Group Screening Level

CSO = Chemical soil

ft bgs = Feet below ground surface

mg/kg = Milligrams per kilogram

PQL = Practical quantitation limit; the lowest concentration that can be reliably detected at a defined level of precision for a given analytical method

TAL = Target Analyte List

RBC = Risk-Based Concentration

USEPA = United States Environmental Protection Agency

USEPA Region III Risk-Based Concentration (RBC) values from the April 14, 2004, RBC Table

Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens

[1] = Chromium VI RBC value used

[2] = Manganese-nonfood RBC value used

[A] = Facility-Wide Background Point Estimate as Reported in the Facility-Wide Background Study Report (IT 2001a)

bold = Concentration exceeds Industrial RBC

= Concentration exceeds Residential RBC

= Concentration exceeds Draft BTAG Screening Level

<u>underline</u> = Concentration exceeds Facility-Wide Background Point Estimate

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Table 6-2
Detected Analytes for SWMU 46
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	Draft BTAG Screening Level	46SB1A 10/1/2003 0-1		MDL	RL	46SB1B 10/1/2003 8-10		MDL	RL	46SB1C 10/1/2003 14-16.6		MDL	RL	46SB2A 10/1/2003 0-1		MDL	RL	46SB2B 10/1/2003 10-12		MDL	RL	46SB2C 10/1/2003 14-16.6		MDL	RL	46SB2C-DUP(SBD-2) 10/1/2003 14-16.6		MDL	RL
								Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
Metals (mg/kg)																																	
Aluminum	7429-90-5	--	40,041	--	--	--	1	22,500		183	1,000	27,000		183	1,000	42,900		183	1,000	23,700		183	1,000	33,600		183	1,000	55,400		457.5	2,500	58,100		457.5	2,500
Antimony	7440-36-0	N	--	3.13	40.9	13.2	0.48	0.32	J,B,p	0.0518	0.5	0.36	J,B,p	0.0518	0.5	0.38	J,B,p	0.0518	0.5	0.33	J,B,p	0.0518	0.5	0.43	J,B,p	0.0518	0.5	0.42	J,B,p	0.0518	0.5	0.42	J,B,p	0.0518	0.5
Arsenic	7440-38-2	C	15.8	0.43	1.91	0.026	328	***1.9***		0.0232	0.4	***2.9***		0.0232	0.4	***4.5***		0.0232	0.4	***2.3***		0.0232	0.4	***3.3***		0.0232	0.4	***5.6***		0.0232	0.4	***5.6***		0.0232	0.4
Barium	7440-39-3	N	209	1564.3	20,440	6,015	440	114		0.53	5	101	,B,p	0.53	5	137		0.53	5	105		0.53	5	114		0.53	5	145		0.53	5	153		0.53	5
Beryllium	7440-41-7	N	1.02	15.64	204.4	1,153.7	0.02	0.77	J	0.0391	1	0.87	J	0.0391	1	1.2		0.0391	1	0.68	J	0.0391	1	0.74	J	0.0391	1	1.5		0.0391	1	1.4		0.0391	1
Cadmium	7440-43-9	N	0.69	3.91	51.1	27.4	2.5	2.2		0.182	1	1.9		0.182	1	0.89	J,B,p	0.182	1	2.2		0.182	1	2.4		0.182	1	1.1	B,p	0.182	1	1.5		0.182	1
Calcium	7440-70-2	--	--	--	--	--	--	1,350	,L,m	83	250	2,900	,L,m	83	250	9,970	L,m	415	1,250	1,530	L,m	83	250	1,050	L,m	83	250	1,220	L,m	83	250	1,160	L,m	83	250
Chromium [1]	7440-47-3	N	65.3	23.46	306.6	42	0.0075	26	,J,s	0.912	5	30	,J,s	0.912	5	28	J,s	0.912	5	25	J,s	0.912	5	25	J,s	0.912	5	38	J,s	0.912	5	38	J,s	0.912	5
Cobalt	7440-48-4	--	72.3	--	--	--	100	11	,J,s	0.208	1	9	,J,s	0.208	1	7.6	J,s	0.208	1	13	J,s	0.208	1	10	J,s	0.208	1	7.1	J,s	0.208	1	7.4	J,s	0.208	1
Copper	7440-50-8	N	53.5	312.86	4,088	10,518	15	16		0.368	1	20		0.368	1	20		0.368	1	15		0.368	1	18		0.368	1	21		0.368	1	19		0.368	1
Iron	7439-89-6	N	50,962	2,346.4	30,660	--	12	33,800	,J,s	212	1,000	34,400	,J,s	212	1,000	37,800	J,s	212	1,000	35,900	J,s	212	1,000	35,200	J,s	212	1,000	37,800	J,s	212	1,000	42,600	J,s	212	1,000
Lead [2]	7439-92-1	--	26.8	400	750	--	0.01	13		0.0218	1	12		0.0218	1	13		0.0218	1	14		0.0218	1	14		0.0218	1	15		0.0218	1	16		0.0218	1
Magnesium	7439-95-4	--	--	--	--	--	4,400	4,690		32.1	500	15,100		80.3	1,250	30,200		160.5	2,500	5,290		32.1	500	13,800		80.25	1,250	50,100		321	5,000	53,300		321	5,000
Manganese	7439-96-5	N	2,543	156.43	2,044	951.9	330	506		2.64	10	457		2.64	10	411		2.64	10	573		2.64	10	466		2.64	10	365		2.64	10	335		2.64	10
Mercury [3]	7439-97-6	--	0.13	2.35	30.66	--	0.058	0.035	J	0.0077	0.1	0.031	J	0.0077	0.1	0.053	J	0.0077	0.1	0.031	J	0.0077	0.1	0.059	J	0.0077	0.1	0.066	J	0.0077	0.1	0.081	J	0.0077	0.1
Nickel	7440-02-0	N	62.8	156.43	2,044	--	2	17	,J,s	0.0356	0.5	21	,J,s	0.0356	0.5	26	J,s	0.0356	0.5	16	J,s	0.0356	0.5	22	J,s	0.0356	0.5	30	J,s	0.0356	0.5	34	J,s	0.0356	0.5
Potassium	7440-09-7	--	--	--	--	--	--	2,170	,J,s	25	100	4,000	,J,s	50	200	6,520	J,s	50	200	2,180	J,s	25	100	3,060	J,s	25	100	13,200	J,s	125	500	11,800	J,s	125	500
Selenium	7782-49-2	N	--	39.11	511	18.98	1.8	0.67	J	0.0502	1	0.81	J	0.0502	1	1.2		0.0502	1	0.63	J	0.0502	1	0.89	J	0.0502	1	1.3		0.0502	1	1.4		0.0502	1
Silver	7440-22-4	N	--	39.11	511	31.03	0.0000098	0.059	J	0.0044	3	0.1	J	0.0044	3	0.14	J	0.0044	3	0.057	J	0.0044	3	0.1	J	0.0044	3	0.18	J	0.0044	3	0.18	J	0.0044	3
Sodium	7440-23-5	--	--	--	--	--	--	40	J,B,x	8.92	100	52	J,B,x	8.92	100	84	J,B,x	8.92	100	50	J,B,x	8.92	100	54	J,B,x	8.92	100	87	J,B,x	8.92	100	88	J,B,x	8.92	100
Thallium	7440-28-0	N	2.11	0.55	7.2	3.6	0.001	0.24	J	0.027	0.5	0.25	J	0.027	0.5	0.36	J	0.027	0.5	0.27	J	0.027	0.5	0.29	J	0.027	0.5	0.43	J	0.027	0.5	0.49	J	0.027	0.5
Vanadium	7440-62-2	N	108	7.82	102.2	730.1	0.5	56		0.207	1	54		0.207	1	60		0.207	1	56		0.207	1	57		0.207	1	72		0.207	1	72		0.207	1
Zinc	7440-66-6	N	202	2,346.4	30,660	13,622	10	65		0.517	4	58		0.517	4	68		0.517	4	72		0.517	4	57		0.517	4	62		0.517	4	61		0.517	4
TCL VOCs (µg/kg)																																			
2-Butanone	78-93-3	N	--	4.7E+06	6.1E+07	2.9E+04	--	140	J	20.8	600	55		6.6	26	100		7.35	30	71		5.95	24	61		6.15	24	76		7.45	30	79		7.45	30
Acetone	67-64-1	N	--	7.0E+06	9.2E+07	2.2E+04	--	870	B,z	53.5	600	98	J,c	6.6	26	150	J,c	7.35	30	160	J,c	5.95	24	89	B,z	6.15	24	80	B,z	7.45	30	91	B,z	7.45	30
cis-1,2-Dichloroethene	156-59-2	N	--	7.8E+04	1.0E+06	--	300	<60	U	6.95	60	<6.6	U	0.937	6.6	<7.4	U	1.04	7.4	<6	U	0.845	6	1.6	J	0.873	6.2	<7.5	U	1.06	7.5	<7.5	U	1.06	7.5
methyl tert-Butyl ether	1634-04-4	C	--	1.6E+05	7.2E+05	1.2E+01	--	7.8	J	3.85	60	<6.6	U	0.846	6.6	<7.4	U	0.942	7.4	<6	U	0.763	6	<6.2	U	0.788	6.2	<7.5	U	0.955	7.5	<7.5	U	0.955	7.5
Methylene chloride	75-09-2	C	--	8.5E+04	3.8E+05	1.9E+01	300	<60	U	5.85	60	4.1	J,B,z	3.71	26	5	J,B,z	4.13	30	<24	U,UJ,c	3.34	24	3.6	J,J,c	3.46	24	4.4	J,J,c	4.19	30	<30	U,UJ,c	4.19	30
Trichloroethene	79-01-6	C	--	1.6E+03	7.2E+03	2.6E-01	300	<60	U	10.6	60	<6.6	U	0.894	6.6	<7.4	U	0.995	7.4	***23***		0.806	6	***3.4***	J	0.833	6.2	<7.5	U	1.01	7.5	<7.5	U	1.01	7.5
VOC TICs (µg/kg)																																			
Butanal	123728	--	--	--	--	--	--	NI				NI				NI				7	E,NJ,t	0	1	NI				NI				NI			
Hexanal	66251	--	--	--	--	--	--	NI				NI				NI				30	E,NJ,t	0	1	NI				NI				NI			
TCL SVOCs (µg/kg)																																			
4-Chloro-3-Methylphenol	59-50-7	--	--	--	--	--	--	13	J	6.25	200	22	J	6.77	220	27	J	7.82	250	25	J	6.25	200	21	J	6.25	210	26	J	7.82	250	41	J	7.82	250
Bis(2-ethylhexyl)phthalate	117-81-7	C	--	4.6E+04	2.0E+05	2.9E+06	--	52	J,B,x	2.48	200	52	J,B,x	2.69	220	56	J,B,x	3.11	250	51	J,B,x	2.48	200	49	J,B,x	2.48	210	64	J,B,x	3.11	250	65	J,B,x	3.11	250
Diethylphthalate	84-66-2	N	--	6.3E+06	8.2E+07	4.5E+05	--	<200	U	2.28	200	3	J,B,x	2.47	220	3	J,B,x	2.85	250	3	J,B,x	2.28	200	3	J,B,x	2.28	210	3	J,B,x	2.85	250	5	J,B,x	2.85	250
Di-n-butylphthalate	84-74-2	N	--	7.8E+05	1.0E+07	5.0E+06	-	21	J	4.58	200	30	J	4.97	220	31	J	5.73	250	28	J	4.58	200	24	J	4.58	210	28	J	5.73	250	48	J	5.73	250
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	100	2	J	1.78	200	<220	U	1.92	220	<250	U	2.22	250	<200	U	1.78	200	<210	U	1.78	210	<250	U	2.22	250	<250	U	2.22	250
SVOC TICs (µg/kg)																																			
(M) 1-Eicosanol	629-96-9	--	--	--	--	--	--	42	E,NJ,t	--	10	NI				NI				NI				NI				NI				NI			
(Z)-9-Octadecenamide	301-02-0	--	--	--	--	--	--	440	E,B,x	--	100	770	E,B,x	--	100	1,000	E,B,x	--	100	NI				110	E,B,x	--	100	140	E,B,x	--	100	240	E,B,x	--	100
1-Heptadecanol	1454-85-9	--	--	--	--	--	--	NI				NI				NI				NI				37	E,NJ,t	--	10	NI				31	E,NJ,t	--	10
1-Octadecanol	112-92-5	--	--	--	--	--	--	NI				NI				54	E,NJ,t	--	100	NI				NI				56	E,NJ,t	--	100	NI			
1,2-Benzenedicarboxylicacid, bis(2-methy	84-69-5	--	--	--	--	--	--	24	E,B,x	--	100	34	E,B,x	--	100	NI				46	E,B,x	--	100	NI				44	E,B,x	--	100	66	E,B,x	--	100
1,2-Benzenedicarboxylic acid, butyl 2-me	17851-53-5	--	--	--	--	--	--	NI				NI				49	E,NJ,t	--	10	NI				31	E,NJ,t	--	10	NI				NI			
2-Ethyl-1-Hexanol	104-76-7	--	--	--	--	--	--	NI				26	E,NJ,t	--	1,700	29	E,NJ,t	--	1,700	28	E,NJ,t	--	1,700	NI				28	E,NJ,t	--	1,700	36	E,NJ,t	--	1,700
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	--	--	--	--	--	--	43	E,B,x	--	100	NI				NI				84	E,B,x	--	100	NI				NI				NI			
3-Hexene-2,5-dione	4436-75-3	--	--	--	--	--	--	NI				160	E,NJ,t	--	10	NI				NI				NI				150	E,NJ,t	--	10	NI			
17-Pentatriacontene	6971-40-0	--	--	--	--	--	--	NI				52	E,NJ,t	--	10	NI				NI				NI				NI				NI			
Ditriacontane	544-85-4	--	--	--	--	--	--	NI				40	E,NJ,t	--	100	NI				NI				NI				NI				NI			
Docosane	629-97-0	--	--	--	--	--	--	NI				45	E,NJ,t	--	10	NI				NI				NI				NI				NI			
Erucylamide	112-84-5	--	--	--	--	--	--	NI				NI				NI				700	E,NJ,t	--	10	560	E,NJ,t	--	10	710	E,NJ,t	--	10	1,100	E,NJ,t	--	10
Heptacosane	593-49-7	--	--	--	--	--	--	NI				60	E,NJ,t	--	10	NI				NI				NI				NI				NI			
Octacosane	630-02-4	--	--	--	--	--	--	NI				NI				NI				22	E,NJ,t	--	10	NI				NI				NI			
Phosphonic acid, dioctadecyl ester	19047-85-9	--	--	--	--	--	--	NI				NI				NI				20	E,NJ,t	--	10	NI				NI				55	E,NJ,t	--	10
Tetratriacontane	14167-59-0	--	--	--	--	--	--	NI				44	E,NJ,t	--	10	NI				NI				NI				NI				NI			
Cyanide (mg/kg)																																			
Cyanide	57-12-5	N	--	1.6E+02	2.0E+03	1.5E+02	0.005	<0.5	U	0.0356	0.5	<0.5	U	0.0356	0.5	0.15	J	0.0356	0.5	<0.5	U	0.0356	0.5	<0.5	U	0.0356	0.5	<0.5	U	0.0356	0.5	<0.5	U	0.0356	0.5
Percent Solids (%)																																			
Percent Solids	--	--	--	--	--	--	--	83		0.1	0.1	76		0.1	0.1	68		0.1	0.1	84		0.1	0.1	81		0.1	0.1	67		0.1	0.1	67		0.1	0.1

Notes:

CAS = Chemical Abstracts Service
ft bgs = Feet Below Ground Surface
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
TIC = Tentatively Identified Compound
NA = Not Applicable
MDL = Method Detection Limit
-- = No MDL Available for TICs
RL = Reporting Limit
NT = Not Tested
NI = Not Identified
LQ = Laboratory Qualifier
VQ = Validation Qualifier
r = Reason Code
[1] = Chromium VI RBC value was used
[2] = Lead criteria are Action Levels; see USEPA Region III guidance
[3] = Mercuric chloride soil RBC value used

[A] = Facility-Wide Background Point Estimate as Reported in the Facility-Wide Background Study Report (IT 2001a)
RBC = USEPA Region III Risk-Based Concentration (RBC) values from the October 31, 2006, RBC Table and October 10, 2006, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
C = Carcinogenic per EPA RBC Table (October 2006)
N = Noncarcinogenic per EPA RBC Table (October 2006)
SSL DAF20 = Soil Screening Level at a Dilution Attenuation Factor of 20
BTAG = Biological Technical Assistance Group Screening Level, Draft 1995

= Concentration Exceeds Adjusted Soil Residential RBC
= Concentration Exceeds Adjusted Soil Industrial RBC
underline = Concentration Exceeds Site Background Values
bold italic = Concentration Exceeds SSL DAF20
= Concentration Exceeds BTAG Screening Level

Laboratory Qualifiers
- U The compound was analyzed for but not detected. The reporting limit will be adjusted to reflect any dilution, and for soil, the percent moisture.
- J Estimated value.
- B Analyte found in associated blank as well as in the sample.
- E Concentration exceeded the upper level of the calibration range of the instrument for that specific analysis. For TICs, compound not present in calibration standard, calculated using total peak areas ion chromatographs and response factor of 1.

Validation Qualifiers
- B Not detected substantially above the level reported in laboratory or field blanks.
- N Tentative Identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.
- J Analyte present. Reported value may not be accurate or precise.
- K Analyte present. Reported value may be biased high. Actual value is expected to be lower.
- L Analyte present. Reported value may be biased low. Actual value is expected to be higher.

Reason Codes

GC/MS Organics
- c Calibration failure; poor (RRF) or unstable (%D) response
- t Tentatively identified Compound
- x Field and/or equipment blank contamination
- z Method blank and/or storage blank contamination

GC and HPLC Organics
- c Calibration failure; poor or unstable (%D) response
- x Trip blank contamination
- z Method blank and/or storage blank contamination

Inorganics and Conventionals
- m MS/MSD recovery failure
- p Preparation blank contamination
- s Serial dilution failure
- x CRDL standard recovery failure

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Table 6-3
HHRS COPC Selection (Surface Soil) for SWMU 46
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	C/N	Adjusted RBC Residential	Adjusted RBC Industrial	COPC Flag (Y/N)	Rationale for Selection or Deletion
	TAL Metals (mg/kg)												
7429905	Aluminum	22,500	23,700	mg/kg	46SB2A	2/2	183 - 183	23,700	--	--	--	Y	NSV
7440360	Antimony	0.32	0.33	mg/kg	46SB2A	2/2	0.0518 - 0.0518	0.33	N	3.13	41	N	BSL
7440382	Arsenic	1.90	2.3	mg/kg	46SB2A	2/2	0.0232 - 0.0232	2.3	C	0.43	1.91	Y	***ARES/IND***
7440393	Barium	105	114	mg/kg	46SB1A	2/2	0.53 - 0.53	114	N	1,564	20,440	N	BSL
7440417	Beryllium	0.68	0.77	mg/kg	46SB1A	2/2	0.0391 - 0.0391	0.77	N	15.6	204	N	BSL
7440439	Cadmium	2.20	2.2	mg/kg	46SB1A	2/2	0.182 - 0.182	2.2	N	3.91	51.1	N	BSL
7440702	Calcium	1,350	1,530	mg/kg	46SB2A	2/2	83 - 83	1,530	--	Nutrient	Nutrient	N	Nutrient
7440473	Chromium[1]	25	26	mg/kg	46SB1A	2/2	0.912 - 0.912	26	N	23.5	307	Y	**ARES**
7440484	Cobalt	11	13	mg/kg	46SB2A	2/2	0.208 - 0.208	13	--	--	--	Y	NSV
7440508	Copper	15	16	mg/kg	46SB1A	2/2	0.368 - 0.368	16	N	313	4,088	N	BSL
7439896	Iron	33,800	35,900	mg/kg	46SB2A	2/2	212 - 212	35,900	N	2,346	30,660	Y	***ARES/IND***
7439921	Lead[2]	13	14	mg/kg	46SB2A	2/2	0.0218 - 0.0218	14	--	400	750	N	BSL
7439954	Magnesium	4,690	5,290	mg/kg	46SB2A	2/2	32.1 - 32.1	5,290	--	Nutrient	Nutrient	N	Nutrient
7439965	Manganese	506	573	mg/kg	46SB2A	2/2	2.64 - 2.64	573	N	156	2,044	Y	**ARES**
7439976	Mercury[3]	0.03	0.035	mg/kg	46SB1A	2/2	0.0077 - 0.0077	0.035	--	0.78	10.2	N	BSL
7440020	Nickel	16	17	mg/kg	46SB1A	2/2	0.0356 - 0.0356	17	N	156	2,044	N	BSL
7440097	Potassium	2,170	2,180	mg/kg	46SB2A	2/2	25 - 25	2,180	--	Nutrient	Nutrient	N	Nutrient
7782492	Selenium	0.63	0.67	mg/kg	46SB1A	2/2	0.0502 - 0.0502	0.67	N	39.1	511	N	BSL
7440224	Silver	0.06	0.059	mg/kg	46SB1A	2/2	0.0044 - 0.0044	0.059	N	39.1	511	N	BSL
7440235	Sodium	40	50	mg/kg	46SB2A	2/2	8.92 - 8.92	50	--	Nutrient	Nutrient	N	Nutrient
7440280	Thallium	0.24	0.27	mg/kg	46SB2A	2/2	0.027 - 0.027	0.27	N	0.55	7.15	N	BSL
7440622	Vanadium	56	56	mg/kg	46SB1A	2/2	0.207 - 0.207	56	N	7.82	102	Y	**ARES**
7440666	Zinc	65	72	mg/kg	46SB2A	2/2	0.517 - 0.517	72	N	2,346	30,660	N	BSL
	TCL VOCs (µg/kg)												
78933	2-Butanone	7.1E+01	1.4E+02	µg/kg	46SB1A	2/2	5.95 - 20.8	1.4E+02	N	4.7E+06	6.1E+07	N	BSL
67641	Acetone	1.6E+02	8.7E+02	µg/kg	46SB1A	2/2	5.95 - 53.5	8.7E+02	N	7.0E+06	9.2E+07	N	BSL
1634044	methyl tert-Butyl ether	7.8E+00	7.8E+00	µg/kg	46SB1A	1/2	0.763 - 3.85	7.8E+00	C	1.6E+05	7.2E+05	N	BSL
79016	Trichloroethene	2.3E+01	2.3E+01	µg/kg	46SB2A	1/2	0.806 - 10.6	2.3E+01	C	1.6E+03	7.2E+03	N	BSL
	VOC TICs (µg/kg)												
123728	Butanal	7.0E+00	7.0E+00	µg/kg	46SB2A	1/2	0 - 0	7.0E+00	--	--	--	Y	NSV
66251	Hexanal	3.0E+01	3.0E+01	µg/kg	46SB2A	1/2	0 - 0	3.0E+01	--	--	--	Y	NSV
	TCL SVOCs (µg/kg)												
59507	4-Chloro-3-Methylphenol	1.3E+01	2.5E+01	µg/kg	46SB2A	2/2	6.25 - 6.25	2.5E+01	--	--	--	Y	NSV
117817	Bis(2-ethylhexyl)phthalate	5.1E+01	5.2E+01	µg/kg	46SB1A	2/2	2.48 - 2.48	5.2E+01	C	4.6E+04	2.0E+05	N	BSL
84662	Diethylphthalate	3.0E+00	3.0E+00	µg/kg	46SB2A	1/2	2.28 - 2.28	3.0E+00	N	6.3E+06	8.2E+07	N	BSL
84742	Di-n-butylphthalate	2.1E+01	2.8E+01	µg/kg	46SB2A	2/2	4.58 - 4.58	2.8E+01	N	7.8E+05	1.0E+07	N	BSL
129000	Pyrene	2.0E+00	2.0E+00	µg/kg	46SB1A	1/2	1.78 - 1.78	2.0E+00	N	2.3E+05	3.1E+06	N	BSL
	SVOC TICs (µg/kg)												
629969	(M) 1-Eicosanol	4.2E+01	4.2E+01	µg/kg	46SB1A	1/2	0 - 0	4.2E+01	--	--	--	Y	NSV
301020	(Z)-9-Octadecenamide	4.4E+02	4.4E+02	µg/kg	46SB1A	1/2	0 - 0	4.4E+02	--	--	--	Y	NSV
84695	1,2-Benzenedicarboxylicacid, bis(2-methy	2.4E+01	4.6E+01	µg/kg	46SB2A	2/2	0 - 0	4.6E+01	--	--	--	Y	NSV
104767	2-Ethyl-1-Hexanol	2.8E+01	2.8E+01	µg/kg	46SB2A	1/2	0 - 0	2.8E+01	--	--	--	Y	NSV
101371	2,4,6-Triallyloxy-1,3,5-triazine	4.3E+01	8.4E+01	µg/kg	46SB2A	2/2	0 - 0	8.4E+01	--	--	--	Y	NSV
112845	Erucylamide	7.0E+02	7.0E+02	µg/kg	46SB2A	1/2	0 - 0	7.0E+02	--	--	--	Y	NSV
630024	Octacosane	2.2E+01	2.2E+01	µg/kg	46SB2A	1/2	0 - 0	2.2E+01	--	--	--	Y	NSV
19047859	Phosphonic acid, dioctadecyl ester	2.0E+01	2.0E+01	µg/kg	46SB2A	1/2	0 - 0	2.0E+01	--	--	--	Y	NSV

Table 6-3
HHRS COPC Selection (Surface Soil) for SWMU 46
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Notes:

CAS = Chemical Abstracts Service
COPC = Chemical of Potential Concern
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
TIC = Tentatively Identified Compound
[1] = Chromium VI RBC value was used
[2] = Lead criteria are Action Levels; see USEPA Region III guidance
[3] = Mercuric chloride soil RBC value used

RBC = USEPA Region III Risk-Based Concentration (RBC) values from the October 31, 2006, RBC Table and October 10, 2006, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
C = Carcinogenic per EPA RBC Table (October 2006)
N = Noncarcinogenic per EPA RBC Table (October 2006)

ARES = Above Residential RBC
ARES/IND = Above Residential RBC/Industrial RBC
BSL = Below Residential/Industrial RBC Screening Levels
NSV = No Screening Value Available

Table 6-4
HHRS COPC Selection (Total Soil) for SWMU 46
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	C/N	Adjusted RBC Residential	Adjusted RBC Industrial	COPC Flag (Y/N)	Rationale for Selection or Deletion
	TAL Metals (mg/kg)												
7429905	Aluminum	22,500	56,750	mg/kg	46SB2C - AVG DUP	6/6	183 - 457.5	56,750	--	--	--	Y	NSV
7440360	Antimony	0.32	0.43	mg/kg	46SB2B	6/6	0.0518 - 0.0518	0.43	N	3	40.88	N	BSL
7440382	Arsenic	1.9	5.6	mg/kg	46SB2C - AVG DUP	6/6	0.0232 - 0.0232	5.6	C	0.43	1.91	Y	***ARES/IND***
7440393	Barium	101	149	mg/kg	46SB2C - AVG DUP	6/6	0.53 - 0.53	149	N	1,564	20,440	N	BSL
7440417	Beryllium	0.68	1.45	mg/kg	46SB2C - AVG DUP	6/6	0.0391 - 0.0391	1.45	N	16	204	N	BSL
7440439	Cadmium	0.89	2.40	mg/kg	46SB2B	6/6	0.182 - 0.182	2.40	N	3.91	51	N	BSL
7440702	Calcium	1,050	9,970	mg/kg	46SB1C	6/6	83 - 415	9,970	--	Nutrient	Nutrient	N	Nutrient
7440473	Chromium[1]	25	38	mg/kg	46SB2C - AVG DUP	6/6	0.912 - 0.912	38	N	23.5	307	Y	**ARES**
7440484	Cobalt	7.25	13	mg/kg	46SB2A	6/6	0.208 - 0.208	13	--	--	--	Y	NSV
7440508	Copper	15.00	20	mg/kg	46SB1B	6/6	0.368 - 0.368	20	N	313	4,088	N	BSL
7439896	Iron	33,800	40,200	mg/kg	46SB2C - AVG DUP	6/6	212 - 212	40,200	N	2,346	30,660	Y	***ARES/IND***
7439921	Lead[2]	12.00	16	mg/kg	46SB2C - AVG DUP	6/6	0.0218 - 0.0218	16	--	400	750	N	BSL
7439954	Magnesium	4,690	51,700	mg/kg	46SB2C - AVG DUP	6/6	32.1 - 321	51,700	--	Nutrient	Nutrient	N	Nutrient
7439965	Manganese	350	573	mg/kg	46SB2A	6/6	2.64 - 2.64	573	N	156	2,044	Y	**ARES**
7439976	Mercury[3]	0.03	0.07	mg/kg	46SB2C - AVG DUP	6/6	0.0077 - 0.0077	0.07	--	0.78	10.22	N	BSL
7440020	Nickel	16.00	32	mg/kg	46SB2C - AVG DUP	6/6	0.0356 - 0.0356	32	N	156	2,044	N	BSL
7440097	Potassium	2,170	12,500	mg/kg	46SB2C - AVG DUP	6/6	25 - 125	12,500	--	Nutrient	Nutrient	N	Nutrient
7782492	Selenium	0.63	1.35	mg/kg	46SB2C - AVG DUP	6/6	0.0502 - 0.0502	1.35	N	39.1	511	N	BSL
7440224	Silver	0.06	0.18	mg/kg	46SB2C - AVG DUP	6/6	0.0044 - 0.0044	0.18	N	39.1	511	N	BSL
7440235	Sodium	40	88	mg/kg	46SB2C - AVG DUP	6/6	8.92 - 8.92	88	--	Nutrient	Nutrient	N	Nutrient
7440280	Thallium	0.24	0.46	mg/kg	46SB2C - AVG DUP	6/6	0.027 - 0.027	0.46	N	0.55	7.15	N	BSL
7440622	Vanadium	54	72	mg/kg	46SB2C - AVG DUP	6/6	0.207 - 0.207	72	N	7.82	102	Y	**ARES**
7440666	Zinc	57	72	mg/kg	46SB2A	6/6	0.517 - 0.517	72	N	2,346.43	30,660	N	BSL
	TCL VOCs (µg/kg)												
78933	2-Butanone	5.5E+01	1.4E+02	µg/kg	46SB1A	6/6	5.95 - 20.8	1.4E+02	N	4.7E+06	6.1E+07	N	BSL
67641	Acetone	8.6E+01	8.7E+02	µg/kg	46SB1A	6/6	5.95 - 53.5	8.7E+02	N	7.0E+06	9.2E+07	N	BSL
156592	cis-1,2-Dichloroethene	1.6E+00	1.6E+00	µg/kg	46SB2B	1/6	0.845 - 6.95	1.6E+00	N	7.8E+04	1.0E+06	N	BSL
1634044	methyl tert-Butyl ether	7.8E+00	7.8E+00	µg/kg	46SB1A	1/6	0.763 - 3.85	7.8E+00	C	1.6E+05	7.2E+05	N	BSL
75092	Methylene chloride	3.2E+00	5.0E+00	µg/kg	46SB1C	4/6	3.34 - 5.85	5.0E+00	C	8.5E+04	3.8E+05	N	BSL
79016	Trichloroethene	3.4E+00	2.3E+01	µg/kg	46SB2A	2/6	0.806 - 10.6	2.3E+01	C	1.6E+03	7.2E+03	N	BSL
	VOC TICs (µg/kg)												
123728	Butanal	7.0E+00	7.0E+00	µg/kg	46SB2A	1/6	0 - 0	7.0E+00	--	--	--	Y	NSV
66251	Hexanal	3.0E+01	3.0E+01	µg/kg	46SB2A	1/6	0 - 0	3.0E+01	--	--	--	Y	NSV
	TCL SVOCs (µg/kg)												
59507	4-Chloro-3-Methylphenol	1.3E+01	3.4E+01	µg/kg	46SB2C - AVG DUP	6/6	6.25 - 7.82	3.4E+01	--	--	--	Y	NSV
117817	Bis(2-ethylhexyl)phthalate	4.9E+01	6.5E+01	µg/kg	46SB2C - AVG DUP	6/6	2.48 - 3.11	6.5E+01	C	4.6E+04	2.0E+05	N	BSL
84662	Diethylphthalate	3.0E+00	4.0E+00	µg/kg	46SB2C - AVG DUP	5/6	2.28 - 2.85	4.0E+00	N	6.3E+06	8.2E+07	N	BSL
84742	Di-n-butylphthalate	2.1E+01	3.8E+01	µg/kg	46SB2C - AVG DUP	6/6	4.58 - 5.73	3.8E+01	N	7.8E+05	1.0E+07	N	BSL
129000	Pyrene	2.0E+00	2.0E+00	µg/kg	46SB1A	1/6	1.78 - 2.22	2.0E+00	N	2.3E+05	3.1E+06	N	BSL
	SVOC TICs (µg/kg)												
629969	(M) 1-Eicosanol	4.2E+01	4.2E+01	µg/kg	46SB1A	1/6	0 - 0	4.2E+01	--	--	--	Y	NSV
301020	(Z)-9-Octadecenamide	1.1E+02	1.0E+03	µg/kg	46SB1C	5/6	0 - 0	1.0E+03	--	--	--	Y	NSV
1454859	1-Heptadecanol	3.1E+01	3.7E+01	µg/kg	46SB2B	2/6	0 - 0	3.7E+01	--	--	--	Y	NSV
112925	1-Octadecanol	5.4E+01	5.6E+01	µg/kg	46SB2C - AVG DUP	2/6	0 - 0	5.6E+01	--	--	--	Y	NSV
84695	1,2-Benzenedicarboxylicacid, bis(2-methy	2.4E+01	5.5E+01	µg/kg	46SB2C - AVG DUP	4/6	0 - 0	5.5E+01	--	--	--	Y	NSV
17851535	1,2-Benzenedicarboxylic acid, butyl 2-me	3.1E+01	4.9E+01	µg/kg	46SB1C	2/6	0 - 0	4.9E+01	--	--	--	Y	NSV
104767	2-Ethyl-1-Hexanol	2.6E+01	3.2E+01	µg/kg	46SB2C - AVG DUP	4/6	0 - 0	3.2E+01	--	--	--	Y	NSV
101371	2,4,6-Triallyloxy-1,3,5-triazine	4.3E+01	8.4E+01	µg/kg	46SB2A	2/6	0 - 0	8.4E+01	--	--	--	Y	NSV
4436753	3-Hexene-2,5-dione	1.5E+02	1.6E+02	µg/kg	46SB1B	2/6	0 - 0	1.6E+02	--	--	--	Y	NSV
6971400	17-Pentatriacontene	5.2E+01	5.2E+01	µg/kg	46SB1B	1/6	0 - 0	5.2E+01	--	--	--	Y	NSV
544854	Ditriacontane	4.0E+01	4.0E+01	µg/kg	46SB1B	1/6	0 - 0	4.0E+01	--	--	--	Y	NSV
629970	Docosane	4.5E+01	4.5E+01	µg/kg	46SB1B	1/6	0 - 0	4.5E+01	--	--	--	Y	NSV
112845	Erucylamide	5.6E+02	9.1E+02	µg/kg	46SB2C - AVG DUP	3/6	0 - 0	9.1E+02	--	--	--	Y	NSV

Table 6-4
HHRS COPC Selection (Total Soil) for SWMU 46
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	C/N	Adjusted RBC Residential	Adjusted RBC Industrial	COPC Flag (Y/N)	Rationale for Selection or Deletion
593497	Heptacosane	6.0E+01	6.0E+01	µg/kg	46SB1B	1/6	0 - 0	6.0E+01	--	--	--	Y	NSV
630024	Octacosane	2.2E+01	2.2E+01	µg/kg	46SB2A	1/6	0 - 0	2.2E+01	--	--	--	Y	NSV
19047859	Phosphonic acid, dioctadecyl ester	2.0E+01	5.5E+01	µg/kg	46SB2C - AVG DUP	2/6	0 - 0	5.5E+01	--	--	--	Y	NSV
14167590	Tetratriacontane	4.4E+01	4.4E+01	µg/kg	46SB1B	1/6	0 - 0	4.4E+01	--	--	--	Y	NSV
	Cyanide (mg/kg)												
57125	Cyanide	1.5E-01	1.5E-01	mg/kg	46SB1C	1/6	0.0356 - 0.0356	1.5E-01	N	1.6E+02	2.0E+03	N	BSL

Notes:

CAS = Chemical Abstracts Service
COPC = Chemical of Potential Concern
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
TIC = Tentatively Identified Compound
[1] = Chromium VI RBC value was used
[2] = Lead criteria are Action Levels; see USEPA Region III guidance
[3] = Mercuric chloride soil RBC value used

DUP AVG = results for duplicate samples averaged
RBC = USEPA Region III Risk-Based Concentration
(RBC) values from the October 31, 2006,
RBC Table and October 10, 2006, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
C = Carcinogenic per EPA RBC Table (October 2006)
N = Noncarcinogenic per EPA RBC Table (October 2006)

ARES = Above Residential RBC
ARES/IND = Above Residential RBC/Industrial RBC
BSL = Below Residential/Industrial RBC Screening Levels
NSV = No Screening Value Available

Table 6-5
Cumulative HHRS for SWMU 46 (Surface Soil)
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Units	MDC	C/N	RBC Residential	RBC Industrial	Non Carcinogenic HI (RBC_{Res})	Excess Cancer Risk (RBC_{Res})	Non Carcinogenic HI (RBC_{Ind})	Excess Cancer Risk (RBC_{Ind})
	TAL Metals									
7429905	Aluminum	mg/kg	2.37E+04	--	--	--	--	--	--	--
7440382	Arsenic	mg/kg	2.30E+00	C	4.26E-01	1.91E+00	--	5.E-06	--	1.E-06
7440382	Arsenic	mg/kg	2.30E+00	N	2.35E+01	3.07E+02	1.E-01	--	7.E-03	--
7440473	Chromium[1]	mg/kg	2.60E+01	N	2.35E+02	3.07E+03	1.E-01	--	8.E-03	--
7440484	Cobalt	mg/kg	1.30E+01	--	--	--	--	--	--	--
7439896	Iron	mg/kg	3.59E+04	N	2.35E+04	3.07E+05	2.E+00	--	1.E-01	--
7439965	Manganese	mg/kg	5.73E+02	N	1.56E+03	2.04E+04	4.E-01	--	3.E-02	--
7440622	Vanadium	mg/kg	5.60E+01	N	7.82E+01	1.02E+03	7.E-01	--	5.E-02	--
	VOC TICs									
123728	Butanal	µg/kg	7.00E+00	--	--	--	--	--	--	--
66251	Hexanal	µg/kg	3.00E+01	--	--	--	--	--	--	--
	TCL SVOCs									
59507	4-Chloro-3-Methylphenol	µg/kg	2.50E+01	--	--	--	--	--	--	--
	SVOC TICs									
629969	(M) 1-Eicosanol	µg/kg	4.20E+01	--	--	--	--	--	--	--
301020	(Z)-9-Octadecenamide	µg/kg	4.40E+02	--	--	--	--	--	--	--
84695	1,2-Benzenedicarboxylicacid, bis(2-methy	µg/kg	4.60E+01	--	--	--	--	--	--	--
104767	2-Ethyl-1-Hexanol	µg/kg	2.80E+01	--	--	--	--	--	--	--
101371	2,4,6-Triallyloxy-1,3,5-triazine	µg/kg	8.40E+01	--	--	--	--	--	--	--
112845	Erucylamide	µg/kg	7.00E+02	--	--	--	--	--	--	--
630024	Octacosane	µg/kg	2.20E+01	--	--	--	--	--	--	--
19047859	Phosphonic acid, dioctadecyl ester	µg/kg	2.00E+01	--	--	--	--	--	--	--
						Cumulative Risk	3.E+00	5.E-06	2.E-01	1.E-06

Notes:

CAS = Chemical Abstracts Service
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
TIC = Tentatively Identified Compound
[1] = Chromium VI RBC value was used

MDC = Maximum Detected Concentration
HI = Hazard Index
RBC = USEPA Region III Risk-Based Concentration
(RBC) values from the October 31, 2006,
RBC Table and October 10, 2006, Alternate RBC Table
C = Carcinogenic per EPA RBC Table (October 2006)
N = Noncarcinogenic per EPA RBC Table (October 2006)

Table 6-6
Exposure Point Concentration Summary for SWMU 46
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Medium:	Total Soil
Exposure Medium:	Total Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic (1)	Rationale (2)
Total Soil	Aluminum	mg/kg	3.44E+04	4.53E+04	5.7E+04	4.53E+04	mg/kg	95% UCL (Student's t)	85% < FOD, Normal
	Arsenic	mg/kg	3.41E+00	4.57E+00	5.6E+00	4.57E+00	mg/kg	95% UCL (Student's t)	85% < FOD, Normal
	Chromium	mg/kg	2.87E+01	3.28E+01	3.8E+01	3.28E+01	mg/kg	95% UCL (Student's t)	85% < FOD, Normal
	Cobalt	mg/kg	--	--	1.3E+01	1.30E+01	mg/kg	--	--
	Iron	mg/kg	3.62E+04	3.82E+04	4.0E+04	3.82E+04	mg/kg	95% UCL (Student's t)	85% < FOD, Normal
	Manganese	mg/kg	4.61E+02	5.23E+02	5.7E+02	5.23E+02	mg/kg	95% UCL (Student's t)	85% < FOD, Normal
	Vanadium	mg/kg	5.92E+01	6.32E+01	7.2E+01	6.32E+01	mg/kg	95% UCL (Bootstrap)	85% < FOD, Unknown

Notes:
UCL = Upper Confidence Limit
mg/kg = Milligram Per Kilogram

(1) See Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites (OSWER Directive 9285.6-10, December 2002) for details on the following methods for calculating the 95% UCL:
95% UCL (Bounding) = The frequency of detection is less than 50%; therefore, the 95% UCL is calculated by the bounding method.
95% UCL (Student's t, adj) = The frequency of detection is between 50% and 85%, and the underlying distribution (detects only) is normal; therefore, Aitchison's Method is used to adjust the detects-only mean and standard deviaiton, and the 95% UCL is calculated using the Student's t method.
95% UCL (Land, adj) = The frequency of detection is between 50% and 85%, and the underlying distribution (detects only) is lognormal; therefore, Aitchison's Method is used to adjust the detects-only mean and standard deviation, and the 95% UCL is calculated using Land's method.
95% UCL (Student's t) = The frequency of detection is greater than 85%, and the distribution is normal.; therefore, the 95% UCL is calculated using the Student's t method.
95% UCL (Bootstrap) = The frequency of detection is between 50% and 85% and the underlying distribution (detects only) is neither normal nor lognormal, OR the frequency of detection is greater than 85% and the distribution (with non-detects represented by half of the detection limit) is neither normal nor lognormal; therefore, the 95% UCL is calculated using Hall's bootstrap method.
Maximum: The 95% UCL exceeds the maximum detected concentration; therefore, the maximum detected concentration is used to represent the 95% UCL.

(2) FOD = Frequency of detection
FOD < 50%: Frequency of detection is less than 50%
50% < FOD < 85%, Normal: Frequency of detection is between 50% and 85%, and the underlying distribution (detects only) is normal.
50% < FOD < 85%, Lognormal: Frequency of detection is between 50% and 85%, and the underlying distribution (detects only) is lognormal.
50% < FOD < 85%, Unknown: Frequency of detection is between 50% and 85%, and the underlying distribution (detects only) is neither normal nor lognormal.
85% < FOD, Normal: Frequency of detection is greater than 85%, and the distribution is normal.
85% < FOD, Lognormal: Frequency of detection is greater than 85%, and the distribution is lognormal.
85% < FOD, Unknown: Frequency of detection is greater than 85%, and the distribution is neither normal nor lognormal.

Table 6-7
Cumulative HHRS for SWMU 46 (Total Soil)
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Units	Maximum EPC	C/N	RBC Residential	RBC Industrial	Non Carcinogenic HI (RBC_{Res})	Excess Cancer Risk (RBC_{Res})	Non Carcinogenic HI (RBC_{Ind})	Excess Cancer Risk (RBC_{Ind})
	TAL Metals									
7429905	Aluminum	mg/kg	4.53E+04	--	--	--	--	--	--	--
7440382	Arsenic	mg/kg	4.57E+00	C	4.26E-01	1.91E+00	--	1.E-05	--	2.E-06
7440382	Arsenic	mg/kg	4.57E+00	N	2.35E+01	3.07E+02	2.E-01	--	1.E-02	--
7440473	Chromium[1]	mg/kg	3.28E+01	N	2.35E+02	3.07E+03	1.E-01	--	1.E-02	--
7440484	Cobalt	mg/kg	1.30E+01	--	--	--	--	--	--	--
7439896	Iron	mg/kg	3.82E+04	N	2.35E+04	3.07E+05	2.E+00	--	1.E-01	--
7439965	Manganese	mg/kg	5.23E+02	N	1.56E+03	2.04E+04	3.E-01	--	3.E-02	--
7440622	Vanadium	mg/kg	6.32E+01	N	7.82E+01	1.02E+03	8.E-01	--	6.E-02	--
	VOC TICs								--	
123728	Butanal	µg/kg	7.00E+00	--	--	--	--	--	--	--
66251	Hexanal	µg/kg	3.00E+01	--	--	--	--	--	--	--
	TCL SVOCs								--	
59507	4-Chloro-3-Methylphenol	µg/kg	3.35E+01	--	--	--	--	--	--	--
	SVOC TICs								--	
629969	(M) 1-Eicosanol	µg/kg	4.20E+01	--	--	--	--	--	--	--
301020	(Z)-9-Octadecenamide	µg/kg	1.00E+03	--	--	--	--	--	--	--
1454859	1-Heptadecanol	µg/kg	3.70E+01	--	--	--	--	--	--	--
112925	1-Octadecanol	µg/kg	5.60E+01	--	--	--	--	--	--	--
84695	1,2-Benzenedicarboxylicacid, bis(2-methy	µg/kg	5.50E+01	--	--	--	--	--	--	--
17851535	1,2-Benzenedicarboxylic acid, butyl 2-me	µg/kg	4.90E+01	--	--	--	--	--	--	--
104767	2-Ethyl-1-Hexanol	µg/kg	3.20E+01	--	--	--	--	--	--	--
101371	2,4,6-Triallyloxy-1,3,5-triazine	µg/kg	8.40E+01	--	--	--	--	--	--	--
4436753	3-Hexene-2,5-dione	µg/kg	1.60E+02	--	--	--	--	--	--	--
6971400	17-Pentatriacontene	µg/kg	5.20E+01	--	--	--	--	--	--	--
544854	Ditriacontane	µg/kg	4.00E+01	--	--	--	--	--	--	--
629970	Docosane	µg/kg	4.50E+01	--	--	--	--	--	--	--
112845	Erucylamide	µg/kg	9.05E+02	--	--	--	--	--	--	--
593497	Heptacosane	µg/kg	6.00E+01	--	--	--	--	--	--	--
630024	Octacosane	µg/kg	2.20E+01	--	--	--	--	--	--	--
19047859	Phosphonic acid, dioctadecyl ester	µg/kg	5.50E+01	--	--	--	--	--	--	--
						Cumulative Risk	3.E+00	1.E-05	2.E-01	2.E-06

Notes:

CAS = Chemical Abstracts Service
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
TIC = Tentatively Identified Compound
[1] = Chromium VI RBC value was used

MDC = Maximum Detected Concentration
HI = Hazard Index
RBC = USEPA Region III Risk-Based Concentration
(RBC) values from the October 31, 2006,
RBC Table and October 10, 2006, Alternate RBC Table
C = Carcinogenic per EPA RBC Table (October 2006)
N = Noncarcinogenic per EPA RBC Table (October 2006)

Table 6-8
HHRS SSL Comparison for SWMU 46
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Soil to Groundwater SSL (DAF 20)	COPC Flag (Y/N)	Rationale for Selection or Deletion
	TAL Metals (mg/kg)										
7429905	Aluminum	27,000	56,750	mg/kg	46SB2C - AVG DUP	4/4	183 - 457.5	56,750	--	Y	NSV
7440360	Antimony	0.36	0.43	mg/kg	46SB2B	4/4	0.0518 - 0.0518	0.43	13.2	N	BSL
7440382	Arsenic	3	6	mg/kg	46SB2C - AVG DUP	4/4	0.0232 - 0.0232	5.60	0.026	Y	**ASSL**
7440393	Barium	101	149	mg/kg	46SB2C - AVG DUP	4/4	0.53 - 0.53	149	6,015.2	N	BSL
7440417	Beryllium	0.74	1.45	mg/kg	46SB2C - AVG DUP	4/4	0.0391 - 0.0391	1.45	1,153.7	N	BSL
7440439	Cadmium	0.89	2.40	mg/kg	46SB2B	4/4	0.182 - 0.182	2.40	27.4	N	BSL
7440702	Calcium	1,050	9,970	mg/kg	46SB1C	4/4	83 - 415	9,970	Nutrient	N	Nutrient
7440473	Chromium[1]	25	38	mg/kg	46SB2C - AVG DUP	4/4	0.912 - 0.912	38	42	N	BSL
7440484	Cobalt	7.25	10	mg/kg	46SB2B	4/4	0.208 - 0.208	10	--	Y	NSV
7440508	Copper	18.00	20	mg/kg	46SB1B	4/4	0.368 - 0.368	20	10,517.8	N	BSL
7439896	Iron	34,400	40,200	mg/kg	46SB2C - AVG DUP	4/4	212 - 212	40,200	--	Y	NSV
7439921	Lead	12.00	16	mg/kg	46SB2C - AVG DUP	4/4	0.0218 - 0.0218	16	--	Y	NSV
7439954	Magnesium	13,800	51,700	mg/kg	46SB2C - AVG DUP	4/4	80.25 - 321	51,700	Nutrient	N	Nutrient
7439965	Manganese	350	466	mg/kg	46SB2B	4/4	2.64 - 2.64	466	951.9	N	BSL
7439976	Mercury	0.03	0.07	mg/kg	46SB2C - AVG DUP	4/4	0.0077 - 0.0077	0.07	--	Y	NSV
7440020	Nickel	21.00	32.00	mg/kg	46SB2C - AVG DUP	4/4	0.0356 - 0.0356	32	--	Y	NSV
7440097	Potassium	3,060	12,500	mg/kg	46SB2C - AVG DUP	4/4	25 - 125	12,500	Nutrient	N	Nutrient
7782492	Selenium	0.81	1.35	mg/kg	46SB2C - AVG DUP	4/4	0.0502 - 0.0502	1.35	19	N	BSL
7440224	Silver	0.10	0.18	mg/kg	46SB2C - AVG DUP	4/4	0.0044 - 0.0044	0.18	31	N	BSL
7440235	Sodium	52	88	mg/kg	46SB2C - AVG DUP	4/4	8.92 - 8.92	88	Nutrient	N	Nutrient
7440280	Thallium	0.25	0.46	mg/kg	46SB2C - AVG DUP	4/4	0.027 - 0.027	0.46	3.6	N	BSL
7440622	Vanadium	54	72	mg/kg	46SB2C - AVG DUP	4/4	0.207 - 0.207	72	730	N	BSL
7440666	Zinc	57	68	mg/kg	46SB1C	4/4	0.517 - 0.517	68	13,622	N	BSL
	TCL VOCs (µg/kg)										
78933	2-Butanone	5.5E+01	1.0E+02	µg/kg	46SB1C	4/4	6.15 - 7.45	1.0E+02	2.9E+04	N	BSL
67641	Acetone	8.6E+01	1.5E+02	µg/kg	46SB1C	4/4	6.15 - 7.45	1.5E+02	2.2E+04	N	BSL
156592	cis-1,2-Dichloroethene	1.6E+00	1.6E+00	µg/kg	46SB2B	1/4	0.873 - 1.06	1.6E+00	--	Y	NSV
75092	Methylene chloride	3.2E+00	5.0E+00	µg/kg	46SB1C	4/4	3.46 - 4.19	5.0E+00	1.9E+01	N	BSL
79016	Trichloroethene	3.4E+00	3.4E+00	µg/kg	46SB2B	1/4	0.833 - 1.01	3.4E+00	2.6E-01	Y	**ASSL**
	TCL SVOCs (µg/kg)										
59507	4-Chloro-3-Methylphenol	2.1E+01	3.4E+01	µg/kg	46SB2C - AVG DUP	4/4	6.25 - 7.82	3.4E+01	--	Y	NSV
117817	Bis(2-ethylhexyl)phthalate	4.9E+01	6.5E+01	µg/kg	46SB2C - AVG DUP	4/4	2.48 - 3.11	6.5E+01	2.9E+06	N	BSL
84662	Diethylphthalate	3.0E+00	4.0E+00	µg/kg	46SB2C - AVG DUP	4/4	2.28 - 2.85	4.0E+00	4.5E+05	N	BSL
84742	Di-n-butylphthalate	2.4E+01	3.8E+01	µg/kg	46SB2C - AVG DUP	4/4	4.58 - 5.73	3.8E+01	5.0E+06	N	BSL
	SVOC TICs (µg/kg)										
301020	(Z)-9-Octadecenamide	1.1E+02	1.0E+03	µg/kg	46SB1C	4/4	0 - 0	1.0E+03	--	Y	NSV
1454859	1-Heptadecanol	3.1E+01	3.7E+01	µg/kg	46SB2B	2/4	0 - 0	3.7E+01	--	Y	NSV
112925	1-Octadecanol	5.4E+01	5.6E+01	µg/kg	46SB2C - AVG DUP	2/4	0 - 0	5.6E+01	--	Y	NSV
84695	1,2-Benzenedicarboxylicacid, bis(2-methy	3.4E+01	5.5E+01	µg/kg	46SB2C - AVG DUP	2/4	0 - 0	5.5E+01	--	Y	NSV
17851535	1,2-Benzenedicarboxylic acid, butyl 2-me	3.1E+01	4.9E+01	µg/kg	46SB1C	2/4	0 - 0	4.9E+01	--	Y	NSV
104767	2-Ethyl-1-Hexanol	2.6E+01	3.2E+01	µg/kg	46SB2C - AVG DUP	3/4	0 - 0	3.2E+01	--	Y	NSV
4436753	3-Hexene-2,5-dione	1.5E+02	1.6E+02	µg/kg	46SB1B	2/4	0 - 0	1.6E+02	--	Y	NSV
6971400	17-Pentatriacontene	5.2E+01	5.2E+01	µg/kg	46SB1B	1/4	0 - 0	5.2E+01	--	Y	NSV
544854	Ditriacontane	4.0E+01	4.0E+01	µg/kg	46SB1B	1/4	0 - 0	4.0E+01	--	Y	NSV
629970	Docosane	4.5E+01	4.5E+01	µg/kg	46SB1B	1/4	0 - 0	4.5E+01	--	Y	NSV
112845	Erucylamide	5.6E+02	9.1E+02	µg/kg	46SB2C - AVG DUP	2/4	0 - 0	9.1E+02	--	Y	NSV

Table 6-8
HHRS SSL Comparison for SWMU 46
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Soil to Groundwater SSL (DAF 20)	COPC Flag (Y/N)	Rationale for Selection or Deletion
593497	Heptacosane	6.0E+01	6.0E+01	µg/kg	46SB1B	1/4	0 - 0	6.0E+01	--	Y	NSV
19047859	Phosphonic acid, dioctadecyl ester	5.5E+01	5.5E+01	µg/kg	46SB2C - AVG DUP	1/4	0 - 0	5.5E+01	--	Y	NSV
14167590	Tetratriacontane	4.4E+01	4.4E+01	µg/kg	46SB1B	1/4	0 - 0	4.4E+01	--	Y	NSV
	Cyanide (mg/kg)										
57125	Cyanide	1.5E-01	1.5E-01	mg/kg	46SB1C	1/4	0.0356 - 0.0356	1.5E-01	1.5E+02	N	BSL

Notes:

CAS = Chemical Abstracts Service
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
TIC = Tentatively Identified Compound
[1] = Chromium VI SSL DAF20 value was used
[2] = Lead criteria are Action Levels; see USEPA Region III guidance
[3] = Mercuric chloride soil RBC value used

DUP AVG = results for duplicate samples averaged
SSL DAF20 = Soil Screening Levels at a Dilution Attenuation Factor of 20 Per (SSL) values from the October 31, 2006, RBC Table

ASSL = Above Soil Screening Level
BSL = Below Soil Screening Levels
NSV = No Screening Value Available
* = Surface Soil Detections used for SSL Screening due to testing of one surface soil sample for PCB/Pesticides/Herbicides

Table 6-9
COPC/Background Comparison for SWMU 46
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Surface Soil COPC/Background Comparison

CAS #	Chemical	Minimum Concentration Surface Soil	Maximum Concentration Surface Soil	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Point Estimate[A]	Background Comparison
	TAL Metals (mg/kg)									
7429905	Aluminum	22,500	23,700	mg/kg	46SB2A	2/2	183 - 183	23,700	40,041	N
7440382	Arsenic	1.9	2.3	mg/kg	46SB2A	2/2	0.0232 - 0.0232	2.3	15.8	N
7440473	Chromium	25	26	mg/kg	46SB1A	2/2	0.912 - 0.912	26	65.3	N
7440484	Cobalt	11	13	mg/kg	46SB2A	2/2	0.208 - 0.208	13	72	N
7439896	Iron	33,800	35,900	mg/kg	46SB2A	2/2	212 - 212	35,900	50,962	N
7439965	Manganese	506	573	mg/kg	46SB2A	2/2	2.64 - 2.64	573	2,543	N
7440622	Vanadium	56	56	mg/kg	46SB1A	2/2	0.207 - 0.207	56	108	N

Total Soil COPC/Background Comparison

CAS #	Chemical	Minimum Concentration Total Soil	Maximum Concentration Total Soil	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Point Estimate[A]	Background Comparison
	TAL Metals (mg/kg)									
7429905	Aluminum	22,500	56,750	mg/kg	46SB2C - AVG DUP	6/6	183 - 457.5	56,750	40,041	**Y**
7440382	Arsenic	1.9	5.6	mg/kg	46SB2C - AVG DUP	6/6	0.0232 - 0.0232	5.6	15.8	N
7440473	Chromium	25	38	mg/kg	46SB2C - AVG DUP	6/6	0.912 - 0.912	38	65.3	N
7440484	Cobalt	7.25	13	mg/kg	46SB2A	6/6	0.208 - 0.208	13	72	N
7439896	Iron	33,800	40,200	mg/kg	46SB2C - AVG DUP	6/6	212 - 212	40,200	50,962	N
7439965	Manganese	350	573	mg/kg	46SB2A	6/6	2.64 - 2.64	573	2,543	N
7440622	Vanadium	54	72	mg/kg	46SB2C - AVG DUP	6/6	0.207 - 0.207	72	108	N

Notes:

CAS = Chemical Abstracts Service
TAL = Target Analyte List
mg/kg = Milligram Per Kilogram
[A] = Facility-Wide Background Point Estimate as Reported in the Facility-Wide Background Study Report (IT 2001a)
AVG DUP = Results for Duplicate Samples Averaged

Table 6-10
Detected Chemicals Occurrence for SWMU 46
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening
	TAL Metals (mg/kg)							
7429905	Aluminum	22,500	23,700	mg/kg	46SB2A	2/2	183 - 183	23,700
7440360	Antimony	0.32	0.33	mg/kg	46SB2A	2/2	0.0518 - 0.0518	0.3
7440382	Arsenic	1.90	2.30	mg/kg	46SB2A	2/2	0.0232 - 0.0232	2
7440393	Barium	105	114	mg/kg	46SB1A	2/2	0.53 - 0.53	114
7440417	Beryllium	0.68	0.77	mg/kg	46SB1A	2/2	0.0391 - 0.0391	0.77
7440439	Cadmium	2.20	2.20	mg/kg	46SB1A	2/2	0.182 - 0.182	2.20
7440702	Calcium	1,350	1,530	mg/kg	46SB2A	2/2	83 - 83	1,530
7440473	Chromium	25	26	mg/kg	46SB1A	2/2	0.912 - 0.912	26
7440484	Cobalt	11	13	mg/kg	46SB2A	2/2	0.208 - 0.208	13
7440508	Copper	15	16	mg/kg	46SB1A	2/2	0.368 - 0.368	16
7439896	Iron	33,800	35,900	mg/kg	46SB2A	2/2	212 - 212	35,900
7439921	Lead	13	14	mg/kg	46SB2A	2/2	0.0218 - 0.0218	14
7439954	Magnesium	4,690	5,290	mg/kg	46SB2A	2/2	32.1 - 32.1	5,290
7439965	Manganese	506	573	mg/kg	46SB2A	2/2	2.64 - 2.64	573
7439976	Mercury	0.03	0.04	mg/kg	46SB1A	2/2	0.0077 - 0.0077	0.04
7440020	Nickel	16	17	mg/kg	46SB1A	2/2	0.0356 - 0.0356	17
7440097	Potassium	2,170	2,180	mg/kg	46SB2A	2/2	25 - 25	2,180
7782492	Selenium	0.63	0.67	mg/kg	46SB1A	2/2	0.0502 - 0.0502	0.67
7440224	Silver	0.06	0.06	mg/kg	46SB1A	2/2	0.0044 - 0.0044	0.06
7440235	Sodium	40	50	mg/kg	46SB2A	2/2	8.92 - 8.92	50
7440280	Thallium	0.24	0.27	mg/kg	46SB2A	2/2	0.027 - 0.027	0.27
7440622	Vanadium	56	56	mg/kg	46SB1A	2/2	0.207 - 0.207	56
7440666	Zinc	65	72	mg/kg	46SB2A	2/2	0.517 - 0.517	72
	TCL VOCs (µg/kg)							
78933	2-Butanone	7.1E+01	1.4E+02	µg/kg	46SB1A	2/2	5.95 - 20.8	1.4E+02
67641	Acetone	1.6E+02	8.7E+02	µg/kg	46SB1A	2/2	5.95 - 53.5	8.7E+02
1634044	Methyl tert-butyl ether	7.8E+00	7.8E+00	µg/kg	46SB1A	1/2	0.763 - 3.85	7.8E+00
79016	Trichloroethene	2.3E+01	2.3E+01	µg/kg	46SB2A	1/2	0.806 - 10.6	2.3E+01
	TCL SVOCs[1] (µg/kg)							
59507	4-Chloro-3-Methylphenol	1.3E+01	2.5E+01	µg/kg	46SB2A	2/2	6.25 - 6.25	2.5E+01
117817	Bis(2-ethylhexyl)phthalate	5.1E+01	5.2E+01	µg/kg	46SB1A	2/2	2.48 - 2.48	5.2E+01
84662	Diethylphthalate	3.0E+00	3.0E+00	µg/kg	46SB2A	1/2	2.28 - 2.28	3.0E+00
84742	Di-n-butylphthalate	2.1E+01	2.8E+01	µg/kg	46SB2A	2/2	4.58 - 4.58	2.8E+01
129000	Pyrene	2.0E+00	2.0E+00	µg/kg	46SB1A	1/2	1.78 - 1.78	2.0E+00

Notes:

CAS = Chemical Abstracts Sevice
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
[1] = SVOCs analyzed by USEPA SW-846 8270 Method 8270C

Table 6-11
Non-detected Chemicals for SWMU 46
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Parameter Name	Units	Number of Samples	Minimum MDL	Maximum MDL	TSV	Maximum Detection Limit Exceeds TSV
Inorganics							
57125	Cyanide	mg/kg	2	0.0356	0.0356	0.005	**Y**
Pesticides/Herbicides							
72548	4,4'-DDD	µg/kg	1	0.286	0.286	--	NS
72559	4,4'-DDE	µg/kg	1	0.21	0.21	100	**Y**
50293	4,4'-DDT	µg/kg	1	0.216	0.216	100	N
309002	Aldrin	µg/kg	1	0.365	0.365	100	N
319846	alpha-BHC	µg/kg	1	0.364	0.364	100	N
5103719	alpha-Chlordane	µg/kg	1	0.521	0.521	100	N
319857	beta-BHC	µg/kg	1	1.36	1.36	100	N
319868	delta-BHC	µg/kg	1	0.982	0.982	100	N
60571	Dieldrin	µg/kg	1	0.371	0.371	100	N
959988	Endosulfan I	µg/kg	1	1.09	1.09	--	NS
33213659	Endosulfan II	µg/kg	1	0.257	0.257	--	NS
1031078	Endosulfan Sulfate	µg/kg	1	0.604	0.604	--	NS
72208	Endrin	µg/kg	1	0.358	0.358	100	N
7421934	Endrin aldehyde	µg/kg	1	1.33	1.33	--	NS
53494705	Endrin ketone	µg/kg	1	0.33	0.33	--	NS
58899	gamma-BHC (Lindane)	µg/kg	1	0.233	0.233	100	N
5103742	gamma-Chlordane	µg/kg	1	0.844	0.844	100	N
76448	Heptachlor	µg/kg	1	0.846	0.846	--	NS
1024573	Heptachlor epoxide	µg/kg	1	0.546	0.546	100	N
72435	Methoxychlor	µg/kg	1	0.336	0.336	100	N
8001352	Toxaphene	µg/kg	1	28	28	--	NS
93765	2,4,5-T	µg/kg	1	2.4	2.4	--	NS
93721	2,4,5-TP (Silvex)	µg/kg	1	4.8	4.8	--	NS
94757	2,4-D	µg/kg	1	19.2	19.2	--	NS
94826	2,4-DB	µg/kg	1	74.4	74.4	--	NS
75990	Dalapon	µg/kg	1	68.4	68.4	--	NS
1918009	Dicamba	µg/kg	1	2.4	2.4	--	NS
120365	Dichlorprop	µg/kg	1	20.4	20.4	--	NS
88857	Dinoseb	µg/kg	1	25.2	25.2	--	NS
94746	MCPA	µg/kg	1	1680	1680	--	NS
93652	MCPP	µg/kg	1	6070	6070	--	NS
PCBs							
12674112	Aroclor 1016	µg/kg	1	19.2	19.2	--	NS
11104282	Aroclor 1221	µg/kg	1	2.4	2.4	--	NS
11141165	Aroclor 1232	µg/kg	1	6	6	--	NS
53469219	Aroclor 1242	µg/kg	1	3.6	3.6	--	NS
12672296	Aroclor 1248	µg/kg	1	6	6	--	NS
11097691	Aroclor 1254	µg/kg	1	3.6	3.6	371	N
11096825	Aroclor 1260	µg/kg	1	8.4	8.4	371	N
VOCs							
71556	1,1,1-Trichloroethane	µg/kg	2	0.507	7.1	300	N
79345	1,1,2,2-Tetrachloroethane	µg/kg	2	0.777	7.4	300	N
76131	1,1,2-Trichloro-1,2,2-trifluoroethane	µg/kg	2	0.903	8.95	--	NS
79005	1,1,2-Trichloroethane	µg/kg	2	0.706	7.1	300	N
75343	1,1-Dichloroethane	µg/kg	2	0.862	2.85	300	N
75354	1,1-Dichloroethene	µg/kg	2	0.872	6.65	--	NS
87616	1,2,3-Trichlorobenzene	µg/kg	2	0.647	11.4	--	NS
120821	1,2,4-Trichlorobenzene	µg/kg	2	0.488	9.45	100	N
96128	1,2-Dibromo-3-chloropropane	µg/kg	2	2.48	13.5	--	NS
106934	1,2-Dibromoethane	µg/kg	2	0.815	8.55	--	NS
95501	1,2-Dichlorobenzene	µg/kg	2	0.576	8.2	100	N
107062	1,2-Dichloroethane	µg/kg	2	0.513	5.55	870,000	N
78875	1,2-Dichloropropane	µg/kg	2	0.697	12.8	700,000	N

Table 6-11
Non-detected Chemicals for SWMU 46
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Parameter Name	Units	Number of Samples	Minimum MDL	Maximum MDL	TSV	Maximum Detection Limit Exceeds TSV
541731	1,3-Dichlorobenzene	µg/kg	2	0.319	8	--	NS
106467	1,4-Dichlorobenzene	µg/kg	2	0.845	6.2	100	N
591786	2-Hexanone	µg/kg	2	2.69	22.8	--	NS
108101	4-Methyl-2-pentanone	µg/kg	2	1.74	18.2	--	NS
71432	Benzene	µg/kg	2	0.627	1.08	100	N
74975	Bromochloromethane	µg/kg	2	0.906	3.79	--	NS
75274	Bromodichloromethane	µg/kg	2	0.596	21.6	450,000	N
75252	Bromoform	µg/kg	2	0.688	5.5	--	NS
74839	Bromomethane	µg/kg	2	1.79	13.4	--	NS
75150	Carbon disulfide	µg/kg	2	1.73	2.97	--	NS
56235	Carbon tetrachloride	µg/kg	2	0.555	5.75	300	N
108907	Chlorobenzene	µg/kg	2	0.787	7.85	100	N
75003	Chloroethane	µg/kg	2	1.61	9	--	NS
67663	Chloroform	µg/kg	2	0.531	5.05	300	N
74873	Chloromethane	µg/kg	2	0.992	5.15	--	NS
156592	cis-1,2-Dichloroethene	µg/kg	2	0.845	6.95	300	N
10061015	cis-1,3-Dichloropropene	µg/kg	2	0.584	9.45	--	NS
110827	Cyclohexane	µg/kg	2	0.376	10.8	--	NS
124481	Dibromochloromethane	µg/kg	2	0.615	5.4	--	NS
75718	Dichlorodifluoromethane	µg/kg	2	0.795	6	--	NS
100414	Ethylbenzene	µg/kg	2	0.503	9.75	100	N
98828	Isopropylbenzene	µg/kg	2	0.65	4.51	--	NS
79209	Methyl acetate	µg/kg	2	4.13	11.6	--	NS
1634044	methyl tert-Butyl ether	µg/kg	1	0.763	0.763	--	NS
108872	Methylcyclohexane	µg/kg	2	1.01	8.4	--	NS
75092	Methylene chloride	µg/kg	2	3.34	5.85	300	N
100425	Styrene	µg/kg	2	0.526	6.85	100	N
127184	Tetrachloroethene	µg/kg	2	0.729	9.65	300	N
108883	Toluene	µg/kg	2	0.552	10.7	100	N
156605	trans-1,2-Dichloroethene	µg/kg	2	0.837	7.15	300	N
10061026	trans-1,3-Dichloropropene	µg/kg	2	0.62	5.85	--	NS
79016	Trichloroethene	µg/kg	1	10.6	10.6	300	N
75694	Trichlorofluoromethane	µg/kg	2	0.884	2.54	--	NS
75014	Vinyl Chloride	µg/kg	2	0.44	5.95	300	N
1330207	Xylenes	µg/kg	2	0.501	26.5	100	N
SVOCs							
92524	1,1'-Biphenyl	µg/kg	2	2.95	2.95	--	NS
95943	1,2,4,5-Tetrachlorobenzene	µg/kg	2	34.4	34.4	--	NS
108601	2,2'-oxybis(1-Chloropropane)	µg/kg	2	1.58	1.58	--	NS
95954	2,4,5-Trichlorophenol	µg/kg	2	4.01	4.01	100	N
88062	2,4,6-Trichlorophenol	µg/kg	2	3.14	3.14	100	N
120832	2,4-Dichlorophenol	µg/kg	2	4.22	4.22	100	N
105679	2,4-Dimethylphenol	µg/kg	2	9.53	9.53	100	N
51285	2,4-Dinitrophenol	µg/kg	2	3.84	3.84	20,000	N
121142	2,4-Dinitrotoluene	µg/kg	2	3.78	3.78	--	NS
606202	2,6-Dinitrotoluene	µg/kg	2	33.2	33.2	--	NS
91587	2-Chloronaphthalene	µg/kg	2	2.76	2.76	--	NS
95578	2-Chlorophenol	µg/kg	2	2.41	2.41	100	N
91576	2-Methylnaphthalene	µg/kg	2	3.29	3.29	--	NS
95487	2-Methylphenol	µg/kg	2	5.81	5.81	100	N
88744	2-Nitroaniline	µg/kg	2	5.52	5.52	--	NS
88755	2-Nitrophenol	µg/kg	2	2.04	2.04	--	NS
91941	3,3'-Dichlorobenzidine	µg/kg	2	80	80	--	NS
99092	3-Nitroaniline	µg/kg	2	40	40	--	NS
534521	4,6-Dinitro-2-methylphenol	µg/kg	2	5.41	5.41	--	NS
101553	4-Bromophenyl-phenylether	µg/kg	2	4.06	4.06	--	NS

Table 6-11
Non-detected Chemicals for SWMU 46
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Parameter Name	Units	Number of Samples	Minimum MDL	Maximum MDL	TSV	Maximum Detection Limit Exceeds TSV
106478	4-Chloroaniline	µg/kg	2	1.51	1.51	--	NS
7005723	4-Chlorophenyl-phenylether	µg/kg	2	3.92	3.92	--	NS
106445	4-Methylphenol	µg/kg	2	7.64	7.64	100	N
100016	4-Nitroaniline	µg/kg	2	8.7	8.7	--	NS
100027	4-Nitrophenol	µg/kg	2	3.4	3.4	100	N
83329	Acenaphthene	µg/kg	2	2.06	2.06	100	N
208968	Acenaphthylene	µg/kg	2	1.8	1.8	100	N
98862	Acetophenone	µg/kg	2	2.28	2.28	--	NS
120127	Anthracene	µg/kg	2	5.54	5.54	100	N
1912249	Atrazine	µg/kg	2	8.26	8.26	--	NS
100527	Benzaldehyde	µg/kg	2	4.86	4.86	--	NS
56553	Benzo(a)anthracene	µg/kg	2	16	16	100	N
50328	Benzo(a)pyrene	µg/kg	2	6.85	6.85	100	N
205992	Benzo(b)fluoranthene	µg/kg	2	11.7	11.7	100	N
191242	Benzo(g,h,i)perylene	µg/kg	2	10.5	10.5	100	N
207089	Benzo(k)fluoranthene	µg/kg	2	16.1	16.1	100	N
111911	Bis(2-chloroethoxy)methane	µg/kg	2	3.77	3.77	--	NS
111444	Bis(2-chloroethyl)ether	µg/kg	2	2.08	2.08	--	NS
85687	Butylbenzylphthalate	µg/kg	2	5.38	5.38	--	NS
105602	Caprolactam	µg/kg	2	7.66	7.66	--	NS
86748	Carbazole	µg/kg	2	7.32	7.32	--	NS
218019	Chrysene	µg/kg	2	12.2	12.2	100	N
53703	Dibenz(a,h)anthracene	µg/kg	2	7.08	7.08	100	N
132649	Dibenzofuran	µg/kg	2	3.79	3.79	--	NS
84662	Diethylphthalate	µg/kg	1	2.28	2.28	100,000	N
131113	Dimethylphthalate	µg/kg	2	3.97	3.97	200,000	N
117840	Di-n-octylphthalate	µg/kg	2	3.72	3.72	--	NS
206440	Fluoranthene	µg/kg	2	2.82	2.82	100	N
86737	Fluorene	µg/kg	2	2.02	2.02	100	N
118741	Hexachlorobenzene	µg/kg	2	3.01	3.01	1,000,000	N
87683	Hexachlorobutadiene	µg/kg	2	4.64	4.64	--	NS
77474	Hexachlorocyclopentadiene	µg/kg	2	2.38	2.38	10,000	N
67721	Hexachloroethane	µg/kg	2	2.8	2.8	--	NS
193395	Indeno(1,2,3-cd)pyrene	µg/kg	2	4.7	4.7	100	N
78591	Isophorone	µg/kg	2	2.08	2.08	--	NS
91203	Naphthalene	µg/kg	2	3.3	3.3	100	N
98953	Nitrobenzene	µg/kg	2	3.84	3.84	40,000	N
621647	N-Nitrosodi-n-propylamine	µg/kg	2	3.95	3.95	--	NS
86306	N-Nitrosodiphenylamine	µg/kg	2	5.7	5.7	20,000	N
87865	Pentachlorophenol	µg/kg	2	5.27	5.27	100	N
85018	Phenanthrene	µg/kg	2	2.76	2.76	100	N
108952	Phenol	µg/kg	2	4.75	4.75	100	N
129000	Pyrene	µg/kg	1	1.78	1.78	100	N
PAHs							
83329	Acenaphthene	µg/kg	2	11.2	11.3	100	N
208968	Acenaphthylene	µg/kg	2	13.8	13.9	100	N
120127	Anthracene	µg/kg	2	0.833	0.84	100	N
56553	Benzo(a)anthracene	µg/kg	2	0.952	0.96	100	N
50328	Benzo(a)pyrene	µg/kg	2	1.19	1.2	100	N
205992	Benzo(b)fluoranthene	µg/kg	2	1.55	1.56	100	N
191242	Benzo(g,h,i)perylene	µg/kg	2	14.9	15	100	N
207089	Benzo(k)fluoranthene	µg/kg	2	1.19	1.2	100	N
218019	Chrysene	µg/kg	2	1.43	1.44	100	N
53703	Dibenz(a,h)anthracene	µg/kg	2	1.67	1.68	100	N
206440	Fluoranthene	µg/kg	2	2.02	2.04	100	N
86737	Fluorene	µg/kg	2	1.55	1.56	100	N

Table 6-11
Non-detected Chemicals for SWMU 46
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Parameter Name	Units	Number of Samples	Minimum MDL	Maximum MDL	TSV	Maximum Detection Limit Exceeds TSV
193395	Indeno(1,2,3-cd)pyrene	µg/kg	2	0.833	0.84	100	N
91203	Naphthalene	µg/kg	2	9.4	9.48	100	N
85018	Phenanthrene	µg/kg	2	0.714	0.72	100	N
129000	Pyrene	µg/kg	2	1.07	1.08	100	N
Explosives							
99354	1,3,5-Trinitrobenzene	mg/kg	2	0.14	0.14	--	NS
99650	1,3-Dinitrobenzene	mg/kg	2	0.159	0.159	--	NS
118967	2,4,6-Trinitrotoluene	mg/kg	2	0.167	0.167	--	NS
121142	2,4-Dinitrotoluene	mg/kg	2	0.142	0.142	--	NS
606202	2,6-Dinitrotoluene	mg/kg	2	0.25	0.25	--	NS
35572782	2-Amino-4,6-dinitrotoluene	mg/kg	2	0.151	0.151	--	NS
88722	2-Nitrotoluene	mg/kg	2	0.266	0.266	--	NS
99081	3-Nitrotoluene	mg/kg	2	0.184	0.184	--	NS
1946510	4-Amino-2,6-dinitrotoluene	mg/kg	2	0.162	0.162	--	NS
99990	4-Nitrotoluene	mg/kg	2	0.251	0.251	--	NS
2691410	HMX (Octahydro-1,3,5,7-tetranitro-1,3,5,	mg/kg	2	0.229	0.229	--	NS
98953	Nitrobenzene	mg/kg	2	0.102	0.102	40,000	N
121824	RDX (Hexahydro-1,3,5-trinitro-1,3,5-tria	mg/kg	2	0.131	0.131	--	NS
Nitroglycerin/PETN							
628966	Nitroglycerin	mg/kg	2	0.195	0.202	--	NS
78115	PETN	mg/kg	2	0.269	0.278	--	NS

Notes:
CAS = Chemical Abstracts Service
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
NS = No screening value
TSV = Toxicity Screening Value
MDL = Method Detection Limit

Table 6-12
Preliminary Soil Invertebrate Risk Characterization for SWMU 46
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Chemicals	CAS #	MDC for Surface Soil	Direct Contact TRV	TRV Source[A]	HQ
TAL Metals (mg/kg)					
Aluminum	7429-90-5	23,700	1	BTAG 1995	**23,700**
Antimony	7440-36-0	0.3	78	ECO SSL 2005	<1
Arsenic	7440-38-2	2	328	BTAG 1995	<1
Barium	7440-39-3	114	330	ECO SSL 2005	<1
Beryllium	7440-41-7	0.77	40	ECO SSL 2005	<1
Cadmium	7440-43-9	2.20	140	ECO SSL 2005	<1
Chromium	7440-47-3	26	0.0075	BTAG 1995	**3,467**
Cobalt	7440-48-4	13	200	BTAG 1995	<1
Copper	7440-50-8	16	50	ORNL 1997a	<1
Iron	7439-89-6	35,900	12	BTAG 1995	**2,992**
Lead	7439-92-1	14	1,700	ECO SSL 2005	<1
Manganese	7439-96-5	573	330	BTAG 1995	**2**
Mercury	7439-97-6	0.04	0.058	BTAG 1995	<1
Nickel	7440-02-0	17	100	ORNL 1997a	<1
Selenium	7782-49-2	0.67	1.8	BTAG 1995	<1
Silver	7440-22-4	0.06	20	CCME 2004	<1
Thallium	7440-28-0	0.27	1	CCME 2004	<1
Vanadium	7440-62-2	56	58	BTAG 1995	<1
Zinc	7440-66-6	72	200	ORNL 1997a	<1
TCL VOCs (µg/kg)					
2-Butanone	78-93-3	140	NV	--	NC
Acetone	67-64-1	870	NV	--	NC
Methyl tert-butyl ether	1634-04-4	7.8	NV	--	NC
Trichloroethene	79-01-6	23	300	BTAG 1995	<1
TCL SVOCs (µg/kg)					
4-Chloro-3-Methylphenol	59-50-7	25	NV	--	NC
Bis(2-ethylhexyl)phthalate	117-81-7	52	NV	--	NC
Diethylphthalate	84-66-2	3	NV	--	NC
Di-n-butylphthalate	84-74-2	28	NV	--	NC
Pyrene	129-00-0	2	100	BTAG 1995	<1

Notes:

CAS = Chemical Abstracts Service
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
MDC = Maximum Detected Concentration
TRV = Toxicity Reference Value
NV = No value
HQ = Hazard Quotient
NC = Not Calculated no TRV available
BTAG = Biological Technical Assistance Group Screening Level, Draft 1995

[A] =
Region III BTAG (USEPA 1995)
Oak Ridge National Laboratory (Efroymson et al. 1997a)
USEPA Ecological SSL (ECO-SSL 2005)
Canadian Environmental Quality Guidelines (CCME 2004)

TABLE 6-13
Inorganic COPEC/Background Comparison for SWMU 46
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Measured Analytes	CAS-Number	MDC for Surface Soil	Background Point Estimate [A]	Maximum Concentration Exceeds Background Point Estimate
TAL METALS (mg/kg)				
ALUMINUM	7429-90-5	23,700	40,041	N
ARSENIC	7440-38-2	2.30	16	N
CADMIUM	7440-43-9	2.20	0.69	**Y**
CHROMIUM	7440-47-3	26	65	N
COPPER	7440-50-8	16	54	N
IRON	7439-89-6	35,900	50,962	N
LEAD	7439-92-1	14	27	N
MANGANESE	7439-96-5	573	2,543	N
MERCURY	7439-97-6	0.04	0.13	N
SELENIUM	7782-49-2	0.67	--	NA
ZINC	7440-66-6	72	202	N

Notes:
CAS = Chemical Abstracts Service
mg/kg = Milligram Per Kilogram
MDC = Maximum Detected Concentration
[A] = Facility-Wide Background Point Estimate as
Reported in the Facility-Wide Background Study Report (IT 2001a)

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Table 6-14
Preliminary/Refined Wildlife Risk Characterization
Screening Level Ecological Risk Assessment
SSP Report - SWMU 46
Radford Army Ammunition Plant, Radford, Virginia

Preliminary Assessment

Parameter	Maximum Soil Concentration (mg/kg)	Wildlife TRV-Based Soil Concentrations																			
		American Robin				Red-tailed Hawk				Meadow Vole				Red Fox				Short-tailed Shrew			
		NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ
Metals																					
ARSENIC	2	1.39E+01	<1	3.46E+01	<1	3.89E+02	<1	9.71E+02	<1	8.99E+00	<1	8.99E+01	<1	1.34E+00	1.5	1.34E+01	<1	3.02E-01	6.6	3.02E+00	<1
CADMIUM	2.2	6.75E-01	3.3	9.31E+00	<1	3.91E+02	<1	5.40E+03	<1	1.50E+01	<1	1.50E+02	<1	1.48E+01	<1	1.48E+02	<1	1.16E+00	1.9	1.16E+01	<1
CHROMIUM	26	5.27E+00	4.9	2.64E+01	<1	2.70E+01	<1	1.35E+02	<1	8.65E+05	<1	8.65E+06	<1	2.38E+04	<1	2.38E+05	<1	1.78E+04	<1	1.78E+05	<1
COPPER	16	1.38E+02	<1	1.82E+02	<1	7.11E+02	<1	9.33E+02	<1	8.34E+02	<1	1.10E+03	<1	7.43E+01	<1	9.78E+01	<1	9.57E+01	<1	1.26E+02	<1
LEAD	14	5.18E+00	2.7	5.18E+01	<1	5.69E+02	<1	5.69E+03	<1	1.05E+03	<1	1.05E+04	<1	4.97E+02	<1	4.97E+03	<1	5.45E+01	<1	5.45E+02	<1
MERCURY	0.04	6.08E-01	<1	1.22E+00	<1	2.62E-01	<1	5.23E-01	<1	4.27E-01	<1	1.74E+00	<1	3.93E-03	10.2	1.60E-02	2.5	8.31E-02	<1	3.39E-01	<1
NICKEL	17	3.86E+02	<1	5.33E+02	<1	1.95E+03	<1	2.70E+03	<1	5.54E+03	<1	1.11E+04	<1	3.23E+02	<1	6.46E+02	<1	2.86E+02	<1	5.71E+02	<1
SELENIUM	0.67	3.13E-01	2.1	6.27E-01	1.1	4.03E+00	<1	8.06E+00	<1	2.73E+00	<1	4.50E+00	<1	6.09E-01	1.1	1.00E+00	<1	5.27E-01	1.3	8.70E-01	<1
SILVER	0.06	2.31E+01	<1	1.73E+02	<1	8.34E+02	<1	6.26E+03	<1	1.72E+03	<1	1.72E+04	<1	2.89E+02	<1	2.89E+03	<1	5.85E+01	<1	5.85E+02	<1
ZINC	72	1.40E+01	5.1	1.26E+02	<1	2.19E+01	3.3	1.98E+02	<1	3.38E+03	<1	6.75E+03	<1	8.28E+01	<1	1.66E+02	<1	4.22E+02	<1	8.44E+02	<1
SVOCs/PAHs																					
PYRENE	0.002	NC		NC		NC		NC		1.07E+03	<1	5.35E+03	<1	1.85E+02	<1	9.25E+02	<1	3.17E+01	<1	1.58E+02	<1

Refined Assessment

Parameter	Maximum Soil Concentration (mg/kg)	Wildlife TRV-Based Soil Concentrations																			
		American Robin				Red-tailed Hawk				Meadow Vole				Red Fox				Short-tailed Shrew			
		NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ
Metals																					
ARSENIC	2	1.09E+03	<1	2.71E+03	<1	1.46E+07	<1	3.64E+07	<1	6.10E+01	<1	6.10E+02	<1	1.48E+04	<1	1.48E+05	<1	1.85E+01	<1	1.85E+02	<1
CADMIUM	2.2	5.55E+01	<1	7.65E+02	<1	1.47E+07	<1	2.02E+08	<1	1.02E+02	<1	1.02E+03	<1	1.79E+05	<1	1.79E+06	<1	7.31E+01	<1	7.31E+02	<1
CHROMIUM	26	3.92E+02	<1	1.96E+03	<1	1.01E+06	<1	5.06E+06	<1	5.87E+06	<1	5.87E+07	<1	2.61E+08	<1	2.61E+09	<1	1.08E+06	<1	1.08E+07	<1
LEAD	14	3.91E+02	<1	3.91E+03	<1	2.13E+07	<1	2.13E+08	<1	7.09E+03	<1	7.09E+04	<1	5.61E+06	<1	5.61E+07	<1	3.29E+03	<1	3.29E+04	<1
MERCURY	0.04	4.90E+01	<1	9.80E+01	<1	9.81E+03	<1	1.96E+04	<1	2.90E+00	<1	1.18E+01	<1	4.31E+01	<1	1.76E+02	<1	5.11E+00	<1	2.09E+01	<1
SELENIUM	0.67	2.56E+01	<1	5.12E+01	<1	1.51E+05	<1	3.02E+05	<1	1.85E+01	<1	3.05E+01	<1	6.82E+03	<1	1.12E+04	<1	3.28E+01	<1	5.42E+01	<1
ZINC	72	1.14E+03	<1	1.03E+04	<1	8.21E+05	<1	7.42E+06	<1	2.29E+04	<1	4.58E+04	<1	9.10E+05	<1	1.82E+06	<1	2.63E+04	<1	5.25E+04	<1

Notes:
NC = Not Calculated no TRV available
TRV = Toxicity Reference Value
HQ = Hazard Quotient
LOAEL = Lowest observable adverse effects level
NOAEL = No observable adverse effects level
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
PCB = Polychlorinated Biphenyls
SVOC = Semi-Volatile Organic Compound
PAH = Poly-Aromatic Hydrocarbon

= Indicate HQs greater than 1.0

Refer to Appendix I for detailed description of model parameters and results

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7.0 SWMU 57 – POND BY BUILDINGS 4931 & 4928

7.1 SITE BACKGROUND – ENVIRONMENTAL SETTING

Physiography

SWMU 57 is a 0.027-acre area (1,172 ft^2), consisting of a man-made, asphalt-lined former lagoon. This site is located in the western section of the HSA on a small plateau above a hillside, which slopes downward to the northwest toward the New River (Figure 7-1). Land surface elevation at the site is approximately 1,805 ft msl.



SWMU 57 – August 2002 – Looking Northwest

An asphalt-paved road is located to the east and several overhead pipes with associated appurtenances are present nearby. A four-foot high perimeter chain-link fence with a locked gate encloses the site. A four-foot high, asphalt-covered (one-inch thick) soil berm surrounds the former lagoon inside of the fence (Figure 7-1). At the time of the SSP site visit and field investigation, the former lagoon was observed to be dry and heavily vegetated.

Tanks and Structures

Several overhead pipes with associated appurtenances, the site perimeter fence, and historically related buildings to the south are present in the site area. Other tanks or structures are not present near the site.

Surface Water

The surrounding berm produces interior drainage with the former lagoon area and prevents run-on and runoff of surface water. A shallow, well-defined, drainage ditch surrounds the former lagoon and connects with a drainageway to the northwest (Figure 7-1). This drainageway leads to a perennial stream located approximately 500 ft northwest of the site, which in turn flows northeastward and northwestward approximately 1,500 ft to the New River. Other manholes, catch basins, storm drains, or other drainageways have not been associated with the site.

Soil and Geology

SWMU 57 is underlain by Braddock loam soil. This soil has moderate permeability and is acidic-to-strongly acidic (IT 2001a). SSP boring 57SB4 completed inside the former lagoon refused at 1.5 ft bgs after penetrating clayey soil. Borings 57SB1, 57SB2, 57SB3 completed outside of the fenced area to the depth of groundwater (up to 36 ft) indicate that the site is underlain by 36 ft + of unconsolidated soil (alluvial terrace deposits). This soil consists of interbedded clay (CL or CH) and silty/clayey sand (SM/SC), with silty gravel present in the bottom six feet of the deepest boring (57SB2). Physical testing of two representative soil samples at the site above the silty gravel indicated acidic CL and CH soil, with organic content in the range of 2.6 to 3.6%, and a vertical hydraulic conductivity of 1.8E-07 cm/sec for the CH sample (Table 3-1).

Groundwater

An unconfined aquifer occurs within the lower portion of unconsolidated alluvial terrace deposits underlying the site; groundwater is also present within the underlying bedrock. Groundwater was encountered at depths of 21.5 ft bgs (57SB1) to 35.5 ft bgs (57SB2). The groundwater depth below the

SWMU is approximately 30 ft bgs. Based on local topography, groundwater flow in the site area is likely toward the north or northwest toward the base of the terrace and the New River.

7.2 SITE BACKGROUND - HISTORY

SWMU 57 is an inactive unit historically used as an acid-settling pond. RFAAP as-built drawings from 1954 and 1967 identify the site as the "Acid Settling Pool" with a diameter of approximately 50 ft and a capacity of 30,000 gallons. On the 1954 drawings, a six-inch diameter terra-cotta drainpipe is shown running to the "pond" from a four-inch Duriron® floor drain in the building south of the site. The floor drain is located near the Chromic Acid and Oakite 33 wash stations, and, reportedly, discharged chromic acid, hydraulic oil, Oakite-33, and zinc phosphate to the site (ATK, 2002). Oakite-33 is a mixture a phosphoric acid and butyl Cellosolve® used after 1974 as an acidic rust stripper to clean rocket encasements instead of the previously used chromic acid (Dames and Moore 1992b). At the time of the SSP site visit, the terra-cotta pipe was observed to be partially broken at one location near the "pond" and dry.

7.3 PREVIOUS INVESTIGATIONS

7.3.1 Verification Investigation – 1992

In 1992, Dames and Moore collected one sediment/surface water sample pair (57SE1/57SW1) from within the former lagoon for analysis of TAL metals, VOCs, and SVOCs (Figure 7-2). The sediment sample was also analyzed for TOC, total organic halogens, and pH.

VOCs and SVOCs were not detected in the surface water or sediment sample (Tables 7-1 and 7-2). TAL metals concentrations in the sediment did not exceed both their background point estimates and adjusted R-RBCs (or BTAG screening levels). Arsenic, chromium, iron, and manganese concentrations in the surface water sample were above their adjusted tap water RBCs (Table 7-2). Aluminum, chromium, copper, lead, and zinc concentrations in the surface water sample were above their Draft BTAG screening levels.

7.3.2 Review of EPIC Aerial Photo Assessment Report

Activity at SWMU 57 was first noted on a 1962 aerial photograph. The interpretation of the 1971 photograph indicated the presence of a "pond" containing liquid. This area remained unchanged through the 1986 photograph, although a drainageway extending from the "pond" to the New River was noted (USEPA 1992).

7.4 WORK PLAN DATA GAP ANALYSIS

The data gap analysis presented in Section 1.7.5 of WPA 016 indicated that limited soil sampling and analyses had occurred at SWMU 57 (URS 2003b). The following data gaps were identified:

- TCL VOCs - surface and subsurface soil;
- TCL SVOCs/PAHs - surface and subsurface soil;
- TCL PCBs and pesticides - surface soil;
- Explosives - surface and subsurface soil;
- TAL inorganics - surface and subsurface soil; and
- Site-specific physical soil testing data.

7.5 SSP FIELD ACTIVITIES

Three borings (57SB1, 57SB2, and 57SB3) were advanced outside of SWMU 57 and one soil boring (57SB4) was advanced within SWMU 57 to evaluate the presence or absence of chemicals in surface soil and subsurface soil (Figure 7-1). Except for 57SB4, which refused at 1.5 ft bgs, each boring was advanced to the depth of encountered groundwater using a tractor mounted, direct-push Geoprobe® unit. Discrete samples were collected from surface, intermediate, and terminal intervals for the three borings advanced outside the SWMU, and two samples were collected from the boring within the SWMU due to shallow refusal depth as summarized below.

SWMU 57 SSP Sample and Boring Information

Boring ID	Total Depth of Boring (ft bgs)	Surface Sample ID	Sample Depth (ft)	Intermediate Sample ID	Sample Depth (ft)	Terminal Sample ID	Sample Depth (ft)
57SB1	24.0	57SB1A	0.0 - 1.0	57SB1B	10.0 - 12.0	57SB1C	18.0 - 20.0
57SB2	36.0	57SB2A	0.0 - 1.0	57SB2B	8.0 - 12.0	57SB2C	33.0 - 35.0
57SB3	34.5	57SB3A	0.0 - 1.0	57SB3B	14.0 - 16.0	57SB3C	29.0 - 31.0
57SB4	1.5	57SB4A	0.5	57SB4B	1.5	Not Collected	--

Soil samples were analyzed for TCL VOCs, TCL SVOCs, PAHs, explosives (including nitroglycerin and PETN), and TAL inorganics. Surface soil sample 57SB4A was also analyzed for TCL pesticides, TCL PCBs, and TCL herbicides. SSP analytical results (detected chemicals) are summarized in Table 7-3.

Two soil samples were collected from 57SB2 (7.5-8.0 ft bgs) and 57SB3 (16.5-17.0 ft bgs) for physical testing including: percent moisture, grain size, pH, TOC, specific gravity, and bulk density. Additional physical testing was conducted on sample 57SB3 including: Atterberg limits, hydrometer analysis, and hydraulic conductivity. Analytical results for these samples are summarized in Table 3-1 and the complete results are presented in Appendix E.

Slight deviations to WPA 016 were necessary to adjust to field conditions encountered at the site. The fence located outside the berm prevented the Geoprobe® unit from gaining access for boring 57SB4 in the interior of the former lagoon; therefore, this boring was advanced using a hand auger. Hand auger refusal occurred at a shallow depth (1.5 ft bgs) at multiple locations, and therefore, two soil samples were collected from 57SB4 instead of three.

7.6 HUMAN HEALTH RISK SCREENING

7.6.1 Identification of COPCs and Cumulative Risk Screen

Tables 7-4 and 7-5 present the results of the COPC evaluations for surface soil and total soil, respectively. COPCs identified for surface soil and total soil included:

- *TAL metals:* aluminum (NSV), antimony, arsenic, cadmium, chromium, cobalt (NSV), iron, manganese, and vanadium.
- *VOC TICs:* 1 compound (NSV);
- *TCL SVOCs:* 4-chloro-3-methylphenol (NSV) and benzo(a)pyrene; and
- *SVOC TICs:* 14 compounds (NSVs) for surface soil and 20 compounds (NSVs) for total soil.

7.6.2 Cumulative Risk Screen

Table 7-6 presents the results of the cumulative risk screening for surface soil. Tables 7-7 and 7-8 present the results of the risk screening for total soil. A summary of the screening results is presented below:

Cumulative Human Health Risk Screening Results for SWMU 57

	Surface Soil			Total Soil		
Residential Excess Cancer Risk	Fail	1.E-05	Arsenic, benzo(a)pyrene	Fail	1.E-05	Arsenic, benzo(a)pyrene
Industrial Excess Cancer Risk	Pass	3.E-06	--	Pass	3.E-06	--
Residential Noncarcinogenic	Fail	12	Sb, As, Cd, Cr, Fe, Mn, V	Fail	6	Sb, As, Cd, Cr, Fe, Mn, V
Industrial Noncarcinogenic	Pass	0.9	--	Pass	0.4	--

The cumulative human health risk screens failed for residential surface soil (carcinogenic and noncarcinogenic) and residential total soil (carcinogenic and noncarcinogenic). Cumulative risk screenings passed for industrial scenarios.

Noncarcinogenic residential cumulative risk screenings for surface soil and total soil resulted in HIs of 12 and 6, respectively, which exceeded the EPA target HI of 1. Due to multiple chemicals contributing to an HI greater than 1, the HIs have been segregated based on primary target organs for chronic exposure. The following tables present the results of the HI segregation using data obtained from Oak Ridge National Laboratory's RAIS, which includes data from various sources such as USEPA and the ATSDR:

HI Segregation for Target Organs – SWMU 57 – Surface Soil

Target Organ	Sb	As	Cd	Cr	Fe	Mn	V	Total HI
Skin	--	0.2	--	--	--	--	--	0.2
CNS	--	0.2	--	--	--	2	--	***2***
CV	--	0.2	--	--	3	--	--	***3***
Blood	--	--	--	--	--	--	1	***1***
Liver	--	--	--	--	3	--	--	***3***
Kidney	--	--	0.4	--	3	--	1	***4***
GI	3	--	--	2	--	--	1	***6***
Reproductive	--	--	--	--	--	2	--	***2***

HI segregation resulted in values equal to or higher than the cumulative SSP HI threshold of 0.5 for a target organ including: the CNS, CV, blood, liver, kidney, GI, and reproductive.

HI Segregation for Target Organs – SWMU 57 – Total Soil

Target Organ	Sb	As	Cd	Cr	Fe	Mn	V	Total HI
Skin	--	0.3	--	--	--	--	--	0.3
CNS	--	0.3	--	--	--	0.9	--	***1***
CV	--	0.3	--	--	2	--	--	***2***
Blood	--	--	--	--	--	--	0.9	***0.9***
Liver	--	--	--	--	2	--	--	***2***
Kidney	--	--	0.2	--	2	--	0.9	***3***
GI	0.2	--	--	0.7	--	--	0.9	***2***
Reproductive	--	--	--	--	--	0.9	--	***0.9***

HI segregation resulted in values equal to or higher than the cumulative SSP HI threshold of 0.5 for a target organ including: the CNS, CV, blood, liver, kidney, GI, and reproductive.

7.6.3 Lead and Iron Screening

The MDC for lead at the site was 222 mg/kg, which was below the action level of 400 mg/kg; therefore, further risk characterization for lead was not required.

Iron concentrations at the site for surface soil and total soil resulted in HQs greater than the iron SSP threshold HQ of 0.5 for the residential scenario, and therefore, the site required further characterization for iron through a margin of exposure evaluation. Appendix H presents the margin of exposure evaluation for surface soil and total soil. A summary of the results for SWMU 57 is presented below.

Iron Margin of Exposure Evaluation – Future Child Resident

	Surface Soil			Total Soil		
		Estimated Site Intake	Exposure Screening Level		Estimated Site Intake	Exposure Screening Level
RDA Screen (mg/day)	Fail	15.1	10	Fail	10.1	10
Provisional Reference Dose (RfD) Screen (mg/kg-day)	Fail	1.01	0.66	Fail	0.67	0.66

The site failed the margin of exposure evaluation for iron in soil.

7.6.4 Comparison to Generic SSLs

The MDC comparisons of subsurface soil to generic SSLs (DAF 20) for detected chemicals indicated that arsenic, chromium, manganese, bromodichloromethane, and chloroform exceeded their SSLs (Table 7-9).

The SSL exceedance for arsenic is not a concern because the detected concentration is below its background point estimates. Chromium exceeds its background point estimate and SSL in one terminal depth sample (57SB1C). Manganese exceeds its background point estimate and SSL in one intermediate sample (57SB2B).

Bromodichloromethane slightly exceeded its SSL of 1.1 µg/kg in sample 57SB2C, with an estimated concentration below the RL (1.2 µg/kg). Chloroform exceeded its SSL in one "B" sample and three "C" samples (Table 7-9).

7.6.5 Comparison to Site-Specific SSLs

The MDC for bromochloromethane was below the site-specific SSL calculated (6 µg/kg) using the average TOC value from the physical sample collected at the site during the SSP (Appendix F). Chloroform exceeded its site-specific SSL of 4 µg/kg in one "B" sample and two "C" samples (Appendix F).

7.6.6 COPC Comparison to Background

The comparison of MDCs for metals identified as COPCs in surface soil and total soil with their background point estimates resulted in background exceedances for cadmium, chromium, iron, and manganese (Table 7-10).

7.6.6.1 Human Health Risk Screening Summary

COPCs with screening values were limited to metals. The residential cumulative human health risk screens failed for surface soil (carcinogenic and noncarcinogenic) and total soil (carcinogenic and noncarcinogenic). Cumulative risk screenings for industrial scenarios passed.

Carcinogenic residential risk screening failed for surface soil and total soil primarily due to arsenic concentrations below the background point estimate. This screening result is not a concern given that: 1) the risk associated with background levels of arsenic contributes 90% of the cumulative risk of 1E-05, and 2) the other COPC for the site, benzo(a)pyrene, contributes negligible risk (1E-06 for surface soil and 5.E-07 for total soil).

Noncarcinogenic residential risk screening failed for surface soil primarily due to metals concentrations above background point estimates (HI of 7.4 due to cadmium, chromium, iron, and manganese) and antimony for which no background point estimate is available (HQ of 3.3).

Noncarcinogenic residential risk screening failed for total soil primarily due to metals concentrations above background point estimates (HI of 4.0 due to cadmium, chromium, iron, and manganese).

The site passed lead screening for soil. Surface soil and total soil failed the margin of exposure evaluation for iron.

Generic SSL exceedances were limited to bromodichloromethane, chloroform, arsenic, chromium, and manganese. Bromodichloromethane is not a concern because the detected concentration is below its calculated site-specific SSL. Chloroform exceeded its site-specific SSL in one intermediate sample and in three termination depth samples. The arsenic SSL exceedance is not a concern because its MDC is below the background point estimate. Chromium exceeded its SSL and its background point estimate in termination sample (57SB1C) collected immediately above encountered groundwater. Manganese exceeds its background point estimate and SSL in one intermediate sample (57SB2B).

7.7 ECOLOGICAL RISK SCREENING

7.7.1 Problem Formulation

7.7.1.1 Ecological Site Characterization

An overview of the site physiography, water resources, soil, and geology for the site is presented in Section 7.1. SWMU 57 is a 0.027-acre area (1,172 ft^2) consisting of an asphalt-lined former lagoon that provides minimal habitat value to wildlife potentially occurring in the area (photograph on page 7-1). A four-foot high chain-link fence encircles the site and a shallow, well-defined ditch surrounds the site and connects with a drainageway to the northwest. An asphalt road borders the site to the east and a network of process pipes and utility lines border the site to the west and north. A complex of buildings related to facility operations is located within 100 ft to the south of the area.

Observations made during the site reconnaissance indicate that an invasive hydrophytic vegetation community of cattail (*Typha sp*.) occurs within the site (photograph on page 7-1). In areas surrounding the former lagoon, vegetation is typical of maintained grass habitats observed elsewhere at RFAAP. Signs of chemical stress to vegetation were not observed during the reconnaissance.

The habitat could support some ecological use (i.e., shelter and foraging) by some smaller common species in the area. Given its limited size, restricted access by a chain-link fence, and frequent disturbance by facility operations on the adjacent asphalt road, few individuals would be expected to utilize the site for a lengthy period.

Threatened, rare, or endangered species were not observed during the site reconnaissance. These species are not likely to be present within the boundaries of the site. Threatened, rare, and endangered specifies information for RFAAP is discussed in Section 3.3.3.

7.7.2 Ecological Conceptual Site Model

The ECSM for SWMU 57 (and other terrestrial sites for the SSP) is presented on Figure 3-1. The limited area surrounding the former lagoon is typical mowed grass that occurs throughout the RFAAP facility. While this is a small area unlikely to support important populations of terrestrial receptors, individual receptors may traverse the area from time to time. Soil represents an unlikely but sole potential exposure medium to ecological receptors. Based on the site characterization and data, the following complete exposure pathway exists: terrestrial receptor exposure to surface soil.

Detected chemical occurrence and distribution table is presented in Table 7-11. In addition, Table 7-12 summarizes the nondetected chemicals for SWMU 57. Potential ecological receptors may be exposed to COPECs in soil through the following exposure routes:

- Direct contact/absorption from soil;
- Direct ingestion of soil;
- Incidental ingestion of soil; and
- Direct ingestion of biota with accumulated COPECs.

Receptors of concern selected for SWMU 57 include:

- Plants;
- Soil invertebrate/microbial community;
- Omnivorous birds (American Robin; *Turdus migratorius*);

- Carnivorous birds (Red-Tailed Hawk; *Buteo jamaicensis*);
- Herbivorous mammals (Meadow Vole; *Microtus pennsylvanicus*);
- Carnivorous mammals (Short-Tailed Shrew; *Blarina brevicauda*); and
- Omnivorous mammals (Red Fox; *Vulpes vulpes*).

Relevant assessment and measurement endpoints for the identified terrestrial receptors are presented in Section 3.3.6.1.

7.7.3 Preliminary Exposure Estimate and Risk Characterization

The preliminary exposure estimate and ecological effects evaluation considers the most conservative risk scenario. Highly conservative assumptions are used to estimate COPEC exposure to terrestrial receptors for pathways to be quantitatively evaluated. Conservative TRVs are used to evaluate the ecological effects of exposure using the two approaches discussed below.

7.7.3.1 Preliminary Exposure Estimate and Ecological Effects Evaluation

Direct Contact Approach

The MDCs for detected chemicals in soil are used as the preliminary exposure estimate concentrations to develop a conservative risk scenario for the direct contact pathway to soil invertebrates. Table 7-13 presents the preliminary exposure estimates for the direct contact approach.

Dose Rate Modeling Approach

In the dose rate modeling approach, detected bioaccumulative chemical MDCs, along with assumptions of maximum ingestion rate, minimum body weight, 100% area use, and 100% bioavailability are used in the conservative risk scenario as the preliminary exposure estimate for soil COPECs and compared to the calculated TRVs. MDCs used in the preliminary exposure estimate for soil COPECs are presented in Table 7-11.

7.7.3.2 Background Concentrations of Metals

Background point estimates for metals were incorporated in the ecological screening to assess site soil concentrations in the context of facility-wide background levels (IT 2001a). Essential nutrients, including calcium, magnesium, potassium, and sodium were not considered COPECs in the risk screening in accordance with the SSP (USEPA 2001a) and the MWP (URS 2003b). The results of the background comparison for SWMU 57 are provided in Table 7-14. The results of this comparison have been incorporated into the risk management decision and ecological summary.

7.7.3.3 Preliminary Risk Characterization

Terrestrial Plants

Qualitative characterization of vegetative communities common to grassed areas at RFAAP is provided in Section 3.3.7.4. Stressed or dead vegetation was not observed in the small area surrounding the lagoon in SWMU 57 during the site reconnaissance. This grass area is typical of regularly mowed areas at RFAAP.

Soil Invertebrates and Microbial Communities

Direct contact HQs calculated for soil invertebrates and microbial communities are presented in Table 7-13. Other potentially complete exposure pathways to soil invertebrate and microbial communities include direct ingestion of soil and biota. However, there is insufficient information to quantify these pathways, and while these pathways exist, they are likely secondary to the direct contact/absorption pathway and should not substantially alter the risk characterization.

Of the detected chemicals for which ecological screening values were available, the concentrations of aluminum, antimony, chromium, iron, manganese, mercury, vanadium, zinc, and cyanide resulted in HQ values that were greater than 1 (Table 7-13). However, MDCs for aluminum and vanadium were below their background point estimates (Table 7-14).

Terrestrial Wildlife

Quantitative risk characterization for terrestrial wildlife is limited to direct ingestion of biota and incidental ingestion of soil. The ECSM identifies a potentially complete direct contact exposure pathway to omnivorous birds, and herbivorous and carnivorous mammals; however, there is insufficient information to quantify this pathway. This pathway is likely secondary to the ingestion of biota and incidental ingestion of soil; therefore, it should not substantially alter the risk characterization.

The risk to each potential wildlife receptor at the site is presented in Table 7-15 and summarized as follows:

Receptor	NOAEL Only Exceedances	NOAEL and LOAEL Exceedances
American Robin	Aroclor 1254	cadmium, chromium, lead, selenium, zinc
Red-tailed Hawk	none	chromium, zinc
Meadow Vole	cadmium	none
Red Fox	arsenic, cadmium, selenium	mercury, zinc
Short-tailed Shrew	lead, mercury, selenium, Aroclor 1254	arsenic, cadmium, zinc

7.7.4 Refined Exposure Estimate, Ecological Effects Evaluation, and Risk Characterization

7.7.4.1 Refined Exposure Estimate and Ecological Effects Evaluation - Dose Modeling

The conservative assumptions used in the preliminary exposure estimate and ecological effects evaluation were replaced with more environmentally realistic assumptions resulting in a more realistic estimate of potential risk.

Refined exposure estimates and ecological effects were not developed for soil invertebrates and microbial communities because an appropriate 95% UCL could not be calculated using the surface soil data.

The refined exposure estimates and ecological effects were developed for wildlife receptors having complete exposure pathways to be quantitatively evaluated (i.e., omnivorous birds and carnivorous and herbivorous mammals). In the refined model, a realistic area use factor ($AF_{refined}$) was calculated as the ratio of the site area to the average home range of the receptor (Appendix I, Table I-16).

7.7.4.2 Refined Risk Characterization -Terrestrial Wildlife

The refined risk characterization for SWMU 57 is presented in Table 7-15 and summarized as follows:

Receptor	NOAEL Only Exceedances	NOAEL and LOAEL Exceedances	COPECs Below Background Point Est.
American Robin	cadmium (8.8) lead (8.1)	chromium (12.3/2.5)* zinc (14.2/1.6)	none
Red-tailed Hawk	none	none	n/a
Meadow Vole	none	none	n/a
Red Fox	none	none	n/a
Short-tailed Shrew	arsenic (4.9) cadmium (6.6)	none	arsenic

*Note: (12.3/2.5) = NOAEL-based HQ/LOAEL-based HQ

7.7.4.3 Exposure and Risk Uncertainty Analysis

Potential risk and exposure uncertainty is discussed in Section 3.3.9. While factors such as the lack of TSVs and wildlife profile assumptions may create limited uncertainty, the very small size and negligible habitat quality of the site in combination with these limited uncertainties has produced a conservative assessment of potential ecological risks associated with SWMU 57.

7.7.5 Ecological Risk Screening Summary

Based in the refined ecological risk screening, the information collected and presented indicates that a more thorough assessment is warranted for metals.

7.8 CONCEPTUAL SITE MODEL

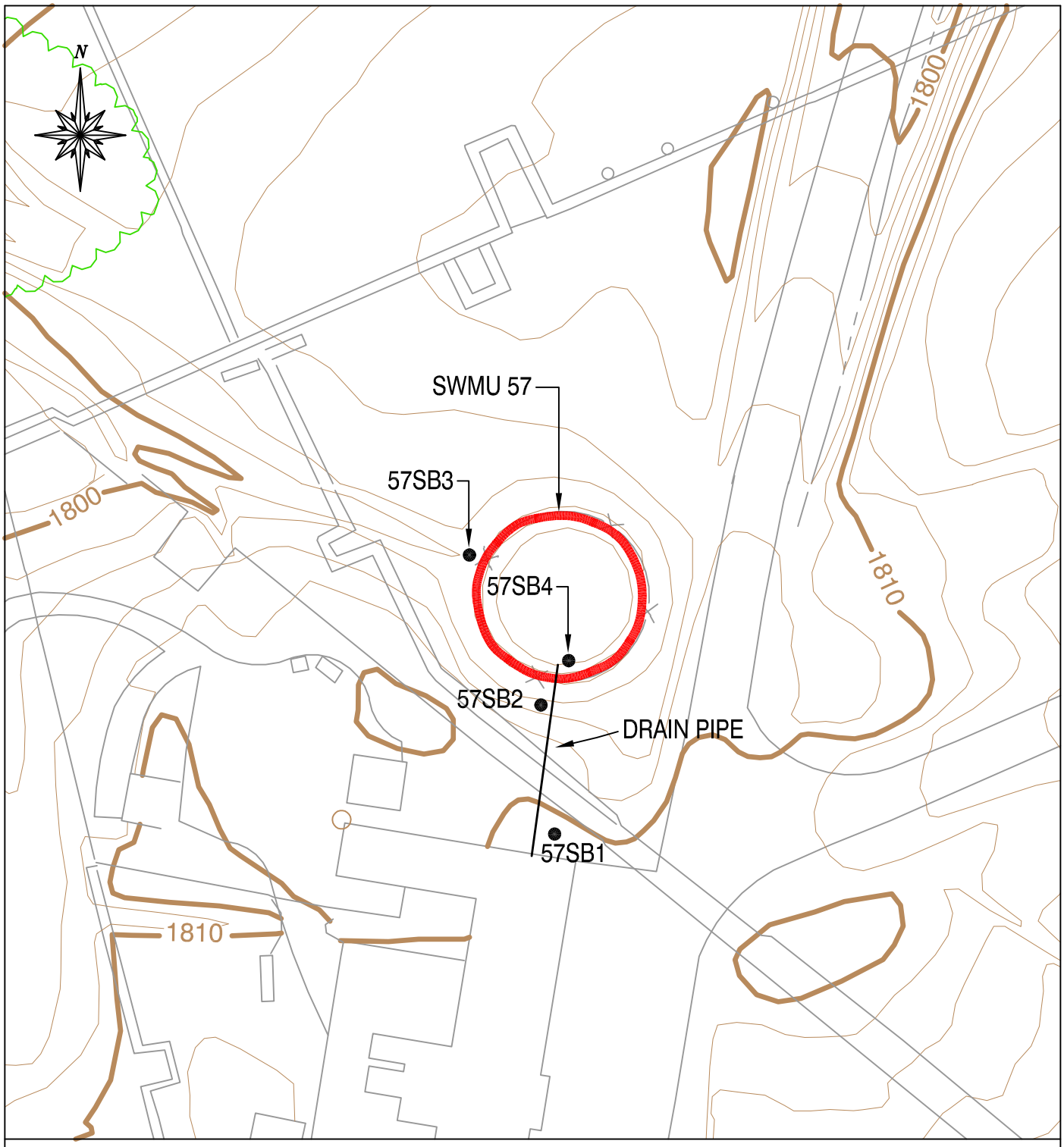
A refined CSM for SWMU 57 is presented on Figure 7-3. The site is a small former lagoon area enclosed by a fence and berm, which is located on a terrace in the HSA of RFAAP. Subsurface geology consists of alluvial deposits overlying carbonate bedrock of the Elbrook Formation. Groundwater is present within lower portion of the alluvial deposits (21 to 36 ft bgs) and in underlying bedrock. Based on local topography, groundwater flow is likely toward the north and northwest toward the New River.

Potentially affected media include surface soil, subsurface soil, and groundwater. Observations during the SSP site reconnaissance and subsequent field investigation did not indicate the presence of measurable surface water or sediment within the former lagoon area. The site is surrounded by a berm, which prevents surface water flow onto or off the site. COPCs identified in soil with screening values included metals.

Although current and likely future land-use scenarios are limited to industrial operations, both residential and industrial scenarios are evaluated for the SSP. The site is enclosed by a fence and the Installation is enclosed by a perimeter fence; therefore, potential receptors are limited to site workers (more conservative than trespasser scenario), future construction workers, and terrestrial biota (for area outside of site fence). Site workers and construction workers could contact surface soil inside and outside the site fence. Terrestrial biota could contact surface soil within the grass area outside of the fence. Leaching of chemicals is considered a potential release mechanism to subsurface soil that may be contacted by potential future construction workers. Leaching of chemicals is considered a potential release mechanism to groundwater.

7.9 RECOMMENDATION FOR FUTURE ACTION

The site is recommended for a focused RFI based on the failure of the residential risk screening, site-specific SSL exceedance for chloroform, the lack of groundwater data for the site, and the results of the ecological risk screening. The RFI will focus on metals and VOCs in soil and groundwater.



(SOURCE: MODIFIED FROM HERCULES, INC., 1992)

0 50'

1 inch = 50 feet

Legend

- Soil Sampling Location
- SWMU 57 Approximate Boundary
- Aboveground Piping
- Vegetation

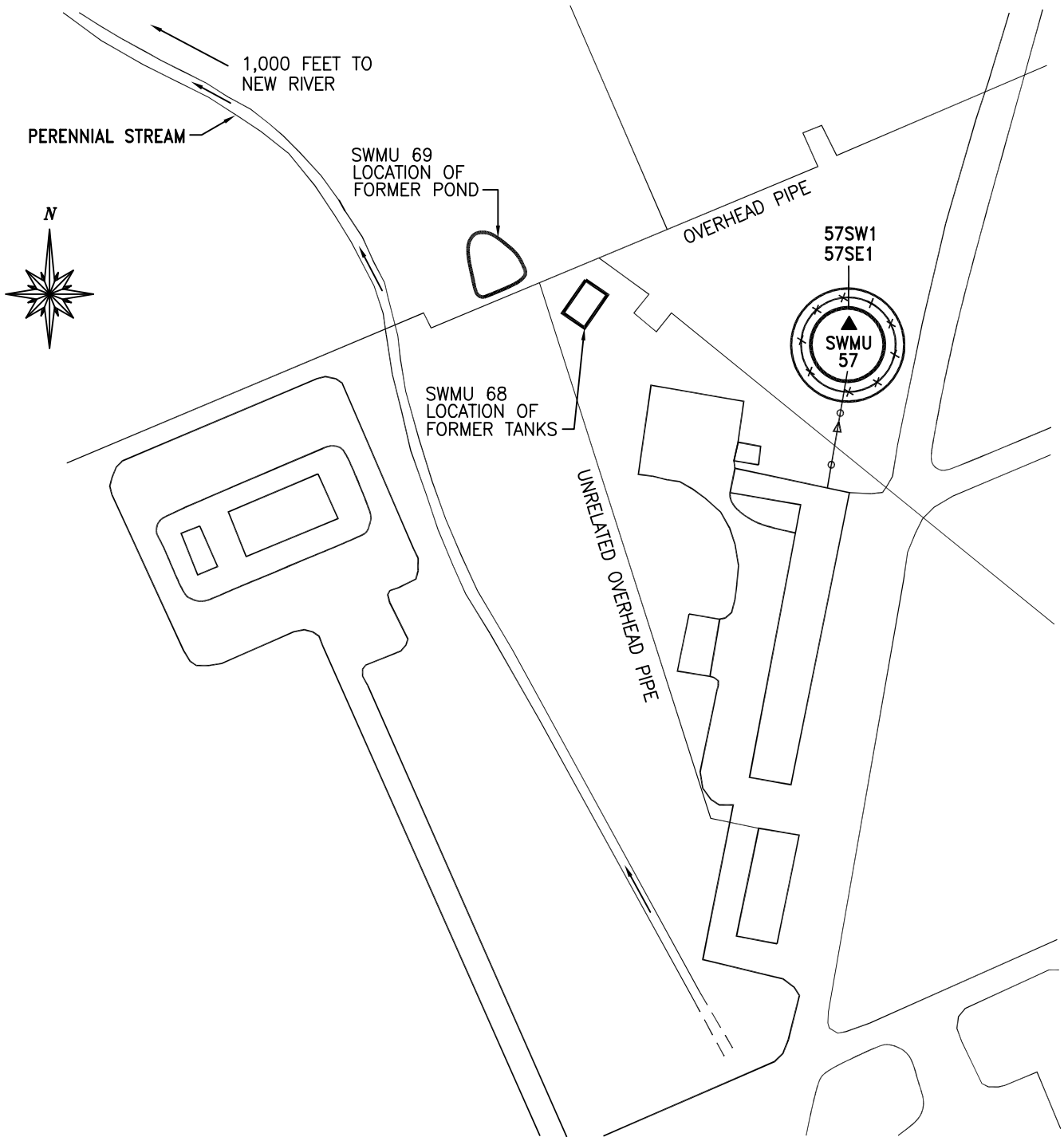
RFAAP

SSP REPORT

Date:	Prepared By:
June 2004	KDC/TDH
Scale:	File Name:
1"=50'	15900619

FIGURE 7-1

SSP SAMPLING LOCATION MAP SWMU 57



Legend

▲ Surface Water/Sediment Sample

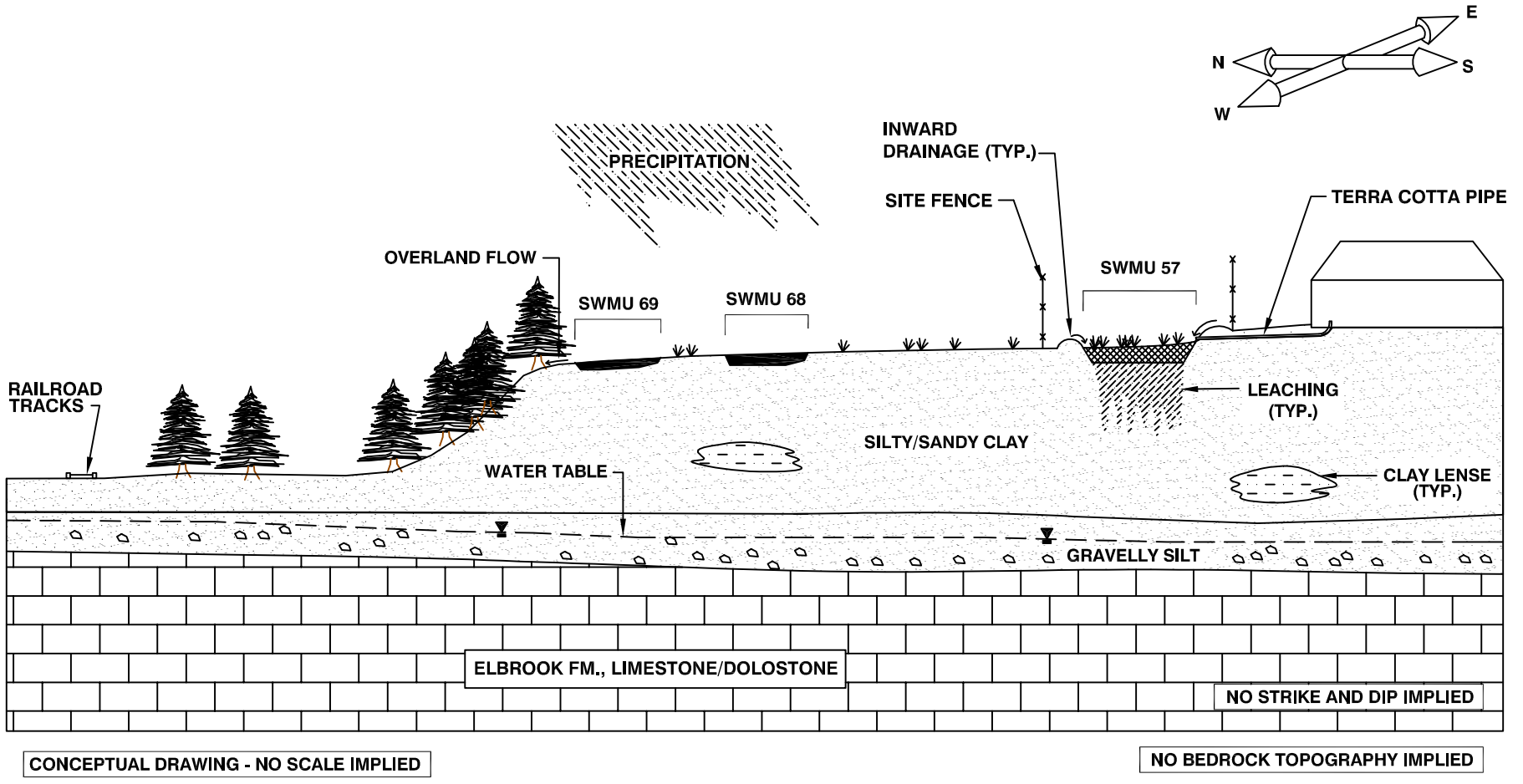
(SOURCE: MODIFIED FROM DAMES & MOORE, 1992a)

RFAAP
SSP REPORT

Date:	Prepared By:
June 2004	*KDC/TDH*
Scale:	**File Name:**
1"=200'	*15900619*

FIGURE 7-2

PREVIOUS INVESTIGATION SAMPLING LOCATIONS SWMU 57



RFAAP

SSP REPORT

Date:	Prepared By:
June 2004	*KDC/TDH*
Scale:	**File Name:**
Not to Scale	*15900619*

FIGURE 7-3

CONCEPTUAL SITE MODEL
SWMU 57

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Table 7-1
Summary of Analytical Data for Sediment Sample Collected at SWMU 57
Modified from Dames and Moore Verification Investigation Report
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

SITE ID FIELD ID SAMPLE DATE DEPTH (ft bgs) MATRIX UNITS	PQLs mg/kg	57SE1 RVFS*92 10-Feb-92 0.5 CSE mg/kg	Adjusted Soil Industrial RBC mg/kg	Adjusted Soil Residential RBC mg/kg	Draft BTAG Screening Level mg/kg	Facility-Wide Background Point Estimates [A] mg/kg
TAL Metals						
Aluminum	14.1	30,000	102,200	7,821	--	40,041
Arsenic	30	**4.66**	1.91	0.426	0.057	15.8
Barium	1	65.5	7,154	548	--	209
Calcium	100	30,800	--	--	--	--
Chromium[1]	4	42.5	307	23.5	0.005	65.3
Cobalt	3	4.71	2,044	156	--	72.3
Copper	7	12.9	4,088	313	34	53.5
Iron	1,000	24,400	30,660	2,346	--	50,962
Magnesium	50	18,500	--	--	--	--
Manganese[2]	0.275	126	2,044	156	--	2,543
Mercury[3]	0.1	0.142	30.7	2.35	0.15	0.13
Nickel	3	10.3	2,044	156	20.9	62.8
Potassium	37.5	785	--	--	--	--
Sodium	150	532B	--	--	--	--
Vanadium	0.775	85	102	7.8	--	108
Zinc	30.2	61.6	30,660	2,346	150	202

Notes:
BTAG = USEPA Region III Draft, Biological Technical Assistance Group Screening Level
CSE = Chemical Sediment
ft bgs = Feet below ground surface
mg/kg = Milligrams per kilogram
PQL = Practical quantitation limit; the lowest concentration that can be reliably detected at a defined level of precision for a given analytical method
RBC = Risk-Based Concentration
USEPA = United States Environmental Protection Agency
USEPA Region III Risk-Based Concentration (RBC) values from the April 14, 2004, RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
TAL = Target Analyte List
[A] = Facility-Wide Background Point Estimate as Reported in the Facility-Wide Background Study Report (IT 2001a)
[1] = Chromium VI RBC value was used
[2] = Manganese-nonfood RBC value was used
[3] = Mercuric chloride RBC value was used

bold = Concentration exceeds Industrial RBC

= Concentration exceeds Residential RBC

= Concentration exceeds BTAG Screening Level

underline = Concentration exceeds Facility-Wide Background Point Estimate

Table 7-2
Summary of Analytical Data for Surface Water Sample Collected at SWMU 57
Modified from Dames and Moore Verification Investigation Report
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

SITE ID FIELD ID SAMPLE DATE DEPTH (ft bgs) MATRIX UNITS	PQLs µg/L	57SW1 RVFS*92 10-Feb-92 0.0 CSW µg/L	Adjusted Tap Water RBC µg/L	MCL µg/L	Draft BTAG Screening Level µg/L
TAL Metals					
Aluminum	141	871	3,650	--	25
Arsenic	10	6.29	0.045	10	48
Barium	20	23.1	256	2,000	10,000
Calcium	500	16,700	--	--	--
Chromium(1)	10	15.9	11.0	100	2
Copper	60	11.8	146	1,300 (AL)	6.5
Iron	38.1	2,750	1,100	--	320
Lead	10	14	--	15 (AL)	3.2
Magnesium	500	6,670	--	--	--
Manganese(2)	2.75	380	73	--	14,500
Potassium	375	8,850	--	--	--
Sodium	500	14,000	--	--	--
Zinc	50	155	1,095	--	30

Notes:

BTAG = USEPA Region III Draft, Biological Technical Assistance Group Screening Level

CSW = Chemical Surface Water

ft bgs = Feet below ground surface

MCL = Maximum Contaminant Level

PQL = Practical quanitation limit; the lowest concentration that can be reliably detected at a defined level of precision for a given analytical method

RBC = Risk-Based Concentration

USEPA = United States Environmental Protection Agency

USEPA Region III Risk-Based Concentration (RBC) values from the April 14, 2004, RBC Table

Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens

TAL = Target Analyte List

µg/L = Microgram Per Liter

(AL) = Action Level

(1) = Chromium VI RBC value used

(2) = Manganese-nonfood RBC value used

= Concentration exceeds Tap Water RBC

= Concentration exceeds MCL

= Concentration exceeds Draft BTAG Screening Level

Table 7-3
Detected Analytes for SWMU 57
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	SSL DAF 20	Draft BTAG Screening Level	57SB1A 10/7/2003 0-1		MDL	RL	57SB1B 10/7/2003 10-12		MDL	RL	57SB1C 10/7/2003 18-20		MDL	RL	57SB2A 10/7/2003 0-1		MDL	RL	57SB2B 10/7/2003 8-12		MDL	RL	57SB2C 10/7/2003 33-35		MDL	RL
								Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
TAL Metals (mg/kg)																															
Aluminum	7429-90-5	--	40,041	--	--	--	1	11,900		1.83	50	23,800		1.83	50	38,900		9.15	250	32,200		9.15	250	13,900		1.83	50	21,800		1.83	50
Antimony	7440-36-0	N	--	3.13	40.9	13.2	0.48	1.2		0.0518	0.5	0.21	J	0.0518	0.5	0.15	J	0.0518	0.5	3.6		0.0518	0.5	<0.5	U	0.0518	0.5	0.073	J	0.0518	0.5
Arsenic	7440-38-2	C	15.8	0.43	1.91	0.026	328	***1.6***		0.0232	0.4	***1.6***		0.0232	0.4	***3.1***		0.0232	0.4	***3.6***		0.0232	0.4	***1.1***		0.0232	0.4	***7.1***		0.0232	0.4
Barium	7440-39-3	N	209	1,564	20,440	6,015.2	440	99		0.106	5	56		0.106	5	73		0.106	5	80		0.106	5	39		0.106	5	42		0.106	5
Beryllium	7440-41-7	N	1.02	15.64	204.4	1,153.7	0.02	0.44	J,J,s	0.0391	1	0.58	J,J,s	0.0391	1	0.84	J,J,s	0.0391	1	0.48	J,J,s	0.0391	1	1.1	,J,s	0.0391	1	3.2	,J,s	0.0391	1
Cadmium	7440-43-9	N	0.69	3.91	51.1	27.4	2.5	1.5		0.182	1	2.8		0.182	1	4		0.182	1	6.7		0.182	1	0.46	J	0.182	1	1.3		0.182	1
Calcium	7440-70-2	--	--	--	--	--	--	4,440		16.6	250	1,030		16.6	250	<250	U	16.6	250	1,530		16.6	250	<250	U	16.6	250	207	J	16.6	250
Chromium[1]	7440-47-3	N	65.3	23.46	306.6	42.05	0.0075	20		0.912	5	28		0.912	5	***88***		0.912	5	***70***		0.912	5	9.3		0.912	5	33		0.912	5
Cobalt	7440-48-4	--	72.3	--	--	--	100	5.8	,J,s	0.208	1	8.7	,J,s	0.208	1	12	,J,s	0.208	1	6.1	,J,s	0.208	1	26	,J,s	0.208	1	19	,J,s	0.208	1
Copper	7440-50-8	N	53.5	312.86	4,088	10,518	15	4.9		0.368	1	13		0.368	1	28		0.368	1	18		0.368	1	15		0.368	1	23		0.368	1
Iron	7439-89-6	N	50,962	2,346	30,660	--	12	13,400		17.9	250	41,300		35.8	500	37,300		35.8	500	39,700		35.8	500	34,500		35.8	500	39,500		35.8	500
Lead[2]	7439-92-1	--	26.8	400	750	--	0.01	19		0.0218	1	29		0.0218	1	19		0.0218	1	49		0.0218	1	2.6		0.0218	1	9.8		0.0218	1
Magnesium	7439-95-4	--	--	--	--	--	4,400	2,700		3.21	250	1,430		3.21	250	5,120		3.21	250	1,560		3.21	250	487		3.21	250	22,300		3.21	250
Manganese	7439-96-5	N	2,543	156.43	2,044	951.9	330	699		0.264	5	264		0.264	5	354		0.264	5	361		0.264	5	***1,090***		1.32	25	632		0.264	5
Mercury[3]	7439-97-6	--	0.13	2.35	30.66	--	0.058	0.049	J	0.0077	0.1	0.035	J	0.0077	0.1	0.053	J	0.0077	0.1	0.16		0.0077	0.1	0.013	J	0.0077	0.1	<0.1	U	0.0077	0.1
Nickel	7440-02-0	N	62.8	156.43	2,044	--	2	6		0.0356	0.5	14		0.0356	0.5	18		0.0356	0.5	12		0.0356	0.5	11		0.0356	0.5	75		0.356	5
Potassium	7440-09-7	--	--	--	--	--	--	528	,J,s	5	100	1,240	,J,s	5	100	3,290	,J,s	5	100	968	,J,s	5	100	999	,J,s	5	100	4,570	,J,s	5	100
Selenium	7782-49-2	N	--	39.11	511	18.98	1.8	0.51	J	0.0502	1	0.33	J	0.0502	1	0.71	J	0.0502	1	0.69	J	0.0502	1	0.55	J	0.0502	1	0.75	J	0.0502	1
Silver	7440-22-4	N	--	39.11	511	31.03	0.0000098	0.054	J	0.0044	3	0.028	J	0.0044	3	0.11	J	0.0044	3	0.1	J	0.0044	3	0.034	J	0.0044	3	0.12	J	0.0044	3
Sodium	7440-23-5	--	--	--	--	--	--	33	J,B,p	8.92	100	74	J,B,p	8.92	100	343		8.92	100	312		8.92	100	161		8.92	100	84	J,B,p	8.92	100
Thallium	7440-28-0	N	2.11	0.55	7.2	3.6	0.001	0.17	J	0.027	0.5	0.18	J	0.027	0.5	0.24	J	0.027	0.5	0.25	J	0.027	0.5	0.11	J	0.027	0.5	0.18	J	0.027	0.5
Vanadium	7440-62-2	N	108	7.82	102.2	730.1	0.5	29		0.207	1	69		0.207	1	58		0.207	1	76		0.207	1	18		0.207	1	50		0.207	1
Zinc	7440-66-6	N	202	2,346	30,660	13,622	10	52		0.517	4	54		0.517	4	97		0.517	4	160		2.59	20	9.3		0.517	4	43		0.517	4
TCL Pesticides/PCBs (µg/kg)																															
Aroclor 1254 [4]	11097-69-1	C	--	1.6E+02	1.4E+03	1.1E+03	--	--				--				--				--				--				--			
TCL VOCs (µg/kg)																															
2-Butanone	78-93-3	N	--	4.7E+06	6.1E+07	2.9E+04	--	29		5.8	24	24	J	6.65	26	26	J	7.45	30	30		6.6	26	23	J	6.6	26	21	J	6.6	26
Acetone	67-64-1	N	--	7.0E+06	9.2E+07	2.2E+04	--	100	B,B,z	5.8	24	50	B,B,z	6.65	26	54	B,B,z	7.45	30	100	B,B,z	6.6	26	51	B,B,z	6.6	26	37	B,B,z	6.6	26
Bromodichloromethane	75-27-4	C	--	1.0E+04	4.6E+04	1.1E+00	450,000	<5.8	U	0.581	5.8	<6.7	U	0.666	6.7	<7.5	U	0.746	7.5	<6.6	U	0.661	6.6	<6.6	U	0.661	6.6	***1.2***	J	0.661	6.6
Chloroform	67-66-3	N	--	7.8E+04	1.0E+06	9.1E-01	300	<5.8	U	0.517	5.8	17		0.593	6.7	24		0.665	7.5	<6.6	U	0.589	6.6	<6.6	U	0.589	6.6	15		0.589	6.6
Ethylbenzene	100-41-4	N	--	7.8E+05	1.0E+07	1.5E+04	100	<5.8	U	0.491	5.8	<6.7	U	0.563	6.7	<7.5	U	0.63	7.5	<6.6	U	0.558	6.6	<6.6	U	0.558	6.6	<6.6	U	0.558	6.6
Methylene chloride	75-09-2	C	--	8.5E+04	3.8E+05	1.9E+01	300	3.6	J	3.26	24	5.3	J	3.74	26	6.4	J	4.19	30	6	J	3.71	26	4.9	J	3.71	26	4.8	J	3.71	26
Toluene	108-88-3	N	--	6.3E+05	8.2E+06	2.7E+04	100	<5.8	U	0.538	5.8	<6.7	U	0.617	6.7	<7.5	U	0.691	7.5	<6.6	U	0.612	6.6	<6.6	U	0.612	6.6	<6.6	U	0.612	6.6
Trichloroethene	79-01-6	C	--	1.6E+03	7.2E+03	2.6E-01	300	<5.8	U	0.785	5.8	<6.7	U	0.9	6.7	<7.5	U	1.01	7.5	<6.6	U	0.894	6.6	<6.6	U	0.894	6.6	<6.6	U	0.894	6.6
VOC TICs (µg/kg)																															
Hexanal	--	--	--	--	--	--	--	7	E,NJ,t	0	1	--				--				28	E,NJ,t	0	1	--				--			
TCL SVOCs (µg/kg)																															
2-Methylnaphthalene	91-57-6	N	--	3.1E+04	4.1E+05	4.4E+03	--	<200	U	3.29	200	<220	U	3.56	220	<260	U	4.11	260	<220	U	3.56	220	<220	U	3.56	220	<220	U	3.56	220
4-Chloro-3-Methylphenol	59-50-7	--	--	--	--	--	--	23	J,B,x	6.25	200	29	J	6.77	220	44	J	7.82	260	19	J,B,x	6.77	220	16	J,B,x	6.77	220	<220	U	6.77	220
Acenaphthylene [5]	208-96-8	N	--	2.3E+05	3.1E+06	--	100	<200	U	1.8	200	<220	U	1.95	220	<260	U	2.25	260	2	J,J,l	1.95	220	<220	U	1.95	220	<220	U	1.95	220
Acetophenone	98-86-2	N	--	7.8E+05	1.0E+07	3.2E+03	--	<200	U	2.28	200	<220	U	2.47	220	<260	U	2.85	260	<220	U	2.47	220	<220	U	2.47	220	<220	U	2.47	220
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	100	<200	U	5.54	200	<220	U	6.01	220	<260	U	6.93	260	<220	U	6.01	220	<220	U	6.01	220	<220	U	6.01	220
Benzo(a)pyrene	50-32-8	C	--	2.2E+01	3.9E+02	1.2E+02	100	12	J	6.85	200	<220	U	7.42	220	<260	U	8.57	260	30	J	7.42	220	<220	U	7.42	220	<220	U	7.42	220
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	100	23	J	11.7	200	<220	U	12.7	220	<260	U	14.6	260	55	J,J,l	12.7	220	<220	U	12.7	220	<220	U	12.7	220
Benzo(g,h,i)perylene [5]	191-24-2	N	--	2.3E+05	3.1E+06	--	100	<200	U	10.5	200	<220	U	11.3	220	<260	U	13.1	260	<220	U	11.3	220	<220	U	11.3	220	<220	U	11.3	220
Bis(2-ethylhexyl)phthalate	117-81-7	C	--	4.6E+04	2.0E+05	2.9E+06	--	27	J	2.48	200	22	J	2.69	220	63	J	3.11	260	62	J,B,z	2.69	220	20	J	2.69	220	48	J,B,z	2.69	220
Butylbenzylphthalate	85-68-7	N	--	1.6E+06	2.0E+07	1.7E+07	--	<200	U	5.38	200	10	J	5.82	220	30	J	6.72	260	44	J	5.82	220	<220	U	5.82	220	<220	U	5.82	220
Caprolactam	105-60-2	N	--	3.9E+06	5.1E+07	--	--	15	J	7.66	400	11	J	8.29	430	36	J	9.57	500	<430	U	8.29	430	<430	U	8.29	430	<430	U	8.29	430
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	100	17	J	12.2	200	<220	U	13.3	220	<260	U	15.3	260	<220	U	13.3	220	<220	U	13.3	220	<220	U	13.3	220
Diethylphthalate	84-66-2	N	--	6.3E+06	8.2E+07	4.5E+05	--	8	J,B,x	2.28	200	10	J,B,x	2.47	220	12	J,B,x	2.85	260	7	J,B,x	2.47	220	12	J,B,x	2.47	220	5	J,B,x	2.47	220
Di-n-butylphthalate	84-74-2	N	--	7.8E+05	1.0E+07	5.0E+06	--	330		4.58	200	430		4.97	220	410		5.73	260	55	J,B,z	4.97	220	44	J	4.97	220	38	J,B,z	4.97	220
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	100	30	J	2.82	200	<220	U	3.06	220	<260	U	3.53	260	26	J	3.06	220	<220	U	3.06	220	<220	U	3.06	220
Fluorene	86-73-7	N	--	3.1E+05	4.1E+06	1.4E+05	100	<200	U	2.02	200	<220	U	2.18	220	<260	U	2.52	260	<220	U	2.18	220	<220	U	2.18	220	<220	U	2.18	220
Indeno(1,2,3-cd)pyrene	193-39-5	C	--	2.2E+02	3.9E+03	4.2E+03	100	7	J	4.7	200	<220	U	5.1	220	<260	U	5.88	260	42	J,J,l	5.1	220	<220	U	5.1	220	<220	U	5.1	220
Naphthalene	91-20-3	N	--	1.6E+05	2.0E+06	1.5E+02	100	<200	U	3.3	200	<220	U	3.58	220	<260	U	4.13	260	<220	U	3.58	220	<220	U	3.58	220	<220	U	3.58	220
Phenanthrene [5]	85-01-8	N	--	2.3E+05	3.1E+06	--	100	13	J	2.76	200	<220	U	2.99	220	<260	U	3.45	260	18	J	2.99	220	<220	U	2.99	220	<220	U	2.99	220
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	100	29	J	1.78	200	<220	U	1.92	220	<260	U	2.22	260	38	J	1.92	220	<220	U	1.92	220	<220	U	1.92	220
SVOC TICs (µg/kg)																															
(Z)-9-Octadecenamide	301-02-0	--	--	--	--	--	--	--				810	E,NJ,t	0	100	79	E,NJ,t	0	100	--				--				80	E,NJ,t	0	100
1-Heptadecanol	1454-85-9	--	--	--	--	--	--	--				--				--				--				--				--			
1-Hexadecanol	36653-82-4	--	--	--	--	--	--	--				--				--				--				--				31	E,NJ,t	0	100
1-Octadecanol	112-92-5	--	--	--	--	--	--	--				--				--				--				--				--			
1-Pentadecanol	629-76-5	--	--	--	--	--	--	--				--				--				--				--				52	E,NJ,t	0	10
1,1'-Biphenyl, 2,3,3',4,4'-pentachloro-	32598-14-4	--	--	--	--	--	--	--				--				--				--				--				--			
1,2-Benzenedicarboxylicacid, bis(2-methy	84-69-5	--	--	--	--	--	--	440	E,NJ,t	0	100	540	E,NJ,t	0	100	--				--				38	E,B,x	0	100	--			
1,2-Benzenedicarboxylic acid, butyl 2-me	17851-53-5	--	--	--	--	--	--	--				--				--				51	E,NJ,t	0	10	--				--			
1,2-Benzenedicarboxylic acid, butyl 8-me	89-18-9	--	--	--	--	--	--	--				--				--				--				--				34	E,NJ,t	0	50
1,2-Benzenedicarboxylic acid, butyl cycl	84-64-0	--	--	--	--	--	--	--				--				470	E,NJ,t	0	1	--				--				--			
2(5H)-Furanone, 5,5-dimethyl-	20019-64-1	--	--	--	--	--	--	260	E,NJ,t	0	100	--				--				--				--				--			
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	--	--	--	--	--	--	94	E,NJ,t	0	100	130	E,NJ,t	0	100	--				--				68	E,NJ,t	0	100	--			
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,	10001-439-24	--	--	--	--	--	--	--				--				--				--				--				--			

Table 7-3
Detected Analytes for SWMU 57
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	SSL DAF 20	Draft BTAG Screening Level	57SB1A 10/7/2003 0-1		MDL	RL	57SB1B 10/7/2003 10-12		MDL	RL	57SB1C 10/7/2003 18-20		MDL	RL	57SB2A 10/7/2003 0-1		MDL	RL	57SB2B 10/7/2003 8-12		MDL	RL	57SB2C 10/7/2003 33-35		MDL	RL
								Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
Bis(2-ethylhexyl)maleate	142-16-5	--	--	--	--	--	--	--				--				120	E,NJ,t	0	100	--				--				--			
Erucylamide	112-84-5	--	--	--	--	--	--	--				--				--				600	E,B,x	0	10	--				330	E,B,x	0	10
Oxirane, hexadecyl-	7390-81-0	--	--	--	--	--	--	--				--				--				--				--				--			
Phenol, (1,1,3,3-tetramethylbutyl)-	27193-28-8	--	--	--	--	--	--	--				--				--				--				--				--			
Phosphoric acid, tris (3-methylphenyl) e	78-30-8	--	--	--	--	--	--	--				--				--				--				--				--			
Phsophoric acid, tris(3-methylphenyl) es	563-04-2	--	--	--	--	--	--	--				--				--				--				--				--			
Stearic Acid	57-11-4	--	--	--	--	--	--	--				64	E,NJ,t	0	1	110	E,NJ,t	0	1	--				--				--			
PAHs (µg/kg)																															
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	100	1.9	J,L,s	0.84	24	<28	U,UL,s	0.91	28	<31	U	1.05	31	1.5	J	0.91	28	<28	U	0.91	28	<28	U,UL,s	0.924	28
Benzo(a)anthracene	56-55-3	C	--	2.2E+02	3.9E+03	4.8E+02	100	<24	U,UL,s	0.96	24	<28	U,UL,s	1.04	28	<31	U	1.2	31	7.1	J	1.04	28	<28	U	1.04	28	<28	U,UL,s	1.06	28
Benzo(a)pyrene	50-32-8	C	--	2.2E+01	3.9E+02	1.2E+02	100	18	J,L,s	1.2	24	<28	U,UL,s	1.3	28	<31	U	1.5	31	10	J	1.3	28	<28	U	1.3	28	<28	U,UL,s	1.32	28
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	100	14	J,L,s	1.56	24	<28	U,UL,s	1.69	28	<31	U	1.95	31	<28	U	1.69	28	<28	U	1.69	28	<28	U,UL,s	1.72	28
Benzo(g,h,i)perylene [5]	191-24-2	N	--	2.3E+05	3.1E+06	--	100	27	,L,s	15	24	<28	U,UL,s	16.3	28	<31	U	18.8	31	<28	U	16.3	28	<28	U	16.3	28	<28	U,UL,s	16.5	28
Benzo(k)fluoranthene	207-08-9	C	--	2.2E+03	3.9E+04	1.5E+04	100	8.5	J,L,s	1.2	24	<28	U,UL,s	1.3	28	<31	U	1.5	31	<28	U	1.3	28	<28	U	1.3	28	<28	U,UL,s	1.32	28
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	100	11	J,L,s	1.44	24	<28	U,UL,s	1.56	28	<31	U	1.8	31	9.2	J	1.56	28	<28	U	1.56	28	<28	U,UL,s	1.58	28
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	100	57	,L,s	2.04	24	<28	U,UL,s	2.21	28	<31	U	2.55	31	29		2.21	28	<28	U	2.21	28	<28	U,UL,s	2.24	28
Indeno(1,2,3-cd)pyrene	193-39-5	C	--	2.2E+02	3.9E+03	4.2E+03	100	11	J,L,s	0.84	24	<28	U,UL,s	0.91	28	<31	U	1.05	31	7.2	J	0.91	28	<28	U	0.91	28	<28	U,UL,s	0.924	28
Phenanthrene [5]	85-01-8	N	--	2.3E+05	3.1E+06	--	100	24	,L,s	0.72	24	<28	U,UL,s	0.78	28	<31	U	0.9	31	11	J	0.78	28	<28	U	0.78	28	<28	U,UL,s	0.792	28
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	100	82	,L,s	1.08	24	<28	U,UL,s	1.17	28	<31	U	1.35	31	20	J	1.17	28	<28	U	1.17	28	<28	U,UL,s	1.19	28
Cyanide (mg/kg)																															
Cyanide	57-12-5	N	--	1.6E+02	2.0E+03	1.5E+02	0.005	0.1	J	0.0356	0.5	<0.5	U	0.0356	0.5	<0.5	U	0.0356	0.5	0.09	J	0.0356	0.5	0.08	J	0.0356	0.5	<0.5	U	0.0356	0.5
Percent Solids (%)																															
Percent Solids	--	--	--	--	--	--	--	86		0.1	0.1	75		0.1	0.1	67		0.1	0.1	76		0.1	0.1	76		0.1	0.1	76		0.1	0.1

Table 7-3
Detected Analytes for SWMU 57
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	SSL DAF 20	Draft BTAG Screening Level	57SB3A 10/7/2003 0-1		MDL	RL	57SB3A-DUP(SBD6) 10/7/2003 0-1		MDL	RL	57SB3B 10/7/2003 14-16		MDL	RL	57SB3C 10/7/2003 29-31		MDL	RL	57SB4A 10/7/2003 0.5		MDL	RL	57SB4B 10/7/2003 1.5		MDL	RL
								Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
TAL Metals (mg/kg)																															
Aluminum	7429-90-5	--	40,041	--	--	--	1	28,900		9.15	250	33,000		9.15	250	37,400		9.15	250	29,600		9.15	250	30,100		9.15	250	33,300		9.15	250
Antimony	7440-36-0	N	--	3.13	40.9	13.2	0.48	***102***		1.3	0.5	***104***		1.3	0.5	0.29	J	0.0518	0.5	<0.5	U	0.0518	0.5	6.3		0.0518	0.5	9.7		0.0518	0.5
Arsenic	7440-38-2	C	15.8	0.43	1.91	0.026	328	***5.1***		0.0232	0.4	***5.3***		0.0232	0.4	***12***		0.0232	0.4	***5.9***		0.0232	0.4	***4.7***		0.0232	0.4	***2***		0.0232	0.4
Barium	7440-39-3	N	209	1,564	20,440	6,015.2	440	107	,J,f	0.106	5	154	,J,f	0.106	5	62		0.106	5	52		0.106	5	149		0.106	5	51		0.106	5
Beryllium	7440-41-7	N	1.02	15.64	204.4	1,153.7	0.02	0.45	J,J,s	0.0391	1	0.39	J,J,s	0.0391	1	1.4	,J,s	0.0391	1	2	,J,s	0.0391	1	0.6	J,J,s	0.0391	1	0.45	J	0.0333	1
Cadmium	7440-43-9	N	0.69	3.91	51.1	27.4	2.5	27	,J,f	0.182	1	***41***	,J,f	0.182	1	1.2		0.182	1	0.87	J	0.182	1	1.5		0.182	1	1.6		0.182	1
Calcium	7440-70-2	--	--	--	--	--	--	1,750	,J,f	16.6	250	2,760	,J,f	16.6	250	<250	U	16.6	250	294		16.6	250	1,420		16.6	250	372	,J,m	16.6	250
Chromium[1]	7440-47-3	N	65.3	23.46	306.6	42.05	0.0075	***268***	,J,f	4.56	25	***454***	,J,f	4.56	25	***43***		0.912	5	31		0.912	5	***43***		0.912	5	***45***	,J,m	0.912	5
Cobalt	7440-48-4	--	72.3	--	--	--	100	75	,J,s	0.208	1	8	,J,s	0.208	1	23	,J,s	0.208	1	18	,J,s	0.208	1	9.7	,J,s	0.208	1	13	,J,s	0.208	1
Copper	7440-50-8	N	53.5	312.86	4,088	10,518	15	27		0.368	1	38		0.368	1	38		0.368	1	17		0.368	1	26		0.368	1	18	,J,s	0.368	2
Iron	7439-89-6	N	50,962	2,346	30,660	--	12	47,100		35.8	500	46,500		71.6	1000	53,400		71.6	1000	35,200		35.8	500	78,700		71.6	1000	59,000		42.4	200
Lead[2]	7439-92-1	--	26.8	400	750	--	0.01	175		0.545	25	268		1.09	50	19		0.0218	1	9.2		0.0218	1	19		0.0218	1	18		0.0218	1
Magnesium	7439-95-4	--	--	--	--	--	4,400	1,420		3.21	250	1,990		3.21	250	4,280		3.21	250	35,000		16.1	1250	923		3.21	250	971	,J,m	3.21	250
Manganese	7439-96-5	N	2,543	156.43	2,044	951.9	330	544		0.264	5	514		0.264	5	518		0.264	5	828		0.264	5	***3,200***		1.32	25	273		0.264	5
Mercury[3]	7439-97-6	--	0.13	2.35	30.66	--	0.058	0.11		0.0077	0.1	0.13		0.0077	0.1	0.023	J	0.0077	0.1	<0.1	U	0.0077	0.1	0.14		0.0077	0.1	0.041	J	0.0077	0.1
Nickel	7440-02-0	N	62.8	156.43	2,044	--	2	13		0.0356	0.5	14		0.0356	0.5	28		0.0356	0.5	50		0.0356	0.5	8.7		0.0356	0.5	12		0.0356	0.5
Potassium	7440-09-7	--	--	--	--	--	--	967	,J,s	5	100	1,060	,J,s	5	100	3,020	,J,s	5	100	5,900	,J,s	5	100	908	,J,s	5	100	1,080		5	100
Selenium	7782-49-2	N	--	39.11	511	18.98	1.8	0.57	J	0.0502	1	0.64	J	0.0502	1	0.55	J	0.0502	1	0.88	J	0.0502	1	0.57	J	0.0502	1	0.4	J	0.0502	1
Silver	7440-22-4	N	--	39.11	511	31.03	0.0000098	0.11	J	0.0044	3	0.15	J	0.0044	3	0.11	J	0.0044	3	0.15	J	0.0044	3	0.076	J	0.0044	3	0.063	J	0.0044	3
Sodium	7440-23-5	--	--	--	--	--	--	76	J,B,p	8.92	100	97	J,B,p	8.92	100	339		8.92	100	169		8.92	100	127		8.92	100	497		18.1	100
Thallium	7440-28-0	N	2.11	0.55	7.2	3.6	0.001	0.24	J	0.027	0.5	0.24	J	0.027	0.5	0.28	J	0.027	0.5	0.22	J	0.027	0.5	0.3	J	0.027	0.5	0.18	J,B,x	0.027	0.5
Vanadium	7440-62-2	N	108	7.82	102.2	730.1	0.5	69		0.207	1	67		0.207	1	59		0.207	1	59		0.207	1	84		0.207	1	66		0.207	1
Zinc	7440-66-6	N	202	2,346	30,660	13,622	10	895	,J,f	5.17	40	1,370	,J,f	12.9	100	53		0.517	4	52		0.517	4	281		2.59	20	88		0.517	4
TCL Pesticides/PCBs (µg/kg)																															
Aroclor 1254 [4]	11097-69-1	C	--	1.6E+02	1.4E+03	1.1E+03	--	--				--				--				--				12	J,J,g	4.2	46	--			
TCL VOCs (µg/kg)																															
2-Butanone	78-93-3	N	--	4.7E+06	6.1E+07	2.9E+04	--	28		6.5	26	32		6.6	26	29	J	7.95	32	25	J	6.65	26	30		7.05	14	27	J	6.75	28
Acetone	67-64-1	N	--	7.0E+06	9.2E+07	2.2E+04	--	99	B,B,z	6.5	26	160	,B,z	6.6	26	77	B,B,z	7.95	32	55	B,B,z	6.65	26	55	B,B,z	7.05	14	66	B,B,z	6.75	28
Bromodichloromethane	75-27-4	C	--	1.0E+04	4.6E+04	1.1E+00	450,000	<6.5	U	0.651	6.5	<6.6	U	0.661	6.6	<7.9	U	0.797	7.9	<6.7	U	0.666	6.7	<7	U	0.706	7	<6.8	U	0.676	6.8
Chloroform	67-66-3	N	--	7.8E+04	1.0E+06	9.1E-01	300	<6.5	U	0.58	6.5	<6.6	U	0.589	6.6	<7.9	U	0.709	7.9	***1.1***	J	0.593	6.7	<7	U	0.629	7	<6.8	U	0.602	6.8
Ethylbenzene	100-41-4	N	--	7.8E+05	1.0E+07	1.5E+04	100	0.66	J	0.55	6.5	<6.6	U	0.558	6.6	<7.9	U	0.673	7.9	<6.7	U	0.563	6.7	<7	U	0.596	7	<6.8	U	0.571	6.8
Methylene chloride	75-09-2	C	--	8.5E+04	3.8E+05	1.9E+01	300	6.5	J	3.65	26	4.3	J	3.71	26	6.8	J	4.47	32	5.4	J	3.74	26	<7	U	3.96	7	<28	U	3.79	28
Toluene	108-88-3	N	--	6.3E+05	8.2E+06	2.7E+04	100	1.3	J	0.603	6.5	2.6	J	0.612	6.6	<7.9	U	0.738	7.9	<6.7	U	0.617	6.7	<7	U	0.654	7	<6.8	U	0.626	6.8
Trichloroethene	79-01-6	C	--	1.6E+03	7.2E+03	2.6E-01	300	***1.9***	J	0.88	6.5	***1.6***	J	0.894	6.6	<7.9	U	1.08	7.9	<6.7	U	0.9	6.7	<7	U	0.955	7	<6.8	U	0.914	6.8
VOC TICs (µg/kg)																															
Hexanal	--	--	--	--	--	--	--	--				--				--				--				--				--			
TCL SVOCs (µg/kg)																															
2-Methylnaphthalene	91-57-6	N	--	3.1E+04	4.1E+05	4.4E+03	--	6	J	3.56	220	12	J	3.56	220	<270	U	4.38	270	<220	U	3.56	220	<240	U	3.84	240	<230	U	3.84	230
4-Chloro-3-Methylphenol	59-50-7	--	--	--	--	--	--	46	J	6.77	220	38	J	6.77	220	16	J,B,x	8.34	270	<220	U	6.77	220	17	J,B,x	7.29	240	18	J	7.29	230
Acenaphthylene [5]	208-96-8	N	--	2.3E+05	3.1E+06	--	100	4	J	1.95	220	9	J	1.95	220	<270	U	2.4	270	<220	U	1.95	220	<240	U	2.1	240	<230	U	2.1	230
Acetophenone	98-86-2	N	--	7.8E+05	1.0E+07	3.2E+03	--	36	J	2.47	220	75	J	2.47	220	<270	U	3.04	270	<220	U	2.47	220	<240	U	2.66	240	<230	U	2.66	230
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	100	<220	U	6.01	220	9	J	6.01	220	<270	U	7.39	270	<220	U	6.01	220	<240	U	6.47	240	<230	U	6.47	230
Benzo(a)pyrene	50-32-8	C	--	2.2E+01	3.9E+02	1.2E+02	100	12	J	7.42	220	20	J	7.42	220	<270	U	9.14	270	<220	U	7.42	220	<240	U	7.99	240	<230	U	7.99	230
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	100	20	J	12.7	220	35	J	12.7	220	<270	U	15.6	270	<220	U	12.7	220	<240	U	13.7	240	<230	U	13.7	230
Benzo(g,h,i)perylene [5]	191-24-2	N	--	2.3E+05	3.1E+06	--	100	<220	U	11.3	220	15	J	11.3	220	<270	U	14	270	<220	U	11.3	220	<240	U	12.2	240	<230	U	12.2	230
Bis(2-ethylhexyl)phthalate	117-81-7	C	--	4.6E+04	2.0E+05	2.9E+06	--	480		2.69	220	62	J	2.69	220	60	J,B,z	3.31	270	52	J,B,z	2.69	220	21	J,B,z	2.9	240	24	J,B,z	2.9	230
Butylbenzylphthalate	85-68-7	N	--	1.6E+06	2.0E+07	1.7E+07	--	<220	U	5.82	220	<220	U	5.82	220	<270	U	7.17	270	<220	U	5.82	220	<240	U	6.27	240	<230	U	6.27	230
Caprolactam	105-60-2	N	--	3.9E+06	5.1E+07	--	--	43	J	8.29	430	25	J	8.29	430	<530	U	10.2	530	<430	U	8.29	430	<460	U	8.93	460	<440	U	8.93	440
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	100	23	J	13.3	220	22	J	13.3	220	<270	U	16.3	270	<220	U	13.3	220	<240	U	14.3	240	<230	U	14.3	230
Diethylphthalate	84-66-2	N	--	6.3E+06	8.2E+07	4.5E+05	--	19	J,B,x	2.47	220	21	J,B,x	2.47	220	<270	U	3.04	270	7	J,B,x	2.47	220	11	J,B,x	2.66	240	6	J,J,l	2.66	230
Di-n-butylphthalate	84-74-2	N	--	7.8E+05	1.0E+07	5.0E+06	--	360		4.97	220	230		4.97	220	55	J,B,z	6.11	270	38	J,B,z	4.97	220	41	J,B,z	5.35	240	76	J,B,z	5.35	230
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	100	40	J	3.06	220	45	J	3.06	220	<270	U	3.76	270	<220	U	3.06	220	<240	U	3.29	240	<230	U	3.29	230
Fluorene	86-73-7	N	--	3.1E+05	4.1E+06	1.4E+05	100	<220	U	2.18	220	3	J	2.18	220	<270	U	2.69	270	<220	U	2.18	220	<240	U	2.35	240	<230	U	2.35	230
Indeno(1,2,3-cd)pyrene	193-39-5	C	--	2.2E+02	3.9E+03	4.2E+03	100	7	J	5.1	220	12	J	5.1	220	<270	U	6.27	270	<220	U	5.1	220	<240	U	5.49	240	<230	U	5.49	230
Naphthalene	91-20-3	N	--	1.6E+05	2.0E+06	1.5E+02	100	4	J	3.58	220	6	J	3.58	220	<270	U	4.4	270	<220	U	3.58	220	<240	U	3.85	240	<230	U	3.85	230
Phenanthrene [5]	85-01-8	N	--	2.3E+05	3.1E+06	--	100	27	J	2.99	220	50	J	2.99	220	<270	U	3.68	270	<220	U	2.99	220	<240	U	3.22	240	<230	U	3.22	230
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	100	40	J	1.92	220	44	J	1.92	220	<270	U	2.37	270	<220	U	1.92	220	<240	U	2.07	240	<230	U	2.07	230
SVOC TICs (µg/kg)																															
(Z)-9-Octadecenamide	301-02-0	--	--	--	--	--	--	1,300	E,NJ,t	0	100	760	E,NJ,t	0	100	--				60	E,NJ,t	0	100	--				--			
1-Heptadecanol	1454-85-9	--	--	--	--	--	--	--				--				--				37	E,NJ,t	0	10	--				--			
1-Hexadecanol	36653-82-4	--	--	--	--	--	--	--				--				--				--				--				48	E,NJ,t	0	100
1-Octadecanol	112-92-5	--	--	--	--	--	--	--				--				--				--				31	E,NJ,t	0	100	--			
1-Pentadecanol	629-76-5	--	--	--	--	--	--	--				--				--				--				--				--			
1,1'-Biphenyl, 2,3,3',4,4'-pentachloro-	32598-14-4	--	--	--	--	--	--	390	E,NJ,t	0	10	--				--				--				--				--			
1,2-Benzenedicarboxylicacid, bis(2-methy	84-69-5	--	--	--	--	--	--	--				530	E,NJ,t	0	100	56	E,B,x	0	100	32	E,NJ,t	0	100	41	E,B,x	0	100	--			
1,2-Benzenedicarboxylic acid, butyl 2-me	17851-53-5	--	--	--	--	--	--	--				--				--				--				--				160	E,NJ,t	0	10
1,2-Benzenedicarboxylic acid, butyl 8-me	89-18-9	--	--	--	--	--	--	--				--				--				--				--				--			
1,2-Benzenedicarboxylic acid, butyl cycl	84-64-0	--	--	--	--	--	--	330	E,NJ,t	0	1	--				--				--				--				--			
2(5H)-Furanone, 5,5-dimethyl-	20019-64-1	--	--	--	--	--	--	--				--				--				--				--				--			
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	--	--	--	--	--	--	--				--				110	E,NJ,t	0	100	--				65	E,NJ,t	0	100	58	E,NJ,t	0	100
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,	10001-439-24	--	--	--	--	--	--	--				--				28	E,NJ,t	0	1	--				--				--			

Table 7-3
Detected Analytes for SWMU 57
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	SSL DAF 20	Draft BTAG Screening Level	57SB3A 10/7/2003 0-1		MDL	RL	57SB3A-DUP(SBD6) 10/7/2003 0-1		MDL	RL	57SB3B 10/7/2003 14-16		MDL	RL	57SB3C 10/7/2003 29-31		MDL	RL	57SB4A 10/7/2003 0.5		MDL	RL	57SB4B 10/7/2003 1.5		MDL	RL
								Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
Bis(2-ethylhexyl)maleate	142-16-5	--	--	--	--	--	--	--				--				--				--				--				--			
Erucylamide	112-84-5	--	--	--	--	--	--	--				--				630	E,B,x	0	10	340	E,B,x	0	10	320	E,B,x	0	10	--			
Oxirane, hexadecyl-	7390-81-0	--	--	--	--	--	--	--				--				--				--				58	E,NJ,t	0	10	--			
Phenol, (1,1,3,3-tetramethylbutyl)-	27193-28-8	--	--	--	--	--	--	--				--				--				--				29	E,NJ,t	0	10	--			
Phosphoric acid, tris (3-methylphenyl) e	78-30-8	--	--	--	--	--	--	--				1,400	E,NJ,t	0	100	--		--		--				--				--			
Phsophoric acid, tris(3-methylphenyl) es	563-04-2	--	--	--	--	--	--	--				560	E,NJ,t	0	100	--		--		--				--				--			
Stearic Acid	57-11-4	--	--	--	--	--	--	--				--				--				--				40	E,NJ,t	0	1	--			
PAHs (µg/kg)																															
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	100	1.6	J	0.77	24	3	J,L,s	0.91	28	<33	U,UL,s	1.12	33	<28	U	0.91	28	<30	U	0.98	30	<28	U	0.98	28
Benzo(a)anthracene	56-55-3	C	--	2.2E+02	3.9E+03	4.8E+02	100	<24	U	0.88	24	<28	U,UL,s	1.04	28	<33	U,UL,s	1.28	33	<28	U	1.04	28	<30	U	1.12	30	<28	U	1.12	28
Benzo(a)pyrene	50-32-8	C	--	2.2E+01	3.9E+02	1.2E+02	100	<24	U	1.1	24	<28	U,UL,s	1.3	28	<33	U,UL,s	1.6	33	<28	U	1.3	28	<30	U	1.4	30	<28	U	1.4	28
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	100	<24	U	1.43	24	<28	U,UL,s	1.69	28	<33	U,UL,s	2.08	33	<28	U	1.69	28	<30	U	1.82	30	<28	U	1.82	28
Benzo(g,h,i)perylene [5]	191-24-2	N	--	2.3E+05	3.1E+06	--	100	<24	U	13.8	24	<28	U,UL,s	16.3	28	<33	U,UL,s	20	33	<28	U	16.3	28	<30	U	17.5	30	<28	U	17.5	28
Benzo(k)fluoranthene	207-08-9	C	--	2.2E+03	3.9E+04	1.5E+04	100	<24	U	1.1	24	<28	U,UL,s	1.3	28	<33	U,UL,s	1.6	33	<28	U	1.3	28	<30	U	1.4	30	<28	U	1.4	28
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	100	5.2	J	1.32	24	12	J,L,s	1.56	28	<33	U,UL,s	1.92	33	<28	U	1.56	28	<30	U	1.68	30	<28	U	1.68	28
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	100	46		1.87	24	84	,L,s	2.21	28	<33	U,UL,s	2.72	33	<28	U	2.21	28	<30	U	2.38	30	<28	U	2.38	28
Indeno(1,2,3-cd)pyrene	193-39-5	C	--	2.2E+02	3.9E+03	4.2E+03	100	<24	U	0.77	24	<28	U,UL,s	0.91	28	<33	U,UL,s	1.12	33	<28	U	0.91	28	<30	U	0.98	30	<28	U	0.98	28
Phenanthrene [5]	85-01-8	N	--	2.3E+05	3.1E+06	--	100	18	J	0.66	24	30	,L,s	0.78	28	<33	U,UL,s	0.96	33	<28	U	0.78	28	<30	U	0.84	30	<28	U	0.84	28
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	100	31		0.99	24	54	,L,s	1.17	28	<33	U,UL,s	1.44	33	<28	U	1.17	28	<30	U	1.26	30	<28	U	1.26	28
Cyanide (mg/kg)																															
Cyanide	57-12-5	N	--	1.6E+02	2.0E+03	1.5E+02	0.005	0.17	J	0.0356	0.5	0.16	J	0.0356	0.5	0.08	J	0.0356	0.5	<0.5	U	0.0356	0.5	0.05	J	0.0356	0.5	<0.5	U	0.0356	0.5
Percent Solids (%)																															
Percent Solids	--	--	--	--	--	--	--	77		0.1	0.1	76		0.1	0.1	63		0.1	0.1	75		0.1	0.1	71		0.1	0.1	74		0.1	0.1

Notes:

CAS = Chemical Abstracts Service
ft bgs = Feet Below Ground Surface
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyl
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon
TIC = Tentatively Identified Compound
MDL = Method Detection Limit
RL = Reporting Limit
NT = Not Tested
NI = Not Identified
LQ = Laboratory Qualifier
VQ = Validation Qualifier
r = Reason Code
NA = Not Applicable
(1) = Chromium VI RBC value was used
(2) = Lead criteria are Action Levels; see USEPA Region III guidance
(3) = Mercuric chloride soil RBC value used
(4) = Noncarcinogenic Residential RBC value for Aroclor 1254 was used for screening
(5) = RBC value for pyrene was used for these compounds
[A] = Facility-Wide Background Point Estimate as Reported in the Facility-Wide Background Study Report (IT 2001a)
RBC = USEPA Region III Risk-Based Concentration (RBC) values from the October 31, 2006, RBC Table and October 10, 2006, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
C = Carcinogenic per EPA RBC Table (October 2006)
N = Noncarcinogenic per EPA RBC Table (October 2006)
SSL DAF20 = Soil Screening Level at a Dilution Attenuation Factor of 20
BTAG = Biological Technical Assistance Group Screening Level, Draft 1995

= Concentration Exceeds Adjusted Soil Residential RBC
= Concentration Exceeds Adjusted Soil Industrial RBC
underline = Concentration Exceeds Site Background Values
bold italic = Concentration Exceeds SSL DAF20
= Concentration Exceeds BTAG Screening Level

Laboratory Qualifiers

U	The compound was analyzed for but not detected. The reporting limit will be adjusted to reflect any dilution, and for soil, the percent moisture.
J	Estimated value.
B	Analyte found in associated blank as well as in the sample.
E	Concentration exceeded the upper level of the calibration range of the instrument for that specific analysis. For TICs, compound not present in calibration standard, calculated using total peak areas ion chromatographs and response factor of 1.

Validation Qualifiers

B	Not detected substantially above the level reported in laboratory or field blanks.
N	Tentative Identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.
J	Analyte present. Reported value may not be accurate or precise.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
UL	Not detected, quantitation limit is probably higher.

Reason Codes

GC/MS Organics

l	MS/MSD recovery failure
q	Concentration exceeded the linear range
s	Surrogate failure
t	Tentatively identified Compound
x	Field and/or equipment blank contamination
z	Method blank and/or storage blank contamination

GC and HPLC Organics

l	MS/MSD recovery failure
q	linearity (%RSD or r) failure in initial calibration
s	No confirmation column
x	Trip blank contamination
z	Method blank and/or storage blank contamination

Inorganics and Conventionals

f	Field duplicate imprecision
m	MS/MSD recovery failure
p	Preparation blank contamination
s	Serial dilution failure
x	CRDL standard recovery failure

Table 7-4
HHRS COPC Selection (Surface Soil) for SWMU 57
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	C/N	Adjusted RBC Residential	Adjusted RBC Industrial	COPC Flag (Y/N)	Rationale for Selection or Deletion
	TAL Metals (mg/kg)												
7429905	Aluminum	11,900	32,200	mg/kg	57SB2A	4/4	1.83 - 9.15	32,200	--	--	--	Y	NSV
7440360	Antimony	1.20	103	mg/kg	57SB3A-DUP AVG	4/4	0.0518 - 1.3	103.0	N	3.13	40.88	Y	***ARES/IND***
7440382	Arsenic	1.6	5.2	mg/kg	57SB3A-DUP AVG	4/4	0.0232 - 0.0232	5.2	C	0.43	1.91	Y	***ARES/IND***
7440393	Barium	80	149	mg/kg	57SB4A	4/4	0.106 - 0.106	149	N	1,564	20,440	N	BSL
7440417	Beryllium	0.42	0.6	mg/kg	57SB4A	4/4	0.0391 - 0.0391	0.60	N	15.6	204	N	BSL
7440439	Cadmium	1.50	34	mg/kg	57SB3A-DUP AVG	4/4	0.182 - 0.182	34.00	N	3.91	51	Y	**ARES**
7440702	Calcium	1,420	4,440	mg/kg	57SB1A	4/4	16.6 - 16.6	4,440	--	Nutrient	Nutrient	N	Nutrient
7440473	Chromium[1]	20.0	361	mg/kg	57SB3A-DUP AVG	4/4	0.912 - 4.56	361	N	23.5	307	Y	***ARES/IND***
7440484	Cobalt	5.8	42	mg/kg	57SB3A-DUP AVG	4/4	0.208 - 0.208	42	--	--	--	Y	NSV
7440508	Copper	4.9	33	mg/kg	57SB3A-DUP AVG	4/4	0.368 - 0.368	33	N	313	4,088	N	BSL
7439896	Iron	13,400	78,700	mg/kg	57SB4A	4/4	17.9 - 71.6	78,700	N	2,346	30,660	Y	***ARES/IND***
7439921	Lead[2]	19.0	222	mg/kg	57SB3A-DUP AVG	4/4	0.0218 - 0.545	222	--	400	750	N	BSL
7439954	Magnesium	923	2,700	mg/kg	57SB1A	4/4	3.21 - 3.21	2,700	--	Nutrient	Nutrient	N	Nutrient
7439965	Manganese	361	3,200	mg/kg	57SB4A	4/4	0.264 - 1.32	3,200	N	156	2,044	Y	***ARES/IND***
7439976	Mercury[3]	0.049	0.160	mg/kg	57SB2A	4/4	0.0077 - 0.0077	0.16	--	0.78	10.22	N	BSL
7440020	Nickel	6	14	mg/kg	57SB3A-DUP AVG	4/4	0.0356 - 0.0356	14	N	156	2,044	N	BSL
7440097	Potassium	528	1,014	mg/kg	57SB3A-DUP AVG	4/4	5 - 5	1,014	--	Nutrient	Nutrient	N	Nutrient
7782492	Selenium	0.51	0.69	mg/kg	57SB2A	4/4	0.0502 - 0.0502	0.69	N	39.1	511	N	BSL
7440224	Silver	0.054	0.13	mg/kg	57SB3A-DUP AVG	4/4	0.0044 - 0.0044	0.13	N	39.1	511	N	BSL
7440235	Sodium	33	312	mg/kg	57SB2A	4/4	8.92 - 8.92	312	--	Nutrient	Nutrient	N	Nutrient
7440280	Thallium	0.17	0.3	mg/kg	57SB4A	4/4	0.027 - 0.027	0.30	N	0.55	7.15	N	BSL
7440622	Vanadium	29	84	mg/kg	57SB4A	4/4	0.207 - 0.207	84	N	7.82	102	Y	**ARES**
7440666	Zinc	52.0	1,133	mg/kg	57SB3A-DUP AVG	4/4	0.517 - 5.17	1,133	N	2,346	30,660	N	BSL
	TCL Pesticides/PCBs (µg/kg)												
11097691	Aroclor 1254[4]	1.2E+01	1.2E+01	µg/kg	57SB4A	1/1	4.2 - 4.2	1.2E+01	C	1.6E+02	1.4E+03	N	BSL
	TCL VOCs (µg/kg)												
78933	2-Butanone	2.9E+01	3.0E+01	µg/kg	57SB2A	4/4	5.8 - 7.05	3.0E+01	N	4.7E+06	6.1E+07	N	BSL
67641	Acetone	5.5E+01	1.3E+02	µg/kg	57SB3A-DUP AVG	4/4	5.8 - 7.05	1.3E+02	N	7.0E+06	9.2E+07	N	BSL
100414	Ethylbenzene	4.7E-01	4.7E-01	µg/kg	57SB3A-DUP AVG	1/4	0.491 - 0.596	4.7E-01	N	7.8E+05	1.0E+07	N	BSL
75092	Methylene chloride	3.6E+00	6.0E+00	µg/kg	57SB2A	3/4	3.26 - 3.96	6.0E+00	C	8.5E+04	3.8E+05	N	BSL
108883	Toluene	2.0E+00	2.0E+00	µg/kg	57SB3A-DUP AVG	1/4	0.538 - 0.654	2.0E+00	N	6.3E+05	8.2E+06	N	BSL
79016	Trichloroethene	1.8E+00	1.8E+00	µg/kg	57SB3A-DUP AVG	1/4	0.785 - 0.955	1.8E+00	C	1.6E+03	7.2E+03	N	BSL
	VOC TICs (µg/kg)												
66251	Hexanal	7.0E+00	2.8E+01	µg/kg	57SB2A	2/4	0 - 0	2.8E+01	--	--	--	Y	NSV
	TCL SVOCs (µg/kg)												
91576	2-Methylnaphthalene	9.0E+00	9.0E+00	µg/kg	57SB3A-DUP AVG	1/4	3.29 - 3.84	9.0E+00	N	3.1E+04	4.1E+05	N	BSL
59507	4-Chloro-3-Methylphenol	1.7E+01	4.2E+01	µg/kg	57SB3A-DUP AVG	4/4	6.25 - 7.29	4.2E+01	--	--	--	Y	NSV
208968	Acenaphthylene[5]	2.0E+00	6.5E+00	µg/kg	57SB3A-DUP AVG	2/4	1.8 - 2.1	6.5E+00	N	2.3E+05	3.1E+06	N	BSL
98862	Acetophenone	5.6E+01	5.6E+01	µg/kg	57SB3A-DUP AVG	1/4	2.28 - 2.66	5.6E+01	N	7.8E+05	1.0E+07	N	BSL
120127	Anthracene	9.0E+00	9.0E+00	µg/kg	57SB3A-DUP AVG	1/4	5.54 - 6.47	9.0E+00	N	2.3E+06	3.1E+07	N	BSL
50328	Benzo(a)pyrene	1.2E+01	3.0E+01	µg/kg	57SB2A	3/4	6.85 - 7.99	3.0E+01	C	2.2E+01	3.9E+02	Y	**ARES**
205992	Benzo(b)fluoranthene	2.3E+01	5.5E+01	µg/kg	57SB2A	3/4	11.7 - 13.7	5.5E+01	C	2.2E+02	3.9E+03	N	BSL
191242	Benzo(g,h,i)perylene[5]	1.0E+01	1.0E+01	µg/kg	57SB3A-DUP AVG	1/4	10.5 - 12.2	1.0E+01	N	2.3E+05	3.1E+06	N	BSL
117817	Bis(2-ethylhexyl)phthalate	2.1E+01	2.7E+02	µg/kg	57SB3A-DUP AVG	4/4	2.48 - 2.9	2.7E+02	C	4.6E+04	2.0E+05	N	BSL
85687	Butylbenzylphthalate	4.4E+01	4.4E+01	µg/kg	57SB2A	1/4	5.38 - 6.27	4.4E+01	N	1.6E+06	2.0E+07	N	BSL
105602	Caprolactam	1.5E+01	3.4E+01	µg/kg	57SB3A-DUP AVG	2/4	7.66 - 8.93	3.4E+01	N	3.9E+06	5.1E+07	N	BSL
218019	Chrysene	1.7E+01	2.3E+01	µg/kg	57SB3A-DUP AVG	2/4	12.2 - 14.3	2.3E+01	C	2.2E+04	3.9E+05	N	BSL
84662	Diethylphthalate	7.0E+00	2.0E+01	µg/kg	57SB3A-DUP AVG	4/4	2.28 - 2.66	2.0E+01	N	6.3E+06	8.2E+07	N	BSL
84742	Di-n-butylphthalate	4.1E+01	3.3E+02	µg/kg	57SB1A	4/4	4.58 - 5.35	3.3E+02	N	7.8E+05	1.0E+07	N	BSL
206440	Fluoranthene	2.6E+01	4.3E+01	µg/kg	57SB3A-DUP AVG	3/4	2.82 - 3.29	4.3E+01	N	3.1E+05	4.1E+06	N	BSL
86737	Fluorene	3.0E+00	3.0E+00	µg/kg	57SB3A-DUP AVG	1/4	2.02 - 2.35	3.0E+00	N	3.1E+05	4.1E+06	N	BSL
193395	Indeno(1,2,3-cd)pyrene	7.0E+00	4.2E+01	µg/kg	57SB2A	3/4	4.7 - 5.49	4.2E+01	C	2.2E+02	3.9E+03	N	BSL
91203	Naphthalene	5.0E+00	5.0E+00	µg/kg	57SB3A-DUP AVG	1/4	3.3 - 3.85	5.0E+00	N	1.6E+05	2.0E+06	N	BSL
85018	Phenanthrene[5]	1.3E+01	3.9E+01	µg/kg	57SB3A-DUP AVG	3/4	2.76 - 3.22	3.9E+01	N	2.3E+05	3.1E+06	N	BSL
129000	Pyrene	2.9E+01	4.2E+01	µg/kg	57SB3A-DUP AVG	3/4	1.78 - 2.07	4.2E+01	N	2.3E+05	3.1E+06	N	BSL

Table 7-4
HHRS COPC Selection (Surface Soil) for SWMU 57
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	C/N	Adjusted RBC Residential	Adjusted RBC Industrial	COPC Flag (Y/N)	Rationale for Selection or Deletion
	SVOC TICs (µg/kg)												
301020	(Z)-9-Octadecenamide	1.0E+03	1.0E+03	µg/kg	57SB3A-DUP AVG	1/4	0 - 0	1.0E+03	--	--	--	Y	NSV
112925	1-Octadecanol	3.1E+01	3.1E+01	µg/kg	57SB4A	1/4	0 - 0	3.1E+01	--	--	--	Y	NSV
32598144	1,1'-Biphenyl, 2,3,3',4,4'-pentachloro-	3.9E+02	3.9E+02	µg/kg	57SB3A-DUP AVG	1/4	0 - 0	3.9E+02	--	--	--	Y	NSV
84695	1,2-Benzenedicarboxylicacid, bis(2-methy	4.1E+01	5.3E+02	µg/kg	57SB3A-DUP AVG	3/4	0 - 0	5.3E+02	--	--	--	Y	NSV
17851535	1,2-Benzenedicarboxylic acid, butyl 2-me	5.1E+01	5.1E+01	µg/kg	57SB2A	1/4	0 - 0	5.1E+01	--	--	--	Y	NSV
84640	1,2-Benzenedicarboxylic acid, butyl cycl	3.3E+02	3.3E+02	µg/kg	57SB3A-DUP AVG	1/4	0 - 0	3.3E+02	--	--	--	Y	NSV
20019641	2(5H)-Furanone, 5,5-dimethyl-	2.6E+02	2.6E+02	µg/kg	57SB1A	1/4	0 - 0	2.6E+02	--	--	--	Y	NSV
101371	2,4,6-Triallyloxy-1,3,5-triazine	6.5E+01	9.4E+01	µg/kg	57SB1A	2/4	0 - 0	9.4E+01	--	--	--	Y	NSV
112845	Erucylamide	3.2E+02	6.0E+02	µg/kg	57SB2A	2/4	0 - 0	6.0E+02	--	--	--	Y	NSV
7390810	Oxirane, hexadecyl-	5.8E+01	5.8E+01	µg/kg	57SB4A	1/4	0 - 0	5.8E+01	--	--	--	Y	NSV
27193288	Phenol, (1,1,3,3-tetramethylbutyl)-	2.9E+01	2.9E+01	µg/kg	57SB4A	1/4	0 - 0	2.9E+01	--	--	--	Y	NSV
78308	Phosphoric acid, tris (3-methylphenyl) e	1.4E+03	1.4E+03	µg/kg	57SB3A-DUP AVG	1/4	0 - 0	1.4E+03	--	--	--	Y	NSV
563042	Phsophoric acid, tris(3-methylphenyl) es	5.6E+02	5.6E+02	µg/kg	57SB3A-DUP AVG	1/4	0 - 0	5.6E+02	--	--	--	Y	NSV
57114	Stearic Acid	4.0E+01	4.0E+01	µg/kg	57SB4A	1/4	0 - 0	4.0E+01	--	--	--	Y	NSV
	PAHs (µg/kg)												
120127	Anthracene	1.5E+00	2.3E+00	µg/kg	57SB3A-DUP AVG	3/4	0.77 - 0.98	2.3E+00	N	2.3E+06	3.1E+07	N	BSL
56553	Benzo(a)anthracene	7.1E+00	7.1E+00	µg/kg	57SB2A	1/4	0.88 - 1.12	7.1E+00	C	2.2E+02	3.9E+03	N	BSL
50328	Benzo(a)pyrene	1.0E+01	1.8E+01	µg/kg	57SB1A	2/4	1.1 - 1.4	1.8E+01	C	2.2E+01	3.9E+02	N	BSL
205992	Benzo(b)fluoranthene	1.4E+01	1.4E+01	µg/kg	57SB1A	1/4	1.43 - 1.82	1.4E+01	C	2.2E+02	3.9E+03	N	BSL
191242	Benzo(g,h,i)perylene[5]	2.7E+01	2.7E+01	µg/kg	57SB1A	1/4	13.8 - 17.5	2.7E+01	N	2.3E+05	3.1E+06	N	BSL
207089	Benzo(k)fluoranthene	8.5E+00	8.5E+00	µg/kg	57SB1A	1/4	1.1 - 1.4	8.5E+00	C	2.2E+03	3.9E+04	N	BSL
218019	Chrysene	8.6E+00	1.1E+01	µg/kg	57SB1A	3/4	1.32 - 1.68	1.1E+01	C	2.2E+04	3.9E+05	N	BSL
206440	Fluoranthene	2.9E+01	6.5E+01	µg/kg	57SB3A-DUP AVG	3/4	1.87 - 2.38	6.5E+01	N	3.1E+05	4.1E+06	N	BSL
193395	Indeno(1,2,3-cd)pyrene	7.2E+00	1.1E+01	µg/kg	57SB1A	2/4	0.77 - 0.98	1.1E+01	C	2.2E+02	3.9E+03	N	BSL
85018	Phenanthrene[5]	1.1E+01	2.4E+01	µg/kg	57SB1A	3/4	0.66 - 0.84	2.4E+01	N	2.3E+05	3.1E+06	N	BSL
129000	Pyrene	2.0E+01	8.2E+01	µg/kg	57SB1A	3/4	0.99 - 1.26	8.2E+01	N	2.3E+05	3.1E+06	N	BSL
	Cyanide (mg/kg)												
57125	Cyanide	5.0E-02	1.7E-01	mg/kg	57SB3A-DUP AVG	4/4	0.0356 - 0.0356	1.7E-01	N	1.6E+02	2.0E+03	N	BSL

Notes:

CAS = Chemical Abstracts Service
COPC = Chemical of Potential Concern
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyls
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
PAH = Polynuclear Aromatic Compound
TIC = Tentatively Identified Compound
[1] = Chromium VI RBC value was used
[2] = Lead criteria are Action Levels; see USEPA Region III guidance
[3] = Mercuric chloride soil RBC value used
[4] = Noncarcinogenic Residential RBC value for Aroclor 1254 was used for screening
[5] = RBC value for pyrene was used for these compounds

DUP AVG = results for duplicate samples averaged
RBC = USEPA Region III Risk-Based Concentration
(RBC) values from the October 31, 2006,
RBC Table and October 10, 2006, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
C = Carcinogenic per EPA RBC Table (October 2006)
N = Noncarcinogenic per EPA RBC Table (October 2006)

ARES = Above Residential RBC
ARES/IND = Above Residential RBC/Industrial RBC
BSL = Below Residential/Industrial RBC Screening Levels
NSV = No Screening Value Available

Table 7-5
HHRS COPC Selection (Total Soil) for SWMU 57
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	C/N	Adjusted RBC Residential	Adjusted RBC Industrial	COPC Flag (Y/N)	Rationale for Selection or Deletion
	TAL Metals (mg/kg)												
7429905	Aluminum	11,900	38,900	mg/kg	57SB1C	11/11	1.83 - 9.15	38,900	--	--	--	Y	NSV
7440360	Antimony	0.07	103	mg/kg	57SB3A-DUP AVG	9/11	0.0518 - 1.3	103.00	N	3.13	40.9	Y	***ARES/IND***
7440382	Arsenic	1.1	12	mg/kg	57SB3B	11/11	0.0232 - 0.0232	12	C	0.43	1.91	Y	***ARES/IND***
7440393	Barium	39	149	mg/kg	57SB4A	11/11	0.106 - 0.106	149	N	1,564	20,440	N	BSL
7440417	Beryllium	0.42	3.2	mg/kg	57SB2C	11/11	0.0333 - 0.0391	3.20	N	15.6	204	N	BSL
7440439	Cadmium	0.46	34	mg/kg	57SB3A-DUP AVG	11/11	0.182 - 0.182	34.00	N	3.91	51	Y	**ARES**
7440702	Calcium	207	4,440	mg/kg	57SB1A	8/11	16.6 - 16.6	4,440	--	Nutrient	Nutrient	N	Nutrient
7440473	Chromium[1]	9.3	361	mg/kg	57SB3A-DUP AVG	11/11	0.912 - 4.56	361	N	23	307	Y	***ARES/IND***
7440484	Cobalt	5.8	42	mg/kg	57SB3A-DUP AVG	11/11	0.208 - 0.208	42	--	--	--	Y	NSV
7440508	Copper	4.9	38	mg/kg	57SB3B	11/11	0.368 - 0.368	38	N	313	4,088	N	BSL
7439896	Iron	13,400	78,700	mg/kg	57SB4A	11/11	17.9 - 71.6	78,700	N	2,346	30,660	Y	***ARES/IND***
7439921	Lead[2]	2.6	222	mg/kg	57SB3A-DUP AVG	11/11	0.0218 - 0.545	222	--	400	750	N	BSL
7439954	Magnesium	487	35,000	mg/kg	57SB3C	11/11	3.21 - 16.1	35,000	--	Nutrient	Nutrient	N	Nutrient
7439965	Manganese	264	3,200	mg/kg	57SB4A	11/11	0.264 - 1.32	3,200	N	156	2,044	Y	***ARES/IND***
7439976	Mercury[3]	0.013	0.16	mg/kg	57SB2A	9/11	0.0077 - 0.0077	0.16	--	0.78	10.22	N	BSL
7440020	Nickel	6	75	mg/kg	57SB2C	11/11	0.0356 - 0.356	75	N	156	2,044	N	BSL
7440097	Potassium	528	5,900	mg/kg	57SB3C	11/11	5 - 5	5,900	--	Nutrient	Nutrient	N	Nutrient
7782492	Selenium	0.33	0.88	mg/kg	57SB3C	11/11	0.0502 - 0.0502	0.88	N	39.1	511	N	BSL
7440224	Silver	0.028	0.15	mg/kg	57SB3C	11/11	0.0044 - 0.0044	0.15	N	39.1	511	N	BSL
7440235	Sodium	33	497	mg/kg	57SB4B	11/11	8.92 - 18.1	497	--	Nutrient	Nutrient	N	Nutrient
7440280	Thallium	0.11	0.3	mg/kg	57SB4A	11/11	0.027 - 0.027	0.30	N	0.55	7.15	N	BSL
7440622	Vanadium	18	84	mg/kg	57SB4A	11/11	0.207 - 0.207	84	N	7.82	102	Y	**ARES**
7440666	Zinc	9.3	1,133	mg/kg	57SB3A-DUP AVG	11/11	0.517 - 5.17	1,133	N	2,346	30,660	N	BSL
	TCL Pesticides/PCBs (µg/kg)												
11097691	Aroclor 1254[4]	1.2E+01	1.2E+01	µg/kg	57SB4A	1/1	4.2 - 4.2	1.2E+01	C	1.6E+02	1.4E+03	N	BSL
	TCL VOCs (µg/kg)												
78933	2-Butanone	2.1E+01	3.0E+01	µg/kg	57SB2A	11/11	5.8 - 7.95	3.0E+01	N	4.7E+06	6.1E+07	N	BSL
67641	Acetone	3.7E+01	1.3E+02	µg/kg	57SB3A-DUP AVG	11/11	5.8 - 7.95	1.3E+02	N	7.0E+06	9.2E+07	N	BSL
75274	Bromodichloromethane	1.2E+00	1.2E+00	µg/kg	57SB2C	1/11	0.581 - 0.797	1.2E+00	C	1.0E+04	4.6E+04	N	BSL
67663	Chloroform	1.1E+00	2.4E+01	µg/kg	57SB1C	4/11	0.517 - 0.709	2.4E+01	N	7.8E+04	1.0E+06	N	BSL
100414	Ethylbenzene	4.7E-01	4.7E-01	µg/kg	57SB3A-DUP AVG	1/11	0.491 - 0.673	4.7E-01	N	7.8E+05	1.0E+07	N	BSL
75092	Methylene chloride	3.6E+00	6.8E+00	µg/kg	57SB3B	9/11	3.26 - 4.47	6.8E+00	C	8.5E+04	3.8E+05	N	BSL
108883	Toluene	2.0E+00	2.0E+00	µg/kg	57SB3A-DUP AVG	1/11	0.538 - 0.738	2.0E+00	N	6.3E+05	8.2E+06	N	BSL
79016	Trichloroethene	1.8E+00	1.8E+00	µg/kg	57SB3A-DUP AVG	1/11	0.785 - 1.08	1.8E+00	C	1.6E+03	7.2E+03	N	BSL
	VOC TICs (µg/kg)												
66251	Hexanal	7.0E+00	2.8E+01	µg/kg	57SB2A	2/11	0 - 0	2.8E+01	--	--	--	Y	NSV
	TCL SVOCs (µg/kg)												
91576	2-Methylnaphthalene	9.0E+00	9.0E+00	µg/kg	57SB3A-DUP AVG	1/11	3.29 - 4.38	9.0E+00	N	3.1E+04	4.1E+05	N	BSL
59507	4-Chloro-3-Methylphenol	1.6E+01	4.4E+01	µg/kg	57SB1C	9/11	6.25 - 8.34	4.4E+01	--	--	--	Y	NSV
208968	Acenaphthylene[5]	2.0E+00	6.5E+00	µg/kg	57SB3A-DUP AVG	2/11	1.8 - 2.4	6.5E+00	N	2.3E+05	3.1E+06	N	BSL
98862	Acetophenone	5.6E+01	5.6E+01	µg/kg	57SB3A-DUP AVG	1/11	2.28 - 3.04	5.6E+01	N	7.8E+05	1.0E+07	N	BSL
120127	Anthracene	9.0E+00	9.0E+00	µg/kg	57SB3A-DUP AVG	1/11	5.54 - 7.39	9.0E+00	N	2.3E+06	3.1E+07	N	BSL
50328	Benzo(a)pyrene	1.2E+01	3.0E+01	µg/kg	57SB2A	3/11	6.85 - 9.14	3.0E+01	C	2.2E+01	3.9E+02	Y	**ARES**
205992	Benzo(b)fluoranthene	2.3E+01	5.5E+01	µg/kg	57SB2A	3/11	11.7 - 15.6	5.5E+01	C	2.2E+02	3.9E+03	N	BSL
191242	Benzo(g,h,i)perylene[5]	1.0E+01	1.0E+01	µg/kg	57SB3A-DUP AVG	1/11	10.5 - 14	1.0E+01	N	2.3E+05	3.1E+06	N	BSL
117817	Bis(2-ethylhexyl)phthalate	2.0E+01	2.7E+02	µg/kg	57SB3A-DUP AVG	11/11	2.48 - 3.31	2.7E+02	C	4.6E+04	2.0E+05	N	BSL
85687	Butylbenzylphthalate	1.0E+01	4.4E+01	µg/kg	57SB2A	3/11	5.38 - 7.17	4.4E+01	N	1.6E+06	2.0E+07	N	BSL
105602	Caprolactam	1.1E+01	3.6E+01	µg/kg	57SB1C	4/11	7.66 - 10.2	3.6E+01	N	3.9E+06	5.1E+07	N	BSL
218019	Chrysene	1.7E+01	2.3E+01	µg/kg	57SB3A-DUP AVG	2/11	12.2 - 16.3	2.3E+01	C	2.2E+04	3.9E+05	N	BSL
84662	Diethylphthalate	5.0E+00	2.0E+01	µg/kg	57SB3A-DUP AVG	10/11	2.28 - 3.04	2.0E+01	N	6.3E+06	8.2E+07	N	BSL
84742	Di-n-butylphthalate	3.8E+01	4.3E+02	µg/kg	57SB1B	11/11	4.58 - 6.11	4.3E+02	N	7.8E+05	1.0E+07	N	BSL
206440	Fluoranthene	2.6E+01	4.3E+01	µg/kg	57SB3A-DUP AVG	3/11	2.82 - 3.76	4.3E+01	N	3.1E+05	4.1E+06	N	BSL
86737	Fluorene	3.0E+00	3.0E+00	µg/kg	57SB3A-DUP AVG	1/11	2.02 - 2.69	3.0E+00	N	3.1E+05	4.1E+06	N	BSL
193395	Indeno(1,2,3-cd)pyrene	7.0E+00	4.2E+01	µg/kg	57SB2A	3/11	4.7 - 6.27	4.2E+01	C	2.2E+02	3.9E+03	N	BSL
91203	Naphthalene	5.0E+00	5.0E+00	µg/kg	57SB3A-DUP AVG	1/11	3.3 - 4.4	5.0E+00	N	1.6E+05	2.0E+06	N	BSL
85018	Phenanthrene[5]	1.3E+01	3.9E+01	µg/kg	57SB3A-DUP AVG	3/11	2.76 - 3.68	3.9E+01	N	2.3E+05	3.1E+06	N	BSL
129000	Pyrene	2.9E+01	4.2E+01	µg/kg	57SB3A-DUP AVG	3/11	1.78 - 2.37	4.2E+01	N	2.3E+05	3.1E+06	N	BSL

Table 7-5
HHRS COPC Selection (Total Soil) for SWMU 57
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	C/N	Adjusted RBC Residential	Adjusted RBC Industrial	COPC Flag (Y/N)	Rationale for Selection or Deletion
	SVOC TICs (µg/kg)												
301020	(Z)-9-Octadecenamide	6.0E+01	1.0E+03	µg/kg	57SB3A-DUP AVG	5/11	0 - 0	1.0E+03	--	--	--	Y	NSV
1454859	1-Heptadecanol	3.7E+01	3.7E+01	µg/kg	57SB3C	1/11	0 - 0	3.7E+01	--	--	--	Y	NSV
36653824	1-Hexadecanol	3.1E+01	4.8E+01	µg/kg	57SB4B	2/11	0 - 0	4.8E+01	--	--	--	Y	NSV
112925	1-Octadecanol	3.1E+01	3.1E+01	µg/kg	57SB4A	1/11	0 - 0	3.1E+01	--	--	--	Y	NSV
629765	1-Pentadecanol	5.2E+01	5.2E+01	µg/kg	57SB2C	1/11	0 - 0	5.2E+01	--	--	--	Y	NSV
32598144	1,1'-Biphenyl, 2,3,3',4,4'-pentach	3.9E+02	3.9E+02	µg/kg	57SB3A-DUP AVG	1/11	0 - 0	3.9E+02	--	--	--	Y	NSV
84695	1,2-Benzenedicarboxylicacid, bis	3.2E+01	5.4E+02	µg/kg	57SB1B	7/11	0 - 0	5.4E+02	--	--	--	Y	NSV
17851535	1,2-Benzenedicarboxylic acid, bi	5.1E+01	1.6E+02	µg/kg	57SB4B	2/11	0 - 0	1.6E+02	--	--	--	Y	NSV
89189	1,2-Benzenedicarboxylic acid, bi	3.4E+01	3.4E+01	µg/kg	57SB2C	1/11	0 - 0	3.4E+01	--	--	--	Y	NSV
84640	1,2-Benzenedicarboxylic acid, bi	3.3E+02	4.7E+02	µg/kg	57SB1C	2/11	0 - 0	4.7E+02	--	--	--	Y	NSV
20019641	2(5H)-Furanone, 5,5-dimethyl-	2.6E+02	2.6E+02	µg/kg	57SB1A	1/11	0 - 0	2.6E+02	--	--	--	Y	NSV
101371	2,4,6-Triallyloxy-1,3,5-triazine	5.8E+01	1.3E+02	µg/kg	57SB1B	6/11	0 - 0	1.3E+02	--	--	--	Y	NSV
1000143924	7,9-Di-tert-butyl-1-oxaspiro(4,5)d	2.8E+01	2.8E+01	µg/kg	57SB3B	1/11	0 - 0	2.8E+01	--	--	--	Y	NSV
142165	Bis(2-ethylhexyl)maleate	1.2E+02	1.2E+02	µg/kg	57SB1C	1/11	0 - 0	1.2E+02	--	--	--	Y	NSV
112845	Erucylamide	3.2E+02	6.3E+02	µg/kg	57SB3B	5/11	0 - 0	6.3E+02	--	--	--	Y	NSV
7390810	Oxirane, hexadecyl-	5.8E+01	5.8E+01	µg/kg	57SB4A	1/11	0 - 0	5.8E+01	--	--	--	Y	NSV
27193288	Phenol, (1,1,3,3-tetramethylbuty	2.9E+01	2.9E+01	µg/kg	57SB4A	1/11	0 - 0	2.9E+01	--	--	--	Y	NSV
78308	Phosphoric acid, tris (3-methylph	1.4E+03	1.4E+03	µg/kg	57SB3A-DUP AVG	1/11	0 - 0	1.4E+03	--	--	--	Y	NSV
563042	Phsophoric acid, tris(3-methylph	5.6E+02	5.6E+02	µg/kg	57SB3A-DUP AVG	1/11	0 - 0	5.6E+02	--	--	--	Y	NSV
57114	Stearic Acid	4.0E+01	1.1E+02	µg/kg	57SB1C	3/11	0 - 0	1.1E+02	--	--	--	Y	NSV
	PAHs (µg/kg)												
120127	Anthracene	1.5E+00	2.3E+00	µg/kg	57SB3A-DUP AVG	3/11	0.77 - 1.12	2.3E+00	N	2.3E+06	3.1E+07	N	BSL
56553	Benzo(a)anthracene	7.1E+00	7.1E+00	µg/kg	57SB2A	1/11	0.88 - 1.28	7.1E+00	C	2.2E+02	3.9E+03	N	BSL
50328	Benzo(a)pyrene	1.0E+01	1.8E+01	µg/kg	57SB1A	2/11	1.1 - 1.6	1.8E+01	C	2.2E+01	3.9E+02	N	BSL
205992	Benzo(b)fluoranthene	1.4E+01	1.4E+01	µg/kg	57SB1A	1/11	1.43 - 2.08	1.4E+01	C	2.2E+02	3.9E+03	N	BSL
191242	Benzo(g,h,i)perylene[5]	2.7E+01	2.7E+01	µg/kg	57SB1A	1/11	13.8 - 20	2.7E+01	N	2.3E+05	3.1E+06	N	BSL
207089	Benzo(k)fluoranthene	8.5E+00	8.5E+00	µg/kg	57SB1A	1/11	1.1 - 1.6	8.5E+00	C	2.2E+03	3.9E+04	N	BSL
218019	Chrysene	8.6E+00	1.1E+01	µg/kg	57SB1A	3/11	1.32 - 1.92	1.1E+01	C	2.2E+04	3.9E+05	N	BSL
206440	Fluoranthene	2.9E+01	6.5E+01	µg/kg	57SB3A-DUP AVG	3/11	1.87 - 2.72	6.5E+01	N	3.1E+05	4.1E+06	N	BSL
193395	Indeno(1,2,3-cd)pyrene	7.2E+00	1.1E+01	µg/kg	57SB1A	2/11	0.77 - 1.12	1.1E+01	C	2.2E+02	3.9E+03	N	BSL
85018	Phenanthrene[5]	1.1E+01	2.4E+01	µg/kg	57SB1A	3/11	0.66 - 0.96	2.4E+01	N	2.3E+05	3.1E+06	N	BSL
129000	Pyrene	2.0E+01	8.2E+01	µg/kg	57SB1A	3/11	0.99 - 1.44	8.2E+01	N	2.3E+05	3.1E+06	N	BSL
	Cyanide (mg/kg)												
57125	Cyanide	5.0E-02	1.7E-01	mg/kg	57SB3A-DUP AVG	6/11	0.0356 - 0.0356	1.7E-01	N	1.6E+02	2.0E+03	N	BSL

Notes:

CAS = Chemical Abstracts Service
COPC = Chemical of Potential Concern
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyls
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
PAH = Polynuclear Aromatic Compound
TIC = Tentatively Identified Compound
[1] = Chromium VI RBC value was used
[2] = Lead criteria are Action Levels; see USEPA Region III guidance
[3] = Mercuric chloride soil RBC value used
[4] = Noncarcinogenic Residential RBC value for Aroclor 1254 was used for screening
[5] = RBC value for pyrene was used for these compounds

DUP AVG = results for duplicate samples averaged
RBC = USEPA Region III Risk-Based Concentration
(RBC) values from the October 31, 2006,
RBC Table and October 10, 2006, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
C = Carcinogenic per EPA RBC Table (October 2006)
N = Noncarcinogenic per EPA RBC Table (October 2006)

ARES = Above Residential RBC
ARES/IND = Above Residential RBC/Industrial RBC
BSL = Below Residential/Industrial RBC Screening Levels
NSV = No Screening Value Available

Table 7-6
Cumulative HHRS for SWMU 57 (Surface Soil)
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Units	MDC	C/N	RBC Residential	RBC Industrial	Non Carcinogenic HI (RBC_{Res})	Excess Cancer Risk (RBC_{Res})	Non Carcinogenic HI (RBC_{Ind})	Excess Cancer Risk (RBC_{Ind})
	TAL Metals									
7429905	Aluminum	mg/kg	3.22E+04	--	--	--	--	--	--	--
7440360	Antimony	mg/kg	1.03E+02	N	3.13E+01	4.09E+02	3.E+00	--	3.E-01	--
7440382	Arsenic	mg/kg	5.20E+00	C	4.26E-01	1.91E+00	--	1.E-05	--	3.E-06
7440382	Arsenic	mg/kg	5.20E+00	N	2.35E+01	3.07E+02	2.E-01	--	2.E-02	--
7440439	Cadmium	mg/kg	3.40E+01	N	3.91E+01	5.11E+02	9.E-01	--	7.E-02	--
7440473	Chromium[1]	mg/kg	3.61E+02	N	2.35E+02	3.07E+03	2.E+00	--	1.E-01	--
7440484	Cobalt	mg/kg	4.15E+01	--	--	--	--	--	--	--
7439896	Iron	mg/kg	7.87E+04	N	2.35E+04	3.07E+05	3.E+00	--	3.E-01	--
7439965	Manganese	mg/kg	3.20E+03	N	1.56E+03	2.04E+04	2.E+00	--	2.E-01	--
7440622	Vanadium	mg/kg	8.40E+01	N	7.82E+01	1.02E+03	1.E+00	--	8.E-02	--
	VOC TICs									
66251	Hexanal	µg/kg	2.80E+01	--	--	--	--	--	--	--
	TCL SVOCs									
59507	4-Chloro-3-Methylphenol	µg/kg	4.20E+01	--	--	--	--	--	--	--
50328	Benzo(a)pyrene	µg/kg	3.00E+01	C	2.20E+01	3.92E+02	--	1.E-06	--	8.E-08
	SVOC TICs									
301020	(Z)-9-Octadecenamide	µg/kg	1.03E+03	--	--	--	--	--	--	--
112925	1-Octadecanol	µg/kg	3.10E+01	--	--	--	--	--	--	--
32598144	1,1'-Biphenyl, 2,3,3',4,4'-pentachloro-	µg/kg	3.90E+02	--	--	--	--	--	--	--
84695	1,2-Benzenedicarboxylicacid, bis(2-methy	µg/kg	5.30E+02	--	--	--	--	--	--	--
17851535	1,2-Benzenedicarboxylic acid, butyl 2-me	µg/kg	5.10E+01	--	--	--	--	--	--	--
84640	1,2-Benzenedicarboxylic acid, butyl cycl	µg/kg	3.30E+02	--	--	--	--	--	--	--
20019641	2(5H)-Furanone, 5,5-dimethyl-	µg/kg	2.60E+02	--	--	--	--	--	--	--
101371	2,4,6-Triallyloxy-1,3,5-triazine	µg/kg	9.40E+01	--	--	--	--	--	--	--
112845	Erucylamide	µg/kg	6.00E+02	--	--	--	--	--	--	--
7390810	Oxirane, hexadecyl-	µg/kg	5.80E+01	--	--	--	--	--	--	--
27193288	Phenol, (1,1,3,3-tetramethylbutyl)-	µg/kg	2.90E+01	--	--	--	--	--	--	--
78308	Phosphoric acid, tris (3-methylphenyl) e	µg/kg	1.40E+03	--	--	--	--	--	--	--
563042	Phsophoric acid, tris(3-methylphenyl) es	µg/kg	5.60E+02	--	--	--	--	--	--	--
57114	Stearic Acid	µg/kg	4.00E+01	--	--	--	--	--	--	--
						Cumulative Risk	1.E+01	1E-05	9.E-01	3.E-06

Notes:

CAS = Chemical Abstracts Service
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
TIC = Tentatively Identified Compound
[1] = Chromium VI RBC value was used

MDC = Maximum Detected Concentration
HI = Hazard Index
RBC = USEPA Region III Risk-Based Concentration
(RBC) values from the October 31, 2006,
RBC Table and October 10, 2006, Alternate RBC Table
C = Carcinogenic per EPA RBC Table (October 2006)
N = Noncarcinogenic per EPA RBC Table (October 2006)

Table 7-7
Exposure Point Concentration Summary for SWMU 57
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Medium:	Total Soil
Exposure Medium:	Total Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic (1)	Rationale (2)
Total Soil	Aluminum	mg/kg	2.76E+04	3.25E+04	3.9E+04	3.25E+04	mg/kg	95% UCL (Student's t)	85% < FOD, Normal
	Antimony	mg/kg	1.30E+00	6.22E+00	1.0E+02	6.22E+00	mg/kg	95%UCL (Land's)	85% < FOD, Lognormal
	Arsenic	mg/kg	4.35E+00	6.11E+00	1.2E+01	6.11E+00	mg/kg	95% UCL (Student's t)	85% < FOD, Normal
	Cadmium	mg/kg	5.08E+00	1.86E+01	3.4E+01	1.86E+01	mg/kg	95%UCL (Chebyshev)	85% < FOD, Lognormal
	Chromium	mg/kg	7.01E+01	1.54E+02	3.6E+02	1.54E+02	mg/kg	95%UCL (Land's)	85% < FOD, Lognormal
	Cobalt	mg/kg	--	--	4.2E+01	4.15E+01	mg/kg	--	--
	Iron	mg/kg	4.35E+04	5.25E+04	7.9E+04	5.25E+04	mg/kg	95% UCL (Student's t)	85% < FOD, Normal
	Manganese	mg/kg	7.95E+02	1.36E+03	3.2E+03	1.36E+03	mg/kg	95%UCL (Land's)	85% < FOD, Lognormal
	Vanadium	mg/kg	5.78E+01	6.85E+01	8.4E+01	6.85E+01	mg/kg	95% UCL (Student's t)	85% < FOD, Normal
	Benzo(a)pyrene	mg/kg	1.01E+01	1.17E+01	3.0E+01	1.17E+01	ug/kg	95% UCL (Bounding)	FOD < 50%

Notes:
UCL = Upper Confidence Limit
mg/kg = Milligram Per Kilogram

(1) See Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites (OSWER Directive 9285.6-10, December 2002) for details on the following methods for calculating the 95% UCL:
95% UCL (Bounding) = The frequency of detection is less than 50%; therefore, the 95% UCL is calculated by the bounding method.
95% UCL (Student's t, adj) = The frequency of detection is between 50% and 85%, and the underlying distribution (detects only) is normal; therefore, Aitchison's Method is used to adjust the detects-only mean and standard deviaiton, and the 95% UCL is calculated using the Student's t method.
95% UCL (Land, adj) = The frequency of detection is between 50% and 85%, and the underlying distribution (detects only) is lognormal; therefore, Aitchison's Method is used to adjust the detects-only mean and standard deviation, and the 95% UCL is calculated using Land's method.
95% UCL (Student's t) = The frequency of detection is greater than 85%, and the distribution is normal.; therefore, the 95% UCL is calculated using the Student's t method.
95% UCL (Bootstrap) = The frequency of detection is between 50% and 85% and the underlying distribution (detects only) is neither normal nor lognormal, OR the frequency of detection is greater than 85% and the distribution (with non-detects represented by half of the detection limit) is neither normal nor lognormal; therefore, the 95% UCL is calculated using Hall's bootstrap method.
Maximum: The 95% UCL exceeds the maximum detected concentration; therefore, the maximum detected concentration is used to represent the 95% UCL.

(2) FOD = Frequency of detection
FOD < 50%: Frequency of detection is less than 50%
50% < FOD < 85%, Normal: Frequency of detection is between 50% and 85%, and the underlying distribution (detects only) is normal.
50% < FOD < 85%, Lognormal: Frequency of detection is between 50% and 85%, and the underlying distribution (detects only) is lognormal.
50% < FOD < 85%, Unknown: Frequency of detection is between 50% and 85%, and the underlying distribution (detects only) is neither normal nor lognormal.
85% < FOD, Normal: Frequency of detection is greater than 85%, and the distribution is normal.
85% < FOD, Lognormal: Frequency of detection is greater than 85%, and the distribution is lognormal.
85% < FOD, Unknown: Frequency of detection is greater than 85%, and the distribution is neither normal nor lognormal.

Table 7-8
Cumulative HHRS for SWMU 57 (Total Soil)
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Units	Maximum EPC	C/N	RBC Residential	RBC Industrial	Non Carcinogenic HI (RBC_{Res})	Excess Cancer Risk (RBC_{Res})	Non Carcinogenic HI (RBC_{Ind})	Excess Cancer Risk (RBC_{Ind})
	TAL Metals									
7429905	Aluminum	mg/kg	3.25E+04	--	--	--	--	--	--	--
7440360	Antimony	mg/kg	6.22E+00	N	3.13E+01	4.09E+02	2.E-01	--	2.E-02	--
7440382	Arsenic	mg/kg	6.11E+00	C	4.26E-01	1.91E+00	--	1.E-05	--	3.E-06
7440382	Arsenic	mg/kg	6.11E+00	N	2.35E+01	3.07E+02	3.E-01	--	2.E-02	--
7440439	Cadmium	mg/kg	1.86E+01	N	3.91E+01	5.11E+02	5.E-01	--	4.E-02	--
7440473	Chromium[1]	mg/kg	1.54E+02	N	2.35E+02	3.07E+03	7.E-01	--	5.E-02	--
7440484	Cobalt	mg/kg	1.55E+02	--	--	--	--	--	--	--
7439896	Iron	mg/kg	5.25E+04	N	2.35E+04	3.07E+05	2.E+00	--	2.E-01	--
7439965	Manganese	mg/kg	1.36E+03	N	1.56E+03	2.04E+04	9.E-01	--	7.E-02	--
7440622	Vanadium	mg/kg	6.85E+01	N	7.82E+01	1.02E+03	9.E-01	--	7.E-02	--
	VOC TICs									
66251	Hexanal	µg/kg	2.80E+01	--	--	--	--	--	--	--
	TCL SVOCs									
59507	4-Chloro-3-Methylphenol	µg/kg	4.40E+01	--	--	--	--	--	--	--
50328	Benzo(a)pyrene	µg/kg	1.17E+01	C	2.20E+01	3.92E+02	--	5.E-07	--	3.E-08
	SVOC TICs									
301020	(Z)-9-Octadecenamide	µg/kg	1.03E+03	--	--	--	--	--	--	--
1454859	1-Heptadecanol	µg/kg	3.70E+01	--	--	--	--	--	--	--
36653824	1-Hexadecanol	µg/kg	4.80E+01	--	--	--	--	--	--	--
112925	1-Octadecanol	µg/kg	3.10E+01	--	--	--	--	--	--	--
629765	1-Pentadecanol	µg/kg	5.20E+01	--	--	--	--	--	--	--
32598144	1,1'-Biphenyl, 2,3,3',4,4'-pentachloro-	µg/kg	3.90E+02	--	--	--	--	--	--	--
84695	1,2-Benzenedicarboxylicacid, bis(2-methy	µg/kg	5.40E+02	--	--	--	--	--	--	--
17851535	1,2-Benzenedicarboxylic acid, butyl 2-me	µg/kg	1.60E+02	--	--	--	--	--	--	--
89189	1,2-Benzenedicarboxylic acid, butyl 8-me	µg/kg	3.40E+01	--	--	--	--	--	--	--
84640	1,2-Benzenedicarboxylic acid, butyl cycl	µg/kg	4.70E+02	--	--	--	--	--	--	--
20019641	2(5H)-Furanone, 5,5-dimethyl-	µg/kg	2.60E+02	--	--	--	--	--	--	--
101371	2,4,6-Triallyloxy-1,3,5-triazine	µg/kg	1.30E+02	--	--	--	--	--	--	--
1000143924	7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,	µg/kg	2.80E+01	--	--	--	--	--	--	--
142165	Bis(2-ethylhexyl)maleate	µg/kg	1.20E+02	--	--	--	--	--	--	--
112845	Erucylamide	µg/kg	6.30E+02	--	--	--	--	--	--	--
7390810	Oxirane, hexadecyl-	µg/kg	5.80E+01	--	--	--	--	--	--	--
27193288	Phenol, (1,1,3,3-tetramethylbutyl)-	µg/kg	2.90E+01	--	--	--	--	--	--	--
78308	Phosphoric acid, tris (3-methylphenyl) e	µg/kg	1.40E+03	--	--	--	--	--	--	--
563042	Phsophoric acid, tris(3-methylphenyl) es	µg/kg	5.60E+02	--	--	--	--	--	--	--
57114	Stearic Acid	µg/kg	1.10E+02	--	--	--	--	--	--	--
						Cumulative Risk	6.E+00	1.E-05	4.E-01	3.E-06

Notes:

CAS = Chemical Abstracts Service
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
TIC = Tentatively Identified Compound
[1] = Chromium VI RBC value was used

MDC = Maximum Detected Concentration
HI = Hazard Index
RBC = USEPA Region III Risk-Based Concentration
(RBC) values from the October 31, 2006,
RBC Table and October 10, 2006, Alternate RBC Table
C = Carcinogenic per EPA RBC Table (October 2006)
N = Noncarcinogenic per EPA RBC Table (October 2006)

Table 7-9
HHRS SSL Comparison for SWMU 57
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Soil to Groundwater SSL (DAF 20)	COPC Flag (Y/N)	Rationale for Selection or Deletion
	TAL Metals (mg/kg)										
7429905	Aluminum	13,900	38,900	mg/kg	57SB1C	7/7	1.83 - 9.15	38,900	--	Y	NSV
7440360	Antimony	0.07	10	mg/kg	57SB4B	5/7	0.0518 - 0.0518	9.70	13.2	N	BSL
7440382	Arsenic	1.1	12	mg/kg	57SB3B	7/7	0.0232 - 0.0232	12.00	0.026	Y	**ASSL**
7440393	Barium	39	73	mg/kg	57SB1C	7/7	0.106 - 0.106	73	6,015.2	N	BSL
7440417	Beryllium	0.45	3.2	mg/kg	57SB2C	7/7	0.0333 - 0.0391	3.20	1,153.7	N	BSL
7440439	Cadmium	0.46	4	mg/kg	57SB1C	7/7	0.182 - 0.182	4.00	27.4	N	BSL
7440702	Calcium	207	1,030	mg/kg	57SB1B	4/7	16.6 - 16.6	1,030	Nutrient	N	Nutrient
7440473	Chromium[1]	9.3	88	mg/kg	57SB1C	7/7	0.912 - 0.912	88	42	Y	**ASSL**
7440484	Cobalt	8.7	26	mg/kg	57SB2B	7/7	0.208 - 0.208	26	--	Y	NSV
7440508	Copper	13.0	38	mg/kg	57SB3B	7/7	0.368 - 0.368	38	10,517.8	N	BSL
7439896	Iron	34,500	59,000	mg/kg	57SB4B	7/7	35.8 - 71.6	59,000	--	Y	NSV
7439921	Lead [2]	2.6	29	mg/kg	57SB1B	7/7	0.0218 - 0.0218	29	--	Y	NSV
7439954	Magnesium	487	35,000	mg/kg	57SB3C	7/7	3.21 - 16.1	35,000	Nutrient	N	Nutrient
7439965	Manganese	264	1,090	mg/kg	57SB2B	7/7	0.264 - 1.32	1,090	951.9	Y	**ASSL**
7439976	Mercury [3]	0.013	0.053	mg/kg	57SB1C	5/7	0.0077 - 0.0077	0.05	--	Y	NSV
7440020	Nickel	11	75	mg/kg	57SB2C	7/7	0.0356 - 0.356	75	--	Y	NSV
7440097	Potassium	999	5,900	mg/kg	57SB3C	7/7	5 - 5	5,900	Nutrient	N	Nutrient
7782492	Selenium	0.33	0.88	mg/kg	57SB3C	7/7	0.0502 - 0.0502	0.88	18.98	N	BSL
7440224	Silver	0.028	0.15	mg/kg	57SB3C	7/7	0.0044 - 0.0044	0.15	31.03	N	BSL
7440235	Sodium	74	497	mg/kg	57SB4B	7/7	8.92 - 18.1	497	Nutrient	N	Nutrient
7440280	Thallium	0.11	0.3	mg/kg	57SB3B	7/7	0.027 - 0.027	0.28	3.64	N	BSL
7440622	Vanadium	18	69	mg/kg	57SB1B	7/7	0.207 - 0.207	69	730	N	BSL
7440666	Zinc	9.3	97	mg/kg	57SB1C	7/7	0.517 - 0.517	97	13,622	N	BSL
	TCL Pesticides/PCBs (µg/kg) *										
11097691	Aroclor 1254 [4]	1.2E+01	1.2E+01	µg/kg	57SB4A	1/1	4.2 - 4.2	1.2E+01	1.1E+03	N	BSL
	TCL VOCs (µg/kg)										
78933	2-Butanone	2.1E+01	2.9E+01	µg/kg	57SB3B	7/7	6.6 - 7.95	2.9E+01	2.9E+04	N	BSL
67641	Acetone	3.7E+01	7.7E+01	µg/kg	57SB3B	7/7	6.6 - 7.95	7.7E+01	2.2E+04	N	BSL
75274	Bromodichloromethane	1.2E+00	1.2E+00	µg/kg	57SB2C	1/7	0.661 - 0.797	1.2E+00	1.1E+00	Y	**ASSL**
67663	Chloroform	1.1E+00	2.4E+01	µg/kg	57SB1C	4/7	0.589 - 0.709	2.4E+01	9.1E-01	Y	**ASSL**
75092	Methylene chloride	4.8E+00	6.8E+00	µg/kg	57SB3B	6/7	3.71 - 4.47	6.8E+00	1.9E+01	N	BSL
	TCL SVOCs (µg/kg)										
59507	4-Chloro-3-Methylphenol	1.6E+01	4.4E+01	µg/kg	57SB1C	5/7	6.77 - 8.34	4.4E+01	--	Y	NSV
117817	Bis(2-ethylhexyl)phthalate	2.0E+01	6.3E+01	µg/kg	57SB1C	7/7	2.69 - 3.31	6.3E+01	2.9E+06	N	BSL
85687	Butylbenzylphthalate	1.0E+01	3.0E+01	µg/kg	57SB1C	2/7	5.82 - 7.17	3.0E+01	1.7E+07	N	BSL
105602	Caprolactam	1.1E+01	3.6E+01	µg/kg	57SB1C	2/7	8.29 - 10.2	3.6E+01	--	Y	NSV
84662	Diethylphthalate	5.0E+00	1.2E+01	µg/kg	57SB1C	6/7	2.47 - 3.04	1.2E+01	4.5E+05	N	BSL
84742	Di-n-butylphthalate	3.8E+01	4.3E+02	µg/kg	57SB1B	7/7	4.97 - 6.11	4.3E+02	5.0E+06	N	BSL
	SVOC TICs (µg/kg)										
301020	(Z)-9-Octadecenamide	6.0E+01	8.1E+02	µg/kg	57SB1B	4/7	0 - 0	8.1E+02	--	Y	NSV
1454859	1-Heptadecanol	3.7E+01	3.7E+01	µg/kg	57SB3C	1/7	0 - 0	3.7E+01	--	Y	NSV
36653824	1-Hexadecanol	3.1E+01	4.8E+01	µg/kg	57SB4B	2/7	0 - 0	4.8E+01	--	Y	NSV
629765	1-Pentadecanol	5.2E+01	5.2E+01	µg/kg	57SB2C	1/7	0 - 0	5.2E+01	--	Y	NSV
84695	1,2-Benzenedicarboxylicacid, bis(2-methy	3.2E+01	5.4E+02	µg/kg	57SB1B	4/7	0 - 0	5.4E+02	--	Y	NSV
17851535	1,2-Benzenedicarboxylic acid, butyl 2-me	1.6E+02	1.6E+02	µg/kg	57SB4B	1/7	0 - 0	1.6E+02	--	Y	NSV
89189	1,2-Benzenedicarboxylic acid, butyl 8-me	3.4E+01	3.4E+01	µg/kg	57SB2C	1/7	0 - 0	3.4E+01	--	Y	NSV
84640	1,2-Benzenedicarboxylic acid, butyl cycl	4.7E+02	4.7E+02	µg/kg	57SB1C	1/7	0 - 0	4.7E+02	--	Y	NSV
101371	2,4,6-Triallyloxy-1,3,5-triazine	5.8E+01	1.3E+02	µg/kg	57SB1B	4/7	0 - 0	1.3E+02	--	Y	NSV

Table 7-9
HHRS SSL Comparison for SWMU 57
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Soil to Groundwater SSL (DAF 20)	COPC Flag (Y/N)	Rationale for Selection or Deletion
1000143924	7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,	2.8E+01	2.8E+01	µg/kg	57SB3B	1/7	0 - 0	2.8E+01	--	Y	NSV
142165	Bis(2-ethylhexyl)maleate	1.2E+02	1.2E+02	µg/kg	57SB1C	1/7	0 - 0	1.2E+02	--	Y	NSV
112845	Erucylamide	3.3E+02	6.3E+02	µg/kg	57SB3B	3/7	0 - 0	6.3E+02	--	Y	NSV
57114	Stearic Acid	6.4E+01	1.1E+02	µg/kg	57SB1C	2/7	0 - 0	1.1E+02	--	Y	NSV
	Cyanide (mg/kg)										
57125	Cyanide	8.0E-02	8.0E-02	mg/kg	57SB2B	2/7	0.0356 - 0.0356	8.0E-02	1.5E+02	N	BSL

Notes:

CAS = Chemical Abstracts Service
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyls
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
TIC = Tentatively Identified Compound
[1] = Chromium VI SSL DAF20 value was used
[2] = Lead criteria are Action Levels; see USEPA Region III guidance
[3] = Mercuric chloride soil RBC value used
[4] = Noncarcinogenic Residential RBC value for Aroclor 1254 was used for screening

DUP AVG = results for duplicate samples averaged
SSL DAF20 = Soil Screening Levels at a Dilution Attenuation Factor of 20 Per (SSL) values from the October 31, 2006, RBC Table

ASSL = Above Soil Screening Level
BSL = Below Soil Screening Levels
NSV = No Screening Value Available
* = Surface Soil Detections used for SSL Screening due to testing of one surface soil sample for PCB/Pesticides/Herbicides

Table 7-10
COPC/Background Comparison for SWMU 57
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Surface Soil COPC/Background Comparison

CAS #	Chemical	Minimum Concentration Surface Soil	Maximum Concentration Surface Soil	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Point Estimate[A]	Background Comparison
	TAL Metals (mg/kg)									
7429905	Aluminum	11,900	32,200	mg/kg	57SB2A	4/4	1.83 - 9.15	32,200	40,041	N
7440360	Antimony	1.2	103	mg/kg	57SB3A-DUP AVG	4/4	0.0518 - 1.3	103	--	NBE
7440382	Arsenic	1.6	5.2	mg/kg	57SB3A-DUP AVG	4/4	0.0232 - 0.0232	5.2	16	N
7440439	Cadmium	1.5	34	mg/kg	57SB3A-DUP AVG	4/4	0.182 - 0.182	34	0.69	**Y**
7440473	Chromium	20	361	mg/kg	57SB3A-DUP AVG	4/4	0.912 - 4.56	361	65	**Y**
7440484	Cobalt	5.8	42	mg/kg	57SB3A-DUP AVG	4/4	0.208 - 0.208	42	72	N
7439896	Iron	13,400	78,700	mg/kg	57SB4A	4/4	17.9 - 71.6	78,700	50,962	**Y**
7439965	Manganese	361	3,200	mg/kg	57SB4A	4/4	0.264 - 1.32	3,200	2,543	**Y**
7440622	Vanadium	29	84	mg/kg	57SB4A	4/4	0.207 - 0.207	84	108	N

Total Soil COPC/Background Comparison

CAS #	Chemical	Minimum Concentration Total Soil	Maximum Concentration Total Soil	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Point Estimate[A]	Background Comparison
	TAL Metals (mg/kg)									
7429905	Aluminum	11,900	38,900	mg/kg	57SB1C	11/11	1.83 - 9.15	38,900	40,041	N
7440360	Antimony	0.073	103	mg/kg	57SB3A-DUP AVG	9/11	0.0518 - 1.3	103	--	NBE
7440382	Arsenic	1.1	12	mg/kg	57SB3B	11/11	0.0232 - 0.0232	12	16	N
7440439	Cadmium	0.46	34	mg/kg	57SB3A-DUP AVG	11/11	0.182 - 0.182	34	0.69	**Y**
7440473	Chromium	9.3	361	mg/kg	57SB3A-DUP AVG	11/11	0.912 - 4.56	361	65	**Y**
7440484	Cobalt	5.8	42	mg/kg	57SB3A-DUP AVG	11/11	0.208 - 0.208	42	72	N
7439896	Iron	13,400	78,700	mg/kg	57SB4A	11/11	17.9 - 71.6	78,700	50,962	**Y**
7439965	Manganese	264	3,200	mg/kg	57SB4A	11/11	0.264 - 1.32	3,200	2,543	**Y**
7440622	Vanadium	18	84	mg/kg	57SB4A	11/11	0.207 - 0.207	84	108	N

Notes:

CAS = Chemical Abstracts Service

TAL = Target Analyte List

mg/kg = Milligram Per Kilogram

[A] = Facility-Wide Background Point Estimate as
Reported in the Facility-Wide Background Study Report (IT 2001a)

DUP AVG = results for duplicate samples averaged

NBE = No Background Point Estimate

Table 7-11
Detected Chemicals Occurrence for SWMU 57
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening
	TAL Metals (mg/kg)							
7429905	Aluminum	11,900	32,200	mg/kg	57SB2A	4/4	1.83 - 9.15	32,200
7440360	Antimony	1.2	102	mg/kg	57SB3A	4/4	0.0518 - 1.3	102
7440382	Arsenic	1.6	5.1	mg/kg	57SB3A	4/4	0.0232 - 0.0232	5
7440393	Barium	80.00	149	mg/kg	57SB4A	4/4	0.106 - 0.106	149
7440417	Beryllium	0.44	0.6	mg/kg	57SB4A	4/4	0.0391 - 0.0391	0.60
7440439	Cadmium	1.5	27	mg/kg	57SB3A	4/4	0.182 - 0.182	27.00
7440702	Calcium	1,420	4,440	mg/kg	57SB1A	4/4	16.6 - 16.6	4,440
7440473	Chromium	20	268	mg/kg	57SB3A	4/4	0.912 - 4.56	268
7440484	Cobalt	5.8	75	mg/kg	57SB3A	4/4	0.208 - 0.208	75
7440508	Copper	4.9	27	mg/kg	57SB3A	4/4	0.368 - 0.368	27
7439896	Iron	13,400	78,700	mg/kg	57SB4A	4/4	17.9 - 71.6	78,700
7439921	Lead	19	175	mg/kg	57SB3A	4/4	0.0218 - 0.545	175
7439954	Magnesium	923	2,700	mg/kg	57SB1A	4/4	3.21 - 3.21	2,700
7439965	Manganese	361	3,200	mg/kg	57SB4A	4/4	0.264 - 1.32	3,200
7439976	Mercury	0.05	0.16	mg/kg	57SB2A	4/4	0.0077 - 0.0077	0.16
7440020	Nickel	6	13	mg/kg	57SB3A	4/4	0.0356 - 0.0356	13
7440097	Potassium	528	968	mg/kg	57SB2A	4/4	5 - 5	968
7782492	Selenium	0.51	0.69	mg/kg	57SB2A	4/4	0.0502 - 0.0502	0.69
7440224	Silver	0.05	0.11	mg/kg	57SB3A	4/4	0.0044 - 0.0044	0.11
7440235	Sodium	33	312	mg/kg	57SB2A	4/4	8.92 - 8.92	312
7440280	Thallium	0.17	0.3	mg/kg	57SB4A	4/4	0.027 - 0.027	0.30
7440622	Vanadium	29	84	mg/kg	57SB4A	4/4	0.207 - 0.207	84
7440666	Zinc	52	895	mg/kg	57SB3A	4/4	0.517 - 5.17	895
	TCL Pesticides/PCBs (µg/kg)							
11097691	Aroclor 1254	1.2E+01	1.2E+01	µg/kg	57SB4A	1/4	4.2 - 4.2	1.2E+01
	TCL VOCs (µg/kg)							
78933	2-Butanone	2.8E+01	3.0E+01	µg/kg	57SB2A	4/4	5.8 - 7.05	3.0E+01
67641	Acetone	5.5E+01	1.0E+02	µg/kg	57SB1A	4/4	5.8 - 7.05	1.0E+02
100414	Ethylbenzene	6.6E-01	6.6E-01	µg/kg	57SB3A	1/4	0.491 - 0.596	6.6E-01
75092	Methylene chloride	3.6E+00	6.5E+00	µg/kg	57SB3A	3/4	3.26 - 3.96	6.5E+00
108883	Toluene	1.3E+00	1.3E+00	µg/kg	57SB3A	1/4	0.538 - 0.654	1.3E+00
79016	Trichloroethene	1.9E+00	1.9E+00	µg/kg	57SB3A	1/4	0.785 - 0.955	1.9E+00

Table 7-11
Detected Chemicals Occurrence for SWMU 57
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening
	TCL SVOCs[1] (µg/kg)							
91576	2-Methylnaphthalene	6.0E+00	6.0E+00	µg/kg	57SB3A	1/4	3.29 - 3.84	6.0E+00
59507	4-Chloro-3-Methylphenol	1.7E+01	4.6E+01	µg/kg	57SB3A	4/4	6.25 - 7.29	4.6E+01
208968	Acenaphthylene	2.0E+00	4.0E+00	µg/kg	57SB3A	2/4	1.8 - 2.1	4.0E+00
98862	Acetophenone	3.6E+01	3.6E+01	µg/kg	57SB3A	1/4	2.28 - 2.66	3.6E+01
117817	Bis(2-ethylhexyl)phthalate	2.1E+01	4.8E+02	µg/kg	57SB3A	4/4	2.48 - 2.9	4.8E+02
85687	Butylbenzylphthalate	4.4E+01	4.4E+01	µg/kg	57SB2A	1/4	5.38 - 6.27	4.4E+01
105602	Caprolactam	1.5E+01	4.3E+01	µg/kg	57SB3A	2/4	7.66 - 8.93	4.3E+01
84662	Diethylphthalate	7.0E+00	1.9E+01	µg/kg	57SB3A	4/4	2.28 - 2.66	1.9E+01
84742	Di-n-butylphthalate	4.1E+01	3.6E+02	µg/kg	57SB3A	4/4	4.58 - 5.35	3.6E+02
91203	Naphthalene	4.0E+00	4.0E+00	µg/kg	57SB3A	1/4	3.3 - 3.85	4.0E+00
	PAHs[2] (µg/kg)							
120127	Anthracene	1.5E+00	1.9E+00	µg/kg	57SB1A	3/4	0.77 - 0.98	1.9E+00
56553	Benzo(a)anthracene	7.1E+00	7.1E+00	µg/kg	57SB2A	1/4	0.88 - 1.12	7.1E+00
50328	Benzo(a)pyrene	1.0E+01	1.8E+01	µg/kg	57SB1A	2/4	1.1 - 1.4	1.8E+01
205992	Benzo(b)fluoranthene	1.4E+01	1.4E+01	µg/kg	57SB1A	1/4	1.43 - 1.82	1.4E+01
191242	Benzo(g,h,i)perylene	2.7E+01	2.7E+01	µg/kg	57SB1A	1/4	13.8 - 17.5	2.7E+01
207089	Benzo(k)fluoranthene	8.5E+00	8.5E+00	µg/kg	57SB1A	1/4	1.1 - 1.4	8.5E+00
218019	Chrysene	5.2E+00	1.1E+01	µg/kg	57SB1A	3/4	1.32 - 1.68	1.1E+01
206440	Fluoranthene	2.9E+01	5.7E+01	µg/kg	57SB1A	3/4	1.87 - 2.38	5.7E+01
193395	Indeno(1,2,3-cd)pyrene	7.2E+00	1.1E+01	µg/kg	57SB1A	2/4	0.77 - 0.98	1.1E+01
85018	Phenanthrene	1.1E+01	2.4E+01	µg/kg	57SB1A	3/4	0.66 - 0.84	2.4E+01
129000	Pyrene	2.0E+01	8.2E+01	µg/kg	57SB1A	3/4	0.99 - 1.26	8.2E+01
	Cyanide (mg/kg)							
57125	Cyanide	5.0E-02	1.7E-01	mg/kg	57SB3A	4/4	0.0356 - 0.0356	1.7E-01

Notes:

CAS = Chemical Abstracts Sevice
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon

mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
[1] = SVOCs analyzed by USEPA SW-846 8270 Method 8270C
[2] = PAHs analyzed by USEPA SW-846 Method8310

Table 7-12
Non-detected Chemicals for SWMU 57
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Parameter Name	Units	Number of Samples	Minimum MDL	Maximum MDL	TSV	Maximum Detection Limit Exceeds TSV
Pesticides/Herbicides							
72548	4,4'-DDD	µg/kg	1	0.357	0.357	--	NS
72559	4,4'-DDE	µg/kg	1	0.263	0.263	100	**Y**
50293	4,4'-DDT	µg/kg	1	0.27	0.27	100	N
309002	Aldrin	µg/kg	1	0.456	0.456	100	N
319846	alpha-BHC	µg/kg	1	0.455	0.455	100	N
5103719	alpha-Chlordane	µg/kg	1	0.651	0.651	100	N
319857	beta-BHC	µg/kg	1	1.7	1.7	100	N
319868	delta-BHC	µg/kg	1	1.23	1.23	100	N
60571	Dieldrin	µg/kg	1	0.464	0.464	100	N
959988	Endosulfan I	µg/kg	1	1.37	1.37	--	NS
33213659	Endosulfan II	µg/kg	1	0.321	0.321	--	NS
1031078	Endosulfan Sulfate	µg/kg	1	0.755	0.755	--	NS
72208	Endrin	µg/kg	1	0.447	0.447	100	N
7421934	Endrin aldehyde	µg/kg	1	1.67	1.67	--	NS
53494705	Endrin ketone	µg/kg	1	0.413	0.413	--	NS
58899	gamma-BHC (Lindane)	µg/kg	1	0.291	0.291	100	N
5103742	gamma-Chlordane	µg/kg	1	1.05	1.05	100	N
76448	Heptachlor	µg/kg	1	1.06	1.06	--	NS
1024573	Heptachlor epoxide	µg/kg	1	0.683	0.683	100	N
72435	Methoxychlor	µg/kg	1	0.42	0.42	100	N
8001352	Toxaphene	µg/kg	1	35	35	--	NS
93765	2,4,5-T	µg/kg	1	2.8	2.8	--	NS
93721	2,4,5-TP (Silvex)	µg/kg	1	5.6	5.6	--	NS
94757	2,4-D	µg/kg	1	22.4	22.4	--	NS
94826	2,4-DB	µg/kg	1	86.8	86.8	--	NS
75990	Dalapon	µg/kg	1	79.8	79.8	--	NS
1918009	Dicamba	µg/kg	1	2.8	2.8	--	NS
120365	Dichlorprop	µg/kg	1	23.8	23.8	--	NS
88857	Dinoseb	µg/kg	1	29.4	29.4	--	NS
94746	MCPA	µg/kg	1	1950	1950	--	NS
93652	MCPP	µg/kg	1	7080	7080	--	NS
PCBs							
12674112	Aroclor 1016	µg/kg	1	22.4	22.4	--	NS
11104282	Aroclor 1221	µg/kg	1	2.8	2.8	--	NS
11141165	Aroclor 1232	µg/kg	1	7	7	--	NS
53469219	Aroclor 1242	µg/kg	1	4.2	4.2	--	NS
12672296	Aroclor 1248	µg/kg	1	7	7	--	NS
11096825	Aroclor 1260	µg/kg	1	9.8	9.8	371	N
VOCs							
71556	1,1,1-Trichloroethane	µg/kg	4	0.494	0.601	300	N
79345	1,1,2,2-Tetrachloroethane	µg/kg	4	0.757	0.921	300	N
76131	1,1,2-Trichloro-1,2,2-trifluoroethane	µg/kg	4	0.88	1.07	--	NS
79005	1,1,2-Trichloroethane	µg/kg	4	0.688	0.836	300	N
75343	1,1-Dichloroethane	µg/kg	4	0.84	1.02	300	N
75354	1,1-Dichloroethene	µg/kg	4	0.85	1.03	--	NS
87616	1,2,3-Trichlorobenzene	µg/kg	4	0.631	0.767	--	NS
120821	1,2,4-Trichlorobenzene	µg/kg	4	0.476	0.578	100	N
96128	1,2-Dibromo-3-chloropropane	µg/kg	4	2.41	2.93	--	NS
106934	1,2-Dibromoethane	µg/kg	4	0.795	0.966	--	NS
95501	1,2-Dichlorobenzene	µg/kg	4	0.561	0.682	100	N
107062	1,2-Dichloroethane	µg/kg	4	0.5	0.608	870,000	N
78875	1,2-Dichloropropane	µg/kg	4	0.68	0.826	700,000	N
541731	1,3-Dichlorobenzene	µg/kg	4	0.311	0.378	--	NS

Table 7-12
Non-detected Chemicals for SWMU 57
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Parameter Name	Units	Number of Samples	Minimum MDL	Maximum MDL	TSV	Maximum Detection Limit Exceeds TSV
106467	1,4-Dichlorobenzene	µg/kg	4	0.824	1	100	N
591786	2-Hexanone	µg/kg	4	2.62	3.19	--	NS
108101	4-Methyl-2-pentanone	µg/kg	4	1.69	2.06	--	NS
71432	Benzene	µg/kg	4	0.611	0.743	100	N
74975	Bromochloromethane	µg/kg	4	0.883	1.07	--	NS
75274	Bromodichloromethane	µg/kg	4	0.581	0.706	450,000	N
75252	Bromoform	µg/kg	4	0.67	0.815	--	NS
74839	Bromomethane	µg/kg	4	1.74	2.12	--	NS
75150	Carbon disulfide	µg/kg	4	1.68	2.04	--	NS
56235	Carbon tetrachloride	µg/kg	4	0.541	0.657	300	N
108907	Chlorobenzene	µg/kg	4	0.767	0.932	100	N
75003	Chloroethane	µg/kg	4	1.57	1.9	--	NS
67663	Chloroform	µg/kg	4	0.517	0.629	300	N
74873	Chloromethane	µg/kg	4	0.967	1.18	--	NS
156592	cis-1,2-Dichloroethene	µg/kg	4	0.824	1	300	N
10061015	cis-1,3-Dichloropropene	µg/kg	4	0.57	0.692	--	NS
110827	Cyclohexane	µg/kg	4	0.367	0.446	--	NS
124481	Dibromochloromethane	µg/kg	4	0.6	0.729	--	NS
75718	Dichlorodifluoromethane	µg/kg	4	0.775	0.942	--	NS
100414	Ethylbenzene	µg/kg	3	0.491	0.596	100	N
98828	Isopropylbenzene	µg/kg	4	0.633	0.77	--	NS
79209	Methyl acetate	µg/kg	4	4.03	4.89	--	NS
1634044	methyl tert-Butyl ether	µg/kg	4	0.744	0.904	--	NS
108872	Methylcyclohexane	µg/kg	4	0.98	1.19	--	NS
75092	Methylene chloride	µg/kg	1	3.96	3.96	300	N
100425	Styrene	µg/kg	4	0.513	0.623	100	N
127184	Tetrachloroethene	µg/kg	4	0.711	0.864	300	N
108883	Toluene	µg/kg	3	0.538	0.654	100	N
156605	trans-1,2-Dichloroethene	µg/kg	4	0.815	0.991	300	N
10061026	trans-1,3-Dichloropropene	µg/kg	4	0.604	0.735	--	NS
79016	Trichloroethene	µg/kg	3	0.785	0.955	300	N
75694	Trichlorofluoromethane	µg/kg	4	0.862	1.05	--	NS
75014	Vinyl Chloride	µg/kg	4	0.429	0.522	300	N
1330207	Xylenes	µg/kg	4	0.488	0.594	100	N
SVOCs							
92524	1,1'-Biphenyl	µg/kg	4	2.95	3.44	--	NS
95943	1,2,4,5-Tetrachlorobenzene	µg/kg	4	34.4	40.2	--	NS
108601	2,2'-oxybis(1-Chloropropane)	µg/kg	4	1.58	1.85	--	NS
95954	2,4,5-Trichlorophenol	µg/kg	4	4.01	4.68	100	N
88062	2,4,6-Trichlorophenol	µg/kg	4	3.14	3.67	100	N
120832	2,4-Dichlorophenol	µg/kg	4	4.22	4.93	100	N
105679	2,4-Dimethylphenol	µg/kg	4	9.53	11.1	100	N
51285	2,4-Dinitrophenol	µg/kg	4	3.84	4.48	20,000	N
121142	2,4-Dinitrotoluene	µg/kg	4	3.78	4.41	--	NS
606202	2,6-Dinitrotoluene	µg/kg	4	33.2	38.8	--	NS
91587	2-Chloronaphthalene	µg/kg	4	2.76	3.22	--	NS
95578	2-Chlorophenol	µg/kg	4	2.41	2.81	100	N
91576	2-Methylnaphthalene	µg/kg	3	3.29	3.84	--	NS
95487	2-Methylphenol	µg/kg	4	5.81	6.78	100	N
88744	2-Nitroaniline	µg/kg	4	5.52	6.44	--	NS
88755	2-Nitrophenol	µg/kg	4	2.04	2.38	--	NS
91941	3,3'-Dichlorobenzidine	µg/kg	4	66.5	86.7	--	NS
99092	3-Nitroaniline	µg/kg	4	22	43.3	--	NS
534521	4,6-Dinitro-2-methylphenol	µg/kg	4	5.41	6.31	--	NS

Table 7-12
Non-detected Chemicals for SWMU 57
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Parameter Name	Units	Number of Samples	Minimum MDL	Maximum MDL	TSV	Maximum Detection Limit Exceeds TSV
101553	4-Bromophenyl-phenylether	µg/kg	4	4.06	4.73	--	NS
106478	4-Chloroaniline	µg/kg	4	1.51	1.76	--	NS
7005723	4-Chlorophenyl-phenylether	µg/kg	4	3.92	4.58	--	NS
106445	4-Methylphenol	µg/kg	4	7.64	8.92	100	N
100016	4-Nitroaniline	µg/kg	4	8.7	10.2	--	NS
100027	4-Nitrophenol	µg/kg	4	3.4	3.96	100	N
83329	Acenaphthene	µg/kg	4	2.06	2.41	100	N
208968	Acenaphthylene	µg/kg	2	1.8	2.1	100	N
98862	Acetophenone	µg/kg	3	2.28	2.66	--	NS
120127	Anthracene	µg/kg	4	5.54	6.47	100	N
1912249	Atrazine	µg/kg	4	8.26	9.63	--	NS
100527	Benzaldehyde	µg/kg	4	4.86	5.67	--	NS
56553	Benzo(a)anthracene	µg/kg	4	16	18.6	100	N
50328	Benzo(a)pyrene	µg/kg	1	7.99	7.99	100	N
205992	Benzo(b)fluoranthene	µg/kg	1	13.7	13.7	100	N
191242	Benzo(g,h,i)perylene	µg/kg	4	10.5	12.2	100	N
207089	Benzo(k)fluoranthene	µg/kg	4	16.1	18.8	100	N
111911	Bis(2-chloroethoxy)methane	µg/kg	4	3.77	4.4	--	NS
111444	Bis(2-chloroethyl)ether	µg/kg	4	2.08	2.42	--	NS
85687	Butylbenzylphthalate	µg/kg	3	5.38	6.27	--	NS
105602	Caprolactam	µg/kg	2	8.29	8.93	--	NS
86748	Carbazole	µg/kg	4	7.32	8.54	--	NS
218019	Chrysene	µg/kg	2	13.3	14.3	100	N
53703	Dibenz(a,h)anthracene	µg/kg	4	7.08	8.26	100	N
132649	Dibenzofuran	µg/kg	4	3.79	4.42	--	NS
131113	Dimethylphthalate	µg/kg	4	3.97	4.63	200,000	N
117840	Di-n-octylphthalate	µg/kg	4	3.72	4.34	--	NS
206440	Fluoranthene	µg/kg	1	3.29	3.29	100	N
86737	Fluorene	µg/kg	4	2.02	2.35	100	N
118741	Hexachlorobenzene	µg/kg	4	3.01	3.51	1,000,000	N
87683	Hexachlorobutadiene	µg/kg	4	4.64	5.42	--	NS
77474	Hexachlorocyclopentadiene	µg/kg	4	2.38	2.77	10,000	N
67721	Hexachloroethane	µg/kg	4	2.8	3.27	--	NS
193395	Indeno(1,2,3-cd)pyrene	µg/kg	1	5.49	5.49	100	N
78591	Isophorone	µg/kg	4	2.08	2.42	--	NS
91203	Naphthalene	µg/kg	3	3.3	3.85	100	N
98953	Nitrobenzene	µg/kg	4	3.84	4.48	40,000	N
621647	N-Nitrosodi-n-propylamine	µg/kg	4	3.95	4.61	--	NS
86306	N-Nitrosodiphenylamine	µg/kg	4	5.7	6.65	20,000	N
87865	Pentachlorophenol	µg/kg	4	5.27	6.15	100	N
85018	Phenanthrene	µg/kg	1	3.22	3.22	100	N
108952	Phenol	µg/kg	4	4.75	5.54	100	N
129000	Pyrene	µg/kg	1	2.07	2.07	100	N
PAHs							
83329	Acenaphthene	µg/kg	4	10.3	13.2	100	N
208968	Acenaphthylene	µg/kg	4	12.8	16.2	100	N
120127	Anthracene	µg/kg	1	0.98	0.98	100	N
56553	Benzo(a)anthracene	µg/kg	3	0.88	1.12	100	N
50328	Benzo(a)pyrene	µg/kg	2	1.1	1.4	100	N
205992	Benzo(b)fluoranthene	µg/kg	3	1.43	1.82	100	N
191242	Benzo(g,h,i)perylene	µg/kg	3	13.8	17.5	100	N
207089	Benzo(k)fluoranthene	µg/kg	3	1.1	1.4	100	N
218019	Chrysene	µg/kg	1	1.68	1.68	100	N
53703	Dibenz(a,h)anthracene	µg/kg	4	1.54	1.96	100	N

Table 7-12
Non-detected Chemicals for SWMU 57
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Parameter Name	Units	Number of Samples	Minimum MDL	Maximum MDL	TSV	Maximum Detection Limit Exceeds TSV
206440	Fluoranthene	µg/kg	1	2.38	2.38	100	N
86737	Fluorene	µg/kg	4	1.43	1.82	100	N
193395	Indeno(1,2,3-cd)pyrene	µg/kg	2	0.77	0.98	100	N
91203	Naphthalene	µg/kg	4	8.69	11.1	100	N
85018	Phenanthrene	µg/kg	1	0.84	0.84	100	N
129000	Pyrene	µg/kg	1	1.26	1.26	100	N
Explosives							
99354	1,3,5-Trinitrobenzene	mg/kg	4	0.14	0.14	--	NS
99650	1,3-Dinitrobenzene	mg/kg	4	0.159	0.159	--	NS
118967	2,4,6-Trinitrotoluene	mg/kg	4	0.167	0.167	--	NS
121142	2,4-Dinitrotoluene	mg/kg	4	0.142	0.142	--	NS
606202	2,6-Dinitrotoluene	mg/kg	4	0.25	0.25	--	NS
35572782	2-Amino-4,6-dinitrotoluene	mg/kg	4	0.151	0.151	--	NS
88722	2-Nitrotoluene	mg/kg	4	0.266	0.266	--	NS
99081	3-Nitrotoluene	mg/kg	4	0.184	0.184	--	NS
1946510	4-Amino-2,6-dinitrotoluene	mg/kg	4	0.162	0.162	--	NS
99990	4-Nitrotoluene	mg/kg	4	0.251	0.251	--	NS
2691410	HMX (Octahydro-1,3,5,7-tetranitro-1,3,5,	mg/kg	4	0.229	0.229	--	NS
98953	Nitrobenzene	mg/kg	4	0.102	0.102	40,000	N
121824	RDX (Hexahydro-1,3,5-trinitro-1,3,5-tria	mg/kg	4	0.131	0.131	--	NS
Nitroglycerin/PETN							
628966	Nitroglycerin	mg/kg	4	0.181	0.247	--	NS
78115	PETN	mg/kg	4	0.249	0.339	--	NS

Notes:
CAS = Chemical Abstracts Service
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
NS = No screening value
TSV = Toxicity Screening Value
MDL = Method Detection Limit

Table 7-13
Preliminary Soil Invertebrate Risk Characterization for SWMU 57
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Chemicals	CAS #	MDC for Surface Soil	Direct Contact TRV	TRV Source[A]	HQ
TAL Metals (mg/kg)					
Aluminum	7429-90-5	32,200	1	BTAG 1995	**32,200**
Antimony	7440-36-0	102	78	ECO SSL 2005	**1.3**
Arsenic	7440-38-2	5	328	BTAG 1995	<1
Barium	7440-39-3	149	330	ECO SSL 2005	<1
Beryllium	7440-41-7	0.60	40	ECO SSL 2005	<1
Calcium	7440-70-2	4,440	NV	--	NC
Chromium	7440-47-3	268	0.0075	BTAG 1995	**35,733**
Cobalt	7440-48-4	75	200	BTAG 1995	<1
Copper	7440-50-8	27	50	ORNL 1997a	<1
Iron	7439-89-6	78,700	12	BTAG 1995	**6,558**
Lead	7439-92-1	175	1,700	ECO SSL 2005	<1
Manganese	7439-96-5	3,200	330	BTAG 1995	**10**
Mercury	7439-97-6	0.16	0.058	BTAG 1995	**3**
Nickel	7440-02-0	13	100	ORNL 1997a	<1
Selenium	7782-49-2	0.69	1.8	BTAG 1995	<1
Silver	7440-22-4	0.11	20	CCME 2004	<1
Thallium	7440-28-0	0.30	1	CCME 2004	<1
Vanadium	7440-62-2	84	58	BTAG 1995	**1.4**
Zinc	7440-66-6	895	100	ORNL 1997a	**9**
TCL Pesticides/PCBs (µg/kg)					
Aroclor 1254	11097-69-1	12	500	CCME 2004	<1
TCL VOCs (µg/kg)					
2-Butanone	78-93-3	30	NV	--	NC
Acetone	67-64-1	100	NV	--	NC
Ethylbenzene	100-41-4	0.66	100	BTAG 1995	<1
Methylene chloride	75-09-2	6.5	300	BTAG 1995	<1
Toluene	108-88-3	1.3	100	BTAG 1995	<1
Trichloroethene	79-01-6	1.9	300	BTAG 1995	<1
TCL SVOCs (µg/kg)					
2-Methylnaphthalene	91-57-6	6	NV	--	NC
4-Chloro-3-Methylphenol	59-50-7	46	NV	--	NC
Acenaphthylene	208-96-8	4	100	BTAG 1995	<1
Acetophenone	98-86-2	36	NV	--	NC
Bis(2-ethylhexyl)phthalate	117-81-7	480	NV	--	NC
Butylbenzylphthalate	85-68-7	44	NV	--	NC
Caprolactam	105-60-2	43	NV	--	NC
Diethylphthalate	84-66-2	19	NV	--	NC
Di-n-butylphthalate	84-74-2	360	NV	--	NC
Naphthalene	91-20-3	4	100	BTAG 1995	<1
PAHs (µg/kg)					
Anthracene	120-12-7	1.9	100	BTAG 1995	<1
Benzo(a)anthracene	56-55-3	7.1	100	BTAG 1995	<1
Benzo(a)pyrene	50-32-8	18	100	BTAG 1995	<1
Benzo(b)fluoranthene	205-99-2	14	100	BTAG 1995	<1
Benzo(g,h,i)perylene	191-24-2	27	100	BTAG 1995	<1
Benzo(k)fluoranthene	207-08-9	8.5	100	BTAG 1995	<1
Chrysene	218-01-9	11	100	BTAG 1995	<1
Fluoranthene	206-44-0	57	100	BTAG 1995	<1
Indeno(1,2,3-cd)pyrene	193-39-5	11	100	BTAG 1995	<1
Phenanthrene	85-01-8	24	100	BTAG 1995	<1
Pyrene	129-00-0	82	100	BTAG 1995	<1
Cyanide (mg/kg)					
Cyanide	57-12-5	0.17	0.005	BTAG 1995	**34**

Table 7-13
Preliminary Soil Invertebrate Risk Characterization for SWMU 57
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Notes:

CAS = Chemical Abstracts Service
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
MDC = Maximum Detected Concentration
TRV = Toxicity Reference Value
HQ = Hazard Quotient
NV = No value
NC = Not Calculated no TRV available
BTAG = Biological Technical Assistance Group Screening Level, Draft 1995

[A] =
Region III BTAG (USEPA 1995)
Oak Ridge National Laboratory (Efroymson et al. 1997a)
USEPA Ecological SSL (ECO-SSL 2005)
Canadian Environmental Quality Guidelines (CCME 2004)

Table 7-14
Inorganic COPEC/Background Comparison for SWMU 57
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Measured Analytes	CAS-Number	MDC for Surface Soil	Background Point Estimate [A]	Maximum Concentration Exceeds Background Point Estimate
TAL METALS (mg/kg)				
ALUMINUM	7429-90-5	32,200	40,041	N
ANTIMONY	7440-36-0	102.00	--	NBE
ARSENIC	7440-38-2	5.10	16	N
CADMIUM	7440-43-9	27.00	0.69	**Y**
CHROMIUM	7440-47-3	268	65	**Y**
IRON	7439-89-6	78,700	50,962	**Y**
LEAD	7439-92-1	175	27	**Y**
MANGANESE	7439-96-5	3,200	2,543	**Y**
MERCURY	7439-97-6	0.16	0.13	**Y**
NICKEL	7440-02-0	13	63	N
SELENIUM	7782-49-2	0.69	--	NBE
VANADIUM	7440-62-2	84	108	N
ZINC	7440-66-6	895	202	**Y**

Notes:
CAS = Chemical Abstracts Service
mg/kg = Milligram Per Kilogram
MDC = Maximum Detected Concentration
[A] = Facility-Wide Background Point Estimate as Reported in the Facility-Wide Background Study Report (IT 2001a)
NBE = No Background Point Estimate Available

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Table 7-15
Preliminary/Refined Wildlife Risk Characterization
Screening Level Ecological Risk Assessment
SSP Report - SWMU 57
Radford Army Ammunition Plant, Radford, Virginia

Preliminary Assessment

Parameter	Maximum Soil Concentration (mg/kg)	Wildlife TRV-Based Soil Concentrations																			
		American Robin				Red-tailed Hawk				Meadow Vole				Red Fox				Short-tailed Shrew			
		NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ
Metals																					
ARSENIC	5	1.39E+01	<1	3.46E+01	<1	3.89E+02	<1	9.71E+02	<1	8.99E+00	<1	8.99E+01	<1	1.34E+00	3.7	1.34E+01	<1	3.02E-01	16.6	3.02E+00	1.7
CADMIUM	27	6.75E-01	40.0	9.31E+00	2.9	3.91E+02	<1	5.40E+03	<1	1.50E+01	1.8	1.50E+02	<1	1.48E+01	1.8	1.48E+02	<1	1.16E+00	23.3	1.16E+01	2.3
CHROMIUM	268	5.27E+00	50.8	2.64E+01	10.2	2.70E+01	9.9	1.35E+02	2.0	8.65E+05	<1	8.65E+06	<1	2.38E+04	<1	2.38E+05	<1	1.78E+04	<1	1.78E+05	<1
COPPER	27	1.38E+02	<1	1.82E+02	<1	7.11E+02	<1	9.33E+02	<1	8.34E+02	<1	1.10E+03	<1	7.43E+01	<1	9.78E+01	<1	9.57E+01	<1	1.26E+02	<1
LEAD	175	5.18E+00	33.8	5.18E+01	3.4	5.69E+02	<1	5.69E+03	<1	1.05E+03	<1	1.05E+04	<1	4.97E+02	<1	4.97E+03	<1	5.45E+01	3.2	5.45E+02	<1
MERCURY	0.16	6.08E-01	<1	1.22E+00	<1	2.62E-01	<1	5.23E-01	<1	4.27E-01	<1	1.74E+00	<1	3.93E-03	40.7	1.60E-02	10.0	8.31E-02	1.9	3.39E-01	<1
NICKEL	13	3.86E+02	<1	5.33E+02	<1	1.95E+03	<1	2.70E+03	<1	5.54E+03	<1	1.11E+04	<1	3.23E+02	<1	6.46E+02	<1	2.86E+02	<1	5.71E+02	<1
SELENIUM	0.69	3.13E-01	2.2	6.27E-01	1.1	4.03E+00	<1	8.06E+00	<1	2.73E+00	<1	4.50E+00	<1	6.09E-01	1.1	1.00E+00	<1	5.27E-01	1.3	8.70E-01	<1
SILVER	0.11	2.31E+01	<1	1.73E+02	<1	8.34E+02	<1	6.26E+03	<1	1.72E+03	<1	1.72E+04	<1	2.89E+02	<1	2.89E+03	<1	5.85E+01	<1	5.85E+02	<1
ZINC	895	1.40E+01	64.0	1.26E+02	7.1	2.19E+01	40.8	1.98E+02	4.5	3.38E+03	<1	6.75E+03	<1	8.28E+01	10.8	1.66E+02	5.4	4.22E+02	2.1	8.44E+02	1.1
PCBs																					
Aroclor 1254	0.012	8.69E-03	1.4	8.69E-02	<1	1.53E+00	<1	1.53E+01	<1	1.17E+01	<1	1.17E+02	<1	5.33E-02	<1	5.33E-01	<1	3.42E-03	3.5	3.42E-02	<1
SVOCs/PAHs																					
ACENAPHTHYLENE	0.004	NC		NC		NC		NC		1.38E+04	<1	6.90E+04	<1	9.71E+03	<1	4.85E+04	<1	9.32E+02	<1	4.66E+03	<1
ANTHRACENE	0.0019	NC		NC		NC		NC		5.23E+04	<1	5.23E+05	<1	2.14E+04	<1	2.14E+05	<1	2.20E+03	<1	2.20E+04	<1
BENZO(A)ANTHRACENE	0.0071	NC		NC		NC		NC		4.78E+01	<1	4.78E+02	<1	2.55E+00	<1	2.55E+01	<1	1.43E+00	<1	1.43E+01	<1
BENZO(A)PYRENE	0.018	3.56E+00	<1	1.78E+01	<1	9.73E+00	<1	4.87E+01	<1	1.66E+02	<1	1.66E+03	<1	3.48E+00	<1	3.48E+01	<1	4.23E+00	<1	4.23E+01	<1
BENZO(B)FLUORANTHENE	0.014	NC		NC		NC		NC		1.68E+02	<1	1.68E+03	<1	2.87E+00	<1	2.87E+01	<1	5.12E+00	<1	5.12E+01	<1
BENZO(G,H,I)PERYLENE	0.027	NC		NC		NC		NC		8.86E+01	<1	4.43E+02	<1	1.87E-01	<1	9.34E-01	<1	2.84E+00	<1	1.42E+01	<1
BENZO(K)FLUORANTHENE	0.0085	NC		NC		NC		NC		1.85E+03	<1	1.85E+04	<1	3.16E+01	<1	3.16E+02	<1	5.65E+01	<1	5.65E+02	<1
CHRYSENE	0.011	NC		NC		NC		NC		2.37E+03	<1	2.37E+04	<1	1.24E+02	<1	1.24E+03	<1	5.65E+01	<1	5.65E+02	<1
FLUORANTHENE	0.057	NC		NC		NC		NC		4.11E+03	<1	2.05E+04	<1	7.02E+02	<1	3.51E+03	<1	1.24E+02	<1	6.22E+02	<1
INDENO(1,2,3-CD)PYRENE	0.011	NC		NC		NC		NC		1.92E+03	<1	1.92E+04	<1	1.15E+01	<1	1.15E+02	<1	4.26E+01	<1	4.26E+02	<1
PHENANTHRENE	0.024	8.17E+00	<1	4.08E+01	<1	7.63E+02	<1	3.81E+03	<1	7.32E+02	<1	3.66E+03	<1	2.98E+02	<1	1.49E+03	<1	3.22E+01	<1	1.61E+02	<1
PYRENE	0.082	NC		NC		NC		NC		1.07E+03	<1	5.35E+03	<1	1.85E+02	<1	9.25E+02	<1	3.17E+01	<1	1.58E+02	<1

Refined Assessment

Parameter	Maximum Soil Concentration (mg/kg)	Wildlife TRV-Based Soil Concentrations																			
		American Robin				Red-tailed Hawk				Meadow Vole				Red Fox				Short-tailed Shrew			
		NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ
Metals																					
ARSENIC	5.0	6.04E+01	<1	1.51E+02	<1	8.09E+05	<1	2.02E+06	<1	1.65E+01	<1	1.65E+02	<1	8.23E+02	<1	8.23E+03	<1	1.03E+00	4.9	1.03E+01	<1
CADMIUM	27	3.08E+00	8.8	4.25E+01	<1	8.15E+05	<1	1.12E+07	<1	2.75E+01	<1	2.75E+02	<1	9.95E+03	<1	9.95E+04	<1	4.06E+00	6.6	4.06E+01	<1
CHROMIUM	268	2.18E+01	12.3	1.09E+02	2.5	5.62E+04	<1	2.81E+05	<1	1.59E+06	<1	1.59E+07	<1	1.45E+07	<1	1.45E+08	<1	5.98E+04	<1	5.98E+05	<1
LEAD	175	2.17E+01	8.1	2.17E+02	<1	1.19E+06	<1	1.19E+07	<1	1.92E+03	<1	1.92E+04	<1	3.11E+05	<1	3.11E+06	<1	1.83E+02	<1	1.83E+03	<1
MERCURY	0.16	2.72E+00	<1	5.45E+00	<1	5.45E+02	<1	1.09E+03	<1	7.83E-01	<1	3.20E+00	<1	2.40E+00	<1	9.78E+00	<1	2.84E-01	<1	1.16E+00	<1
SELENIUM	0.69	1.42E+00	<1	2.84E+00	<1	8.39E+03	<1	1.68E+04	<1	5.00E+00	<1	8.25E+00	<1	3.79E+02	<1	6.25E+02	<1	1.82E+00	<1	3.01E+00	<1
ZINC	895	6.32E+01	14.2	5.71E+02	1.6	4.56E+04	<1	4.12E+05	<1	6.19E+03	<1	1.24E+04	<1	5.06E+04	<1	1.01E+05	<1	1.46E+03	<1	2.92E+03	<1
PCBs																					
Aroclor 1254	0.012	4.00E-02	<1	4.00E-01	<1	3.18E+03	<1	3.18E+04	<1	2.14E+01	<1	2.14E+02	<1	3.25E+01	<1	3.25E+02	<1	1.21E-02	<1	1.21E-01	<1

Notes:
NC = Not Calculated no TRV available
TRV = Toxicity Reference Value
HQ = Hazard Quotient
LOAEL = Lowest observable adverse effects level
NOAEL = No observable adverse effects level
mg/kg = Milligram Per Kilogram
PCB = Polychlorinated Biphenyls
SVOC = Semi-Volatile Organic Compound
PAH = Poly-Aromatic Hydrocarbon

= Indicate HQs greater than 1.0

Refer to Appendix I for detailed description of model parameters and results

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8.0 SWMU 68 – CHROMIC ACID TREATMENT TANKS

8.1 SITE BACKGROUND – ENVIRONMENTAL SETTING

Physiography

SWMU 68, the former chromic acid tanks, is a 0.023-acre area (1,011 ft^2) located in the western section of the HSA northwest of historically related buildings. Topography at SWMU 68 is moderately sloping towards the northwest at an elevation of approximately 1,800 ft msl (Figure 8-1).

The site is located in an area of dense vegetation. Piping components and an eye wash station related to the site are present. Other physical features near the site include asphalt-paved roads to the east, a densely wooded area to the north and west, and several unrelated overhead pipes and associated appurtenances (Figure 8-1).



SWMU 68 – August 2002 – Looking Northwest

Tanks and Structures

Other tanks or structures are not located on or near the site.

Surface Water

Drainage from this area was engineered to flow into a former settling pond (SWMU 69). During the SSP site visit, stormwater runoff in the area of the site was observed flowing westward in a well-defined drainage ditch to a perennial stream that discharges to the New River located approximately 1,400 ft to the northwest. Other manholes, catch basins, storm drains, or other drainageways have not been identified associated with the site.

Soil and Geology

SWMU 68 is underlain by the Braddock loam soil. This soil has moderate permeability and is acidic-to-strongly acidic (IT 2001a). SSP borings completed to the depth of groundwater (up to 24 ft) and refusal (68SB1) indicate that the site is underlain by 22 ft + of unconsolidated soil (alluvial terrace deposits and saprolite) overlying carbonate bedrock of the Elbrook Formation. Overburden soil consists primarily of silt and clay (ML and CL), with saprolitic soil occurring from 10 ft bgs to boring completion depths. Approximately 7 ft of fill material was encountered in borings 68SB1 and 68SB2. Physical soil testing of two representative soil samples at the site indicated slightly acidic to acidic ML and CL soil, with organic content in the range of 1.5 to 3.6%, and a vertical hydraulic conductivity of 1.9E-06 cm/sec for the ML sample (Table 3-1).

Groundwater

An unconfined aquifer occurs within the lower portion of unconsolidated soil underlying the site; groundwater is also present within the underlying bedrock. Groundwater was encountered at depths of 20 ft bgs (68SB1) to 23.5 ft bgs (68SB2). Based on surface topography, groundwater flow in the site area is likely toward the northwest toward the New River.

8.2 SITE BACKGROUND - HISTORY

In 1958, RFAAP started reconditioning "Nike" and "Honest John" rocket motors utilizing a rinse of chromic acid with rust inhibitors (Hercules 1958). RFAAP operated a Virginia State Water Control Board approved waste treatment plant (SWMU 68) in the Cast Propellant Area to treat chromic-acid wastewater prior to discharge to the New River (Hercules 1958, SWCB 1958).

RFAAP as-built specifications and drawings indicate that the site consisted of two 4,000-gallon aboveground, open top tanks (ASTs) with associated pumps, piping, and appurtenances. Each tank was reportedly 9 ft tall with an 8.5 ft diameter. The former ASTs received discharge from chemical feed tanks (sodium metabisulfate, sulfuric acid, and lime) located in a nearby building via an existing four-inch-diameter stainless steel line. The drawings also indicate that a 4-inch-diameter terra cotta line from a 1,500-gallon Chromic Acid Treatment Tank in nearby Building 4931 was connected to the former ASTs.

Tanks in the nearby building were used prior to 1974 to treat spent chromic acid generated from the cleaning of rocket encasements (USEPA 1987). Hexavalent chromic acid was batch treated using hydroxide precipitation. Spent hexavalent chromic acid (Cr^{+6}) was first adjusted to a pH of approximately 1.5 using sulfuric acid, and then reduced to the trivalent state (Cr^{+3}) using sodium metabisulfate. High calcium lime was added to the solution to adjust the pH to approximately 8.6. Treated wastewater was then discharged to a 12,000-gallon settling pond (SWMU 69) where chromium-hydroxide sludge precipitated (Hercules 1958). Additionally, spent Oakite 33®, pH adjusted to pH of 5.0 with soda ash, and high-pH rust stripper, neutralized with sulfuric acid, was also discharged to SWMU 69 (Hercules 1958).

In July 1997, the site underwent closure including removal of the two treatment ASTs, appurtenances, and impacted soil. A draft Closure Plan was prepared by ICF Kaiser and submitted by RFAAP to the USEPA Region III and VDEQ in October 1997 (ATK 1997b). USEPA Region III responded in March 1998 with a completeness review and requested revisions to the draft Closure Plan (USEPA 1998b). RFAAP revised the Plan to comply with the USEPA revision request and resubmitted the Final Closure Plan to USEPA Region III and VDEQ in April 1998 (ATK 1998a; Appendix C). Based on the results of the investigation, "no further action" was recommended for this site (ICF Kaiser 1998).

8.3 PREVIOUS INVESTIGATIONS

8.3.1 Verification Investigation – 1992

Dames & Moore conducted a VI at SWMU 68 in February 1992 to "evaluate whether surface soil(s) in the vicinity of the treatment tanks were impacted as a results of past spills, leaks, or overflows of waste chromic acid" (Dames and Moore 1992b). Two surface soil samples (68SS1 and 68SS2) were collected from a depth of 0 to 6 inches bgs and analyzed for pH and TAL metals (Figure 8-2).

TAL metals results did not exceed both background point estimates and an adjusted RBC (or Draft BTAG screening level), except for thallium, which was detected in samples 68SS1 and 68SS2 at concentrations above the adjusted I-RBC and the Draft BTAG screening level.

8.3.2 SWMU 68 Closure Report – 1997/1998

In 1998, ICF Kaiser conducted SWMU closure activities at SWMU 68 in accordance with WPA 001. The location of the twelve test pits and associated samples is shown on Figure 8-2. One sample and one duplicate soil sample were collected within each assumed homogeneous 8 ft by 8 ft by 4 ft sample grid. Each sample was collected from approximately 4 to 5 ft bgs and was analyzed for TAL metals. Two contingency samples were also collected from 8.0 to 8.5 feet bgs from test pits in the northwest and southwest quadrants.

TAL metals results did not exceed both the Facility-wide background point estimates and an adjusted RBC (or Draft BTAG screening level), except for aluminum in sample 68TP11B and iron in samples 68TP10A and 68TP11B, respectively (Table 8-2).

8.3.3 Review of EPIC Aerial Photo Assessment Report

Activity at SWMU 68 was first noted on a 1962 aerial photograph as "two visible tanks." This area remained unchanged through the 1986 photograph (USEPA 1992).

8.4 WORK PLAN DATA GAP ANALYSIS

The data gap analysis presented in Section 1.8.5 of WPA 016 indicated that limited soil sampling and analyses had occurred at SWMU 68 (URS 2003b). The following data gaps were identified:

- TCL VOCs - surface and subsurface soil;
- TCL SVOCs/PAHs - surface and subsurface soil;
- TCL PCBs and pesticides - surface soil;
- Explosives - surface and subsurface soil;
- TAL inorganics - surface and subsurface soil; and
- Site-specific physical soil testing data.

8.5 SSP FIELD ACTIVITIES

Soil borings 68SB1, 68SB2, and 68SB3 were advanced within and around the former tank location to evaluate the presence or absence of chemicals in surface soil and subsurface soil (Figure 8-1). Each boring was advanced to the depth of groundwater (refusal also occurred in one boring below the depth of groundwater) using a tractor mounted, direct-push Geoprobe® unit. Discrete samples were collected from surface, intermediate, and terminal intervals for the three borings as summarized below.

SWMU 68 SSP Samples

Boring ID	Total Depth of Boring (ft bgs)	Surface Sample ID	Sample Depth (ft)	Intermediate Sample ID	Sample Depth (ft)	Terminal Sample ID	Sample Depth (ft)
68SB1	22.5	68SB1A	0.0 - 1.0	68SB1B	7.0 - 9.0	68SB1C	18.0 - 20.0
68SB2	24.0	68SB2A	0.0 - 1.0	68SB2B	7.0 - 9.0	68SB2C	21.0 - 23.0
68SB3	24.0	68SB3A	0.0 - 1.0	68SB3B	8.0 - 10.0	68SB3C	18.0 – 20.0

Soil samples were analyzed for TCL VOCs, TCL SVOCs, PAHs, explosives (including nitroglycerin and PETN), and TAL inorganics. Surface soil sample 68SB1A was also analyzed for TCL pesticides, TCL PCBs, and TCL herbicides. SSP analytical results (detected chemicals) are summarized in Table 8-3.

Two soil samples were collected from 68SB2 (18-18.5 ft bgs) and 68SB3 (7-7.5 ft bgs) for physical testing of percent moisture, grain size, pH, TOC, specific gravity, and bulk density. Additional physical testing was conducted on sample 68SB3 including: Atterberg limits, hydrometer analysis, and hydraulic conductivity. Analytical results for these samples are summarized in Table 3-1 and complete results are presented in Appendix E.

Deviations to the SSP field program outlined in WPA 016 were not necessary to adjust to field conditions at the site.

8.6 HUMAN HEALTH RISK SCREENING

8.6.1 Identification of COPCs

Tables 8-4 and 8-5 present the results of the COPC evaluations for surface soil and total soil, respectively. COPCs identified for surface soil and total soil included:

- *TAL Metals:* aluminum (NSV), antimony, arsenic, cadmium, chromium, cobalt (NSV), iron, manganese, and vanadium.
- *TCL SVOCs:* 4-chloro-3-methylphenol (NSV) and benzo(a)pyrene; and
- *SVOC TICs:* 10 compounds (NSVs) for surface soil and 16 compounds (NSVs) for total soil.

8.6.2 Cumulative Risk Screen

Table 8-6 presents the results of the cumulative risk screening for surface soil. Tables 8-7 and 8-8 present the results of the cumulative risk screening for total soil. A summary of the screening results is presented below:

Cumulative Human Health Risk Screening Results for SWMU 68

	Surface Soil			**Total Soil**		
Residential Excess Cancer Risk	Pass	9.E-06	--	Fail	2.E-05	Arsenic, benzo(a)pyrene
Industrial Excess Cancer Risk	Pass	2.E-06	--	Pass	4.E-06	--
Residential Noncarcinogenic	Fail	4	Sb, As, Cd, Cr, Fe, Mn, V	Fail	4	Sb, As, Cd, Cr, Fe, Mn, V
Industrial Noncarcinogenic	Pass	0.3	--	Pass	0.3	--

The cumulative human health risk screens failed for residential surface soil (noncarcinogenic) and residential total soil (carcinogenic and noncarcinogenic). Cumulative risk screenings passed for industrial scenarios.

Noncarcinogenic residential cumulative risk screenings for surface soil and total soil resulted in HIs of 4, which exceeded the EPA target HI of 1. Due to multiple chemicals contributing to an HI greater than 1, the HIs have been segregated based on primary target organs for chronic exposure. The following tables present the results of the HI segregation using data obtained from Oak Ridge National Laboratory's RAIS, which includes data from various sources such as USEPA and the ATSDR:

HI Segregation for Target Organs – SWMU 68 – Surface Soil

Target Organ	Sb	As	Cd	Cr	Fe	Mn	V	Total HI
Skin	--	0.1	--	--	--	--	--	0.1
CNS	--	0.1	--	--	--	0.6	--	***0.7***
CV	--	0.1	--	--	1	--	--	***1***
Blood	--	--	--	--	--	--	0. 7	***0.7***
Liver	--	--	--	--	1	--	--	***1***
Kidney	--	--	0.1	--	1	--	0.7	***2***
GI	0.4	--	--	0.2	--	--	0.7	***1***
Reproductive	--	--	--	--	--	0.6	--	***0.6***

HI segregation resulted in values equal to or higher than the cumulative SSP HI threshold of 0.5 for a target organ including: the CNS, CV, blood, liver, kidney, GI, and reproductive.

HI Segregation for Target Organs – SWMU 68 – Total Soil

Target Organ	Sb	As	Cd	Cr	Fe	Mn	V	Total HI
Skin	--	0.3	--	--	--	--	--	0.3
CNS	--	0.3	--	--	--	0.4	--	***0.7***
CV	--	0.3	--	--	2	--	--	***2***
Blood	--	--	--	--	--	--	0.7	***0.7***
Liver	--	--	--	--	2	--	--	***2***
Kidney	--	--	0.1	--	2	--	0.7	***3***
GI	0.1	--	--	0.1	--	--	0.7	***0.9***
Reproductive	--	--	--	--	--	0.4	--	0.4

HI segregation resulted in values equal to or higher than the cumulative SSP HI threshold of 0.5 for a target organ including: the CNS, CV, blood, liver, kidney, and GI.

8.6.3 Lead and Iron Screening

The MDC for lead at the site was 23 mg/kg, which was below the action level of 400 mg/kg; therefore, further risk characterization for lead was not required.

Iron concentrations at the site for surface soil and total soil resulted in HQs greater than the iron SSP threshold HQ of 0.5 for the residential scenario, and therefore, the site required further characterization for iron through a margin of exposure evaluation. Appendix H presents the margin of exposure evaluation for surface soil and total soil. A summary of the results for SWMU 68 is presented below.

Iron Margin of Exposure Evaluation – Future Child Resident

	Surface Soil			Total Soil		
		Estimated Site Intake	Exposure Screening Level		Estimated Site Intake	Exposure Screening Level
RDA Screen (mg/day)	Pass	6.4	10	Pass	8.6	10
Provisional Reference Dose (RfD) Screen (mg/kg-day)	Pass	0.42	0.66	Pass	0.57	0.66

The site passed the margin of exposure evaluation for iron in soil.

8.6.4 Comparison to Generic SSLs

The MDC comparisons to generic SSLs (DAF 20) for detected chemicals indicated that arsenic exceeded its SSL; however, the arsenic MDC was below its background point estimate (Table 8-9).

8.6.5 Comparison to Site-Specific SSLs

The calculation of site-specific SSLs was not conducted for the site.

8.6.6 Comparison to Background

The comparison of MDCs for metals identified as COPCs for surface soil and total soil with their background point estimates resulted in a background exceedance for iron in total soil (Table 8-10).

8.6.6.1 Human Health Risk Screening Summary

COPCs with available screening value were limited to metals and benzo(a)pyrene. The residential cumulative human health risk screens failed for surface soil (noncarcinogenic) and total soil (carcinogenic and noncarcinogenic). Cumulative risk screenings for industrial scenarios passed.

Carcinogenic residential risk screening failed for total soil due to arsenic concentrations below the background point estimate. This screening result is not a concern given that: 1) the risk associated with background levels of arsenic contributes 96% of the cumulative risk of 2E-05, and 2) the other COPC for the site, benzo(a)pyrene, contributes negligible risk (8E-07).

Noncarcinogenic residential risk screening failed for surface soil due to metals concentrations below background point estimates and iron. This screening result is not a concern given that the elevated HI (>1) is primarily due to background levels of metals in soil (HI of 2.0) and iron concentrations (HI of 1.4), which passed the margin of exposure evaluation. Antimony, which lacks a background point estimate, is not a concern at the site because its MDC is below the unadjusted R-RBC.

Noncarcinogenic residential risk screening failed for total soil due to metals concentrations below background point estimates. This screening result is not a concern given that the elevated HI (>1) is primarily due to background levels of metals in soil (HI of 1.9) and iron concentrations (HI of 1.9), which passed the margin of exposure evaluation. Antimony, which lacks a background point estimate, is not a concern at the site because its MDC is below the unadjusted R-RBC.

Generic SSL exceedances were limited to arsenic. The arsenic MDC is below its background point estimate, and therefore, it is not of concern at the site.

8.7 ECOLOGICAL RISK SCREENING

8.7.1 Problem Formulation

8.7.1.1 Ecological Site Characterization

An overview of the site physiography, water resources, soil, and geology for the site is presented in Section 8.1. SWMU 68 is a small 0.023-acre (1,011 ft^2) grassy area that provides minimal habitat value to wildlife potentially occurring in the area (photograph on page 8-1). The site is surrounded by similar maintained grass habitat. A complex of buildings related to facility operations is located within 100 ft to the south of the area. A network of process pipes and utility lines traverses areas immediately adjacent to the site.

Observations made during the site reconnaissance indicate that a viable community of transitional vegetation occurs at the site (photograph on page 8-1). Signs of chemical vegetative stress were not observed during the reconnaissance. Based on information from the Installation-Wide Biological Survey and observations made during the site reconnaissance, the grassland vegetative community at the site is typical of other meadow-grassed areas that are maintained regularly at RFAAP.

The habitat could support some ecological use (i.e., shelter and foraging) by some smaller common species in the area. Given its limited size and frequent disturbance by facility operations, few individuals would be expected to utilize the area for a lengthy period.

Threatened, rare, or endangered species were not observed during the site reconnaissance. These species are not likely to be present within the boundaries of the site. Threatened, rare, and endangered specifies information for RFAAP is discussed in Section 3.3.3.

8.7.1.2 Ecological Conceptual Site Model

The ECSM for SWMU 68 (and other terrestrial sites for the SSP) is presented on Figure 3-1. While SWMU 68 is a small area unlikely to support important populations of terrestrial receptors, individual receptors may traverse the area from time to time. Soil represents the potential exposure medium to ecological receptors. Based on the site characterization and data, the following complete exposure pathway exists: terrestrial receptor exposure to surface soil

Detected chemical occurrence and distribution table is presented in Table 8-11. In addition, Table 8-12 summarizes the nondetected chemicals for SWMU 68. Potential ecological receptors may be exposed to COPECs in soil through the following exposure routes:

- Direct contact/absorption from soil;
- Direct ingestion of soil;
- Incidental ingestion of soil; and
- Direct ingestion of biota with accumulated COPECs.

Receptors of concern selected for SWMU 57 include:

- Plants;
- Soil invertebrate/microbial community;
- Omnivorous birds (American Robin; *Turdus migratorius*);

- Carnivorous birds (Red-Tailed Hawk; *Buteo jamaicensis*);
- Herbivorous mammals (Meadow Vole; *Microtus pennsylvanicus*);
- Carnivorous mammals (Short-Tailed Shrew; *Blarina brevicauda*); and
- Omnivorous mammals (Red Fox; *Vulpes vulpes*).

Relevant assessment and measurement endpoints for the identified terrestrial receptors are presented in Section 3.3.6.1.

8.7.2 Preliminary Exposure Estimate and Risk Characterization

The preliminary exposure estimate and ecological effects evaluation considers the most conservative risk scenario. Highly conservative assumptions are used to estimate COPEC exposure to terrestrial receptors for pathways to be quantitatively evaluated. Conservative TRVs are used to evaluate the ecological effects of exposure using the two approaches discussed below.

8.7.2.1 Preliminary Exposure Estimate and Ecological Effects Evaluation

Direct Contact Approach

The MDCs for detected chemicals in soil are used as the preliminary exposure estimate concentrations to develop a conservative risk scenario for the direct contact pathway to soil invertebrates. Table 8-13 presents the preliminary exposure estimates for direct contact for SWMU 68.

Dose Rate Modeling Approach

In the dose rate modeling approach, the detected bioaccumulative chemical MDCs, along with assumptions of maximum ingestion rate, minimum body weight, 100% area use, and 100% bioavailability are used in the conservative risk scenario as the preliminary exposure estimate for soil COPECs and compared to the calculated TRVs. The MDCs used in the preliminary exposure assessment for soil COPECs at SWMU 68 are presented in Table 8-11.

8.7.2.2 Background Concentrations of Metals

Background point estimates for metals were incorporated in the ecological screening to assess site soil concentrations in the context of facility-wide background levels (IT 2001a). Essential nutrients, including calcium, magnesium, potassium, and sodium were not considered COPECs in the risk screening in accordance with the SSP (USEPA 2001a) and the MWP (URS 2003b). The results of the background comparison for SWMU 68 are provided in Table 8-14. The results of this comparison have been incorporated into the risk management decision and ecological summary.

8.7.2.3 Preliminary Risk Characterization

Terrestrial Plants

Qualitative characterization of vegetative communities common to grassed areas at RFAAP is provided in Section 3.3.7.4. Stressed or dead vegetation was not observed in the small area surrounding the lagoon during the site reconnaissance. The grassed area surrounding the lagoon is typical of regularly maintained areas at RFAAP.

Soil Invertebrates and Microbial Communities

Direct contact HQs calculated for soil invertebrates and microbial communities are presented in Table 8-13. Other potentially complete exposure pathways to soil invertebrate and microbial communities include direct ingestion of soil and biota. However, there is insufficient information to quantify these pathways,

and while these pathways exist, they are likely secondary to the direct contact/absorption pathway and should not substantially alter the risk characterization.

Of the detected chemicals for which ecological screening values were available, the concentrations of aluminum, chromium, iron, manganese, cyanide, and pyrene resulted in HQ values that were greater than one (Table 8-13). MDCs for metals were below their respective background point estimates with the exception of cyanide for which a background point estimate is not available.

Terrestrial Wildlife

Quantitative risk characterization for terrestrial wildlife is limited to direct ingestion of biota and incidental ingestion of soil. The ECSM identifies a potentially complete direct contact exposure pathway to omnivorous birds, and herbivorous and carnivorous mammals; however, there is insufficient information to quantify this pathway. This pathway is likely secondary to the ingestion of biota and the incidental ingestion of soil; therefore, it should not substantially alter the risk characterization.

The risk to each potential wildlife receptor at the site is presented in Table 8-15 and summarized as follows:

Receptor	NOAEL Only Exceedances	NOAEL and LOAEL Exceedances
American Robin	cadmium, lead, Aroclor 1254	chromium, selenium, zinc
Red-tailed Hawk	chromium, zinc	none
Meadow Vole	none	none
Red Fox	arsenic, selenium, zinc	mercury
Short-tailed Shrew	cadmium, Aroclor 1254	arsenic, selenium

8.7.3 Refined Exposure Estimate, Ecological Effects Evaluation, and Risk Characterization

8.7.3.1 Refined Exposure Estimate and Ecological Effects Evaluation - Dose Modeling

The conservative assumptions used in the preliminary exposure estimate and ecological effects evaluation were replaced with more environmentally realistic assumptions resulting in a more realistic estimate of potential risk.

Refined exposure estimates and ecological effects were not developed for soil invertebrates and microbial communities because an appropriate 95% UCL could not be calculated using the surface soil data.

The refined exposure estimates and ecological effects are developed for wildlife receptors having complete exposure pathways to be quantitatively evaluated (i.e., omnivorous birds and carnivorous and herbivorous mammals). In the refined model, a realistic area use factor ($AF_{refined}$) was calculated as the ratio of the site area to the average home range of the receptor (Appendix I, Table I-16).

8.7.3.2 Refined Risk Characterization -Terrestrial Wildlife

Based on the refined risk characterization of wildlife ingestion, the HQs for the receptors are less than 1 (Table 8-15).

8.7.3.3 Exposure and Risk Uncertainty Analysis

Potential risk and exposure uncertainty is discussed in Section 3.3.9. While factors such as the lack of TSVs and wildlife profile assumptions may create limited uncertainty, the very small size and negligible habitat quality of the site in combination with these limited uncertainties has produced a conservative assessment of potential ecological risks associated with SWMU 68.

8.7.4 Ecological Risk Screening Summary

The maximum surface soil concentrations for aluminum, chromium, iron, manganese, cyanide, and pyrene in surface soil exceed their respective direct contact TRVs and therefore, may pose risk to soil invertebrates and microbes; although concentrations for aluminum, chromium, iron and manganese are below their background point estimates. The refined risk characterization of wildlife ingestion resulted in HQs of less than 1 for the receptors.

Therefore, there is adequate information to conclude that ecological risks are negligible and there is no need for further action at SWMU 68 on the basis of ecological risk.

8.8 CONCEPTUAL SITE MODEL

A refined CSM for SWMU 68 is presented on Figure 8-3. The area surrounding the former tanks consists of maintained flat grass. Subsurface geology consists of 22+ ft unconsolidated deposits overlying carbonate bedrock of the Elbrook Formation. Groundwater is present within the lower portion of the alluvial deposits (20 to 23.5 ft bgs) and in underlying bedrock. Based on local topography, groundwater flow is likely toward the northwest toward the New River.

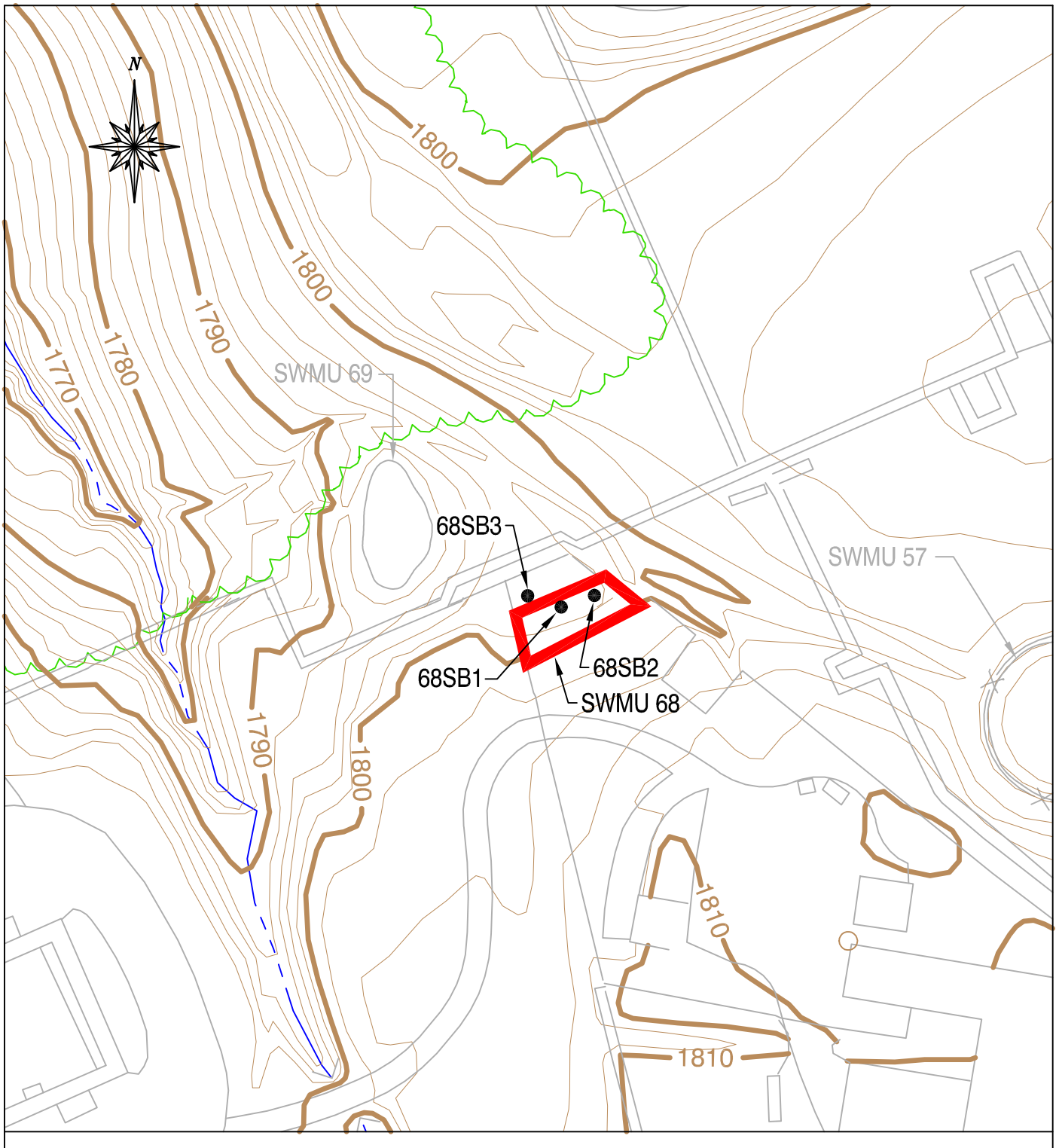
Tank activities may have impacted surface soil through direct deposition and subsurface soil through leaching of chemicals. Potentially affected media include surface soil, subsurface soil, and groundwater. Stormwater water runoff would flow to a well-defined drainage ditch that flows to the northwest toward a perennial stream, which discharges to the New River approximately 1,400 ft northwest of the site. COPCs identified in soil with screening values included metals.

Although current and likely future land-use scenarios are limited to industrial operations, residential and industrial scenarios are evaluated. SWMU 68 is enclosed by the Installation perimeter fence, and, therefore, potential receptors are limited to site workers (more conservative than trespasser scenario), future construction workers, and terrestrial biota. Site workers, construction workers, and terrestrial biota could contact surface soil. Leaching of chemicals is considered a potential release mechanism to subsurface soil that may be contacted by potential future construction workers. The lack of generic SSL exceedances other than arsenic (MDC below background point estimate) indicates that leaching of chemicals to groundwater at levels of concern is unlikely.

8.9 RECOMMENDATION FOR FURTHER ACTION

No further action is recommended for SWMU 68 based on the following results of the SSP screening:

- Cumulative risk and hazard screenings for industrial scenarios passed;
- Site-related cumulative risk and hazard screenings for residential scenarios passed;
- The MDC for lead is below the SSP screening level of 400 mg/kg;
- Surface soil and total soil passed the margin of exposure evaluation for iron;
- The generic SSL exceedance was limited to arsenic. The arsenic SSL exceedance is not a concern because the MDC is below the background point estimate; and
- Based on the refined risk characterization of wildlife ingestion, which resulted in HQs of less than 1 for the receptors and the results of the direct contact assessment, there is adequate information to conclude that ecological risks are negligible and therefore there is no need for further action at SWMU 68 on the basis of ecological risk.



(SOURCE: MODIFIED FROM HERCULES, INC., 1992)

0 50'

1 inch = 50 feet

Legend

- Soil Sampling Location
- SWMU 68 Approximate Boundary
- Aboveground Piping
- Vegetation
- Water

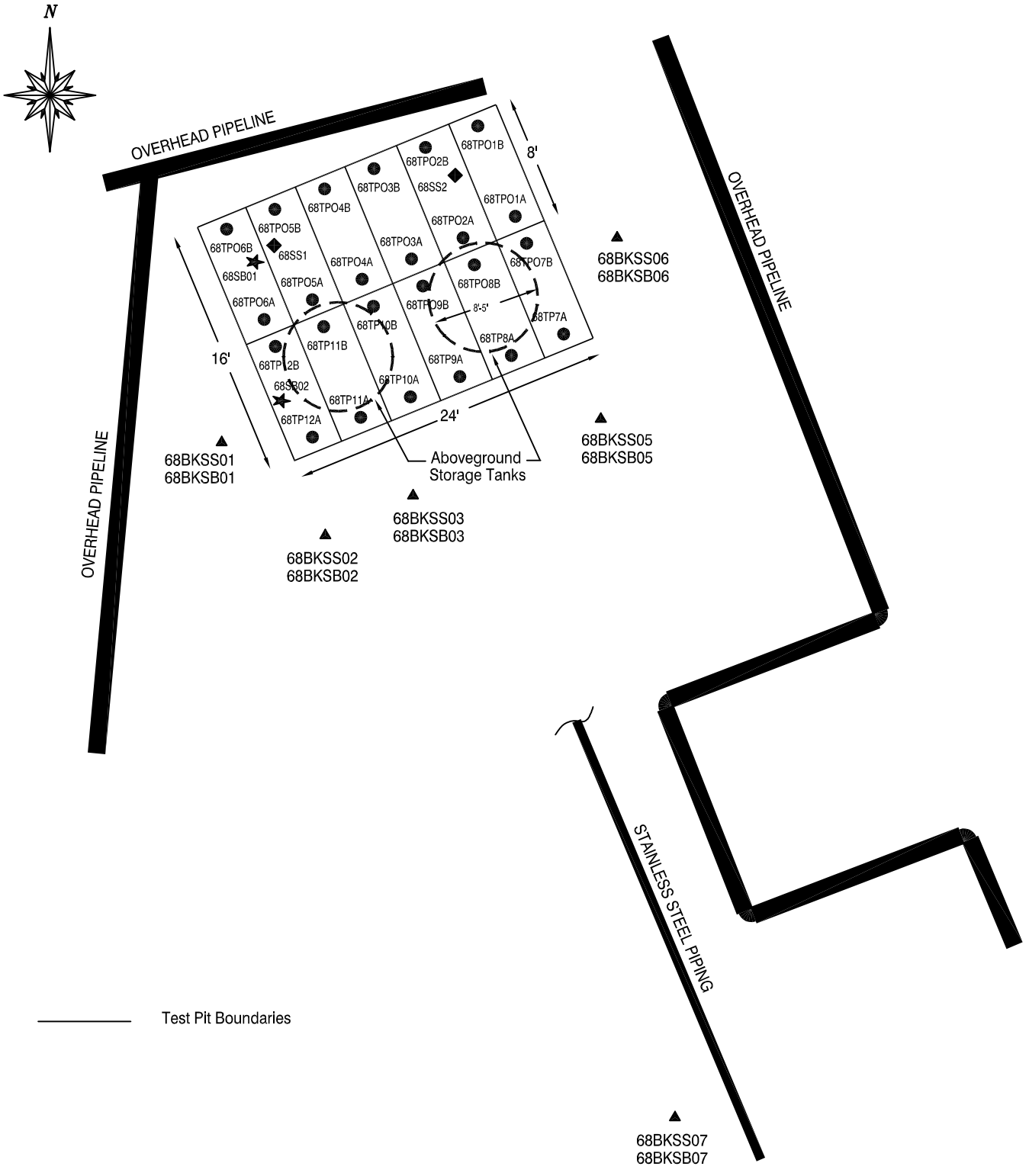
RFAAP

SSP REPORT

Date:	Prepared By:
June 2004	KDC/TDH
Scale:	**File Name:**
1"=50'	15900619

FIGURE 8-1

SSP SAMPLING LOCATION MAP SWMU 68



Legend

- VI Samples 0-6" bgs
- Preliminary Background Samples 0-6", 4-5' bgs
- Confirmatory Samples 4-5' bgs
- Contingency Samples 7-9' bgs

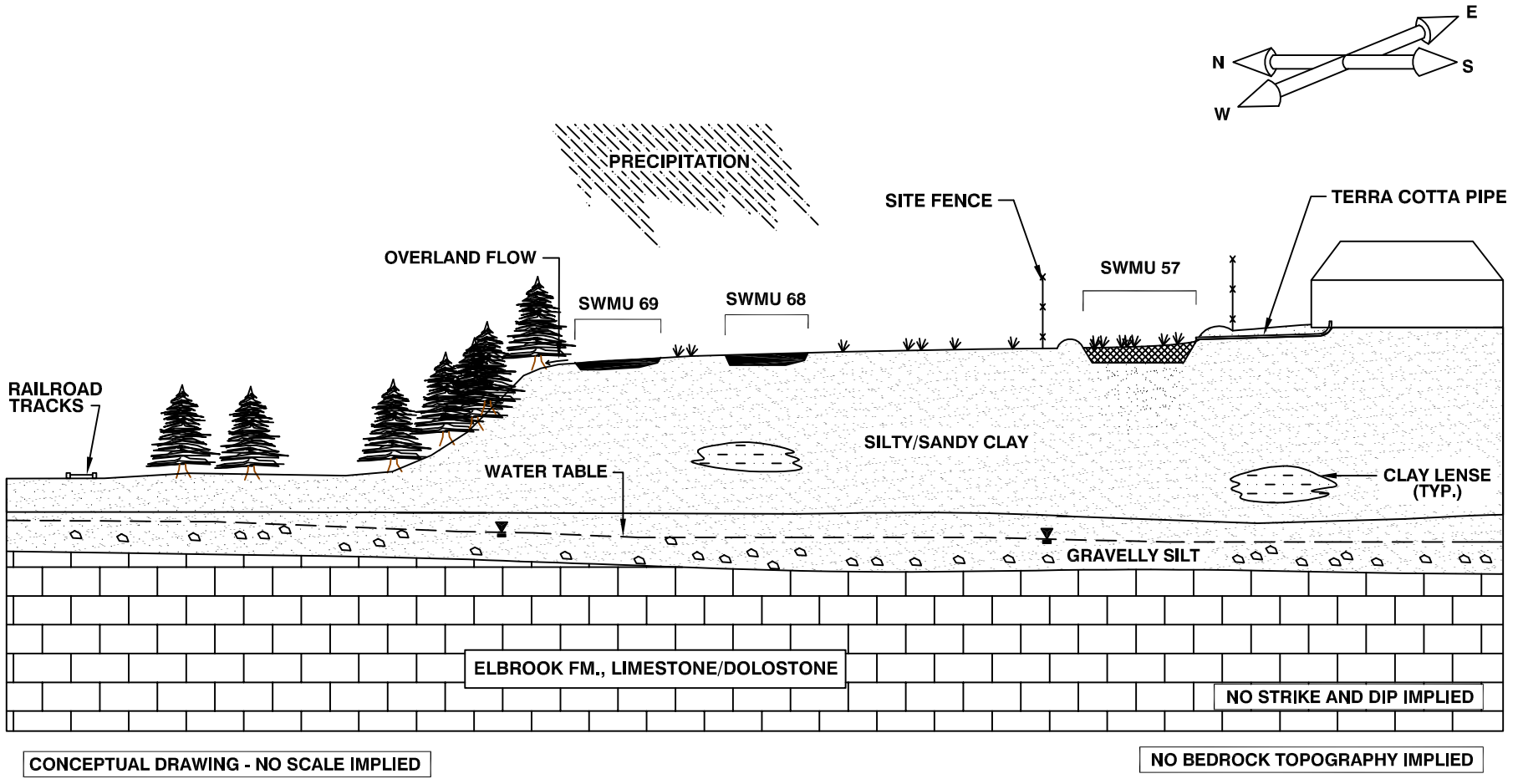
(SOURCE: MODIFIED FROM ICF KAISER ENGINEERS, 1998)

RFAAP

FIGURE 8-2

PREVIOUS INVESTIGATION SAMPLING LOCATIONS SWMU 68

Date:	Prepared By:
June 2004	*KDC/TDH*
Scale:	**File Name:**
Not to Scale	*15900619*



RFAAP

SSP REPORT

Date:	Prepared By:
June 2004	*KDC/TDH*
Scale:	**File Name:**
Not to Scale	*15900619*

FIGURE 8-3

CONCEPTUAL SITE MODEL
SWMU 68

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Table 8-1
Summary of Detected Analytes for Soil Samples Collected at SWMU 68
Modified from Dames and Moore Verification Investigation Report
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

SITE ID FIELD ID SAMPLE DATE DEPTH (ft bgs) MATRIX UNITS	PQLs mg/kg	68SS1 RVFS*59 4-Feb-92 0.5 CSO mg/kg	68SS2 RVFS*60 4-Feb-92 0.5 CSO mg/kg	Adjusted Soil Industrial RBC mg/kg	Adjusted Soil Residential RBC mg/kg	Draft BTAG Screening Level mg/kg	Facility-Wide Background Point Estimates [A] mg/kg
TAL Metals							
Aluminum	14.1	9,450	18,500	102,200	7,821	1	40,041
Antimony	20	<7.14	26.3	40.9	3.13	0.48	--
Arsenic	30	**2.40**	**7.3**	1.91	0.43	328	15.8
Barium	1	118	61.3	7,154	548	440	209
Beryllium	0.2	1.13	1.87	204	16	0.02	1.02
Cadmium	2	1.59	<0.7	102	7.82	2.5	0.69
Calcium	100	624B	2270B	--	--	--	--
Chromium[1]	4	26.9	49.2	307	23.0	0.0075	65.3
Cobalt	3	11.5	14.6	2,044	156	100	72.3
Copper	7	9.96	20.1	4,088	313	15	53.5
Iron	1000	12,600	**33,900**	30,660	2,346	12	50,962
Lead[2]	2	16.5	28.7	1,000	400	0.01	26.8
Magnesium	50	642B	1,610	--	--	4,400	--
Manganese[3]	0.275	1,250	885	2,044	156	330	2,543
Mercury[4]	0.1	<0.05	0.362	30.7	2.35	0.058	0.13
Nickel	3	8.77	10.7	2,044	156	2	62.8
Potassium	37.5	538	1010	--	--	--	--
Silver	4	0.779	1.1	511	39	0.0000098	--
Sodium	150	650B	188B	--	--	--	--
Thallium	20	**9.62**	**21.1**	7.15	0.547	0.001	2.11
Vanadium	0.775	30.5	75.8	102	7.8	0.5	108
Zinc	30.2	54.1	87.4	30,660	2,346	10	202

Notes:

B = Analyte was detected in corresponding method blank; values are flagged if the sample concentration is less than ten (10) times the method blank concentration for common laboratory constituents and five (5) times for all other constituents

BTAG = USEPA Region III Draft, Biological Technical Assistance Group Screening Level

CSO = Chemical soil

ft bgs = Feet below ground surface

mg/kg = Micrograms per kilogram

PQL = Practical quantitation limit; the lowest concentration that can be reliably detected at a defined level of precision for a given analytical method

TAL = Target Analyte List

RBC = Risk-Based Concentration

USEPA = United States Environmental Protection Agency

USEPA Region III Risk-Based Concentration (RBC) values from the April 14, 2004, RBC Table

Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens

[1] = Chromium VI RBC value used

[2] = Lead criteria are Action Levels; see USEPA Region III guidance

[3] = Manganese-nonfood RBC value used

[4] = Mercuric chloride RBC value was used

[A] = Facility-Wide Background Point Estimate as Reported in the Facility-Wide Background Study Report (IT 2001a)

bold = Concentration exceeds Industrial RBC

= Concentration exceeds Residential RBC

= Concentration exceeds Draft BTAG Screening Level

underline = Concentration exceeds Facility-Wide Background Point Estimate

Table 8-2
Summary of Detected Analytes for Soil Samples Collected at SWMU 68
Modified from ICF Kaiser Engineers, Inc. SWMU 68 Closure Report
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

SITE ID		68TP01A	68TP01B	68TP02A	68TP02B	68TP03A	68TP03B	Adjusted Soil Industrial RBC	Adjusted Soil Residential RBC	Draft BTAG Screening Level	Facility-Wide Background Point Estimates[A]
SAMPLE DATE		23-Jul-97	23-Jul-97	23-Jul-97	23-Jul-97	23-Jul-97	23-Jul-97				
DEPTH (ft bgs)		4-4.5	4-4.5	4-4.5	4-4.5	4-4.5	4-4.5				
MATRIX	PQLs	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL				
UNITS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
TAL Metals											
Aluminum	10	32,100	28,600	19,900	18,300	18,900	11,800	102,200	7,821	1	40,041
Antimony	20	1.0L	1.6L	0.66L	0.77L	0.71L	0.60L	40.9	3.13	0.48	--
Arsenic	30	**5.10**	**5.1**	**5.3**	**5.8**	**4.1**	**6.1**	1.91	0.43	328	15.8
Barium	1	63.8	64.3	50.7	45.0	39.1	34.6	7,154	548	440	209
Beryllium	0.2	0.60	0.59	0.52	0.48	0.58	0.39	204	16	0.02	1.02
Cadmium	2	0.94	<0.61	1.3	0.86	0.84	<0.60	102	7.82	2.5	0.69
Calcium	50	1,330L	4,080L	1,360L	<605L	1,060L	<597L	--	--	--	--
Chromium[1]	4	30K	34.8K	37.3K	43.1K	26.3K	53.8K	307	23.0	0.0075	65.3
Cobalt	0.8	8.8	10.6	10.3	12.8	6.3	12.8	2,044	156	100	72.3
Copper	2	20.9	17.5	16.4	17.9	22.1	11.3	4,088	313	15	53.5
Iron	10	**34,700**	**32,200**	**31,600**	25,700	23,500	25,100	30,660	2,346	12	50,962
Lead[2]	2	<13	13.1	12.5	13.7	<12.1	19.3	750	400	0.01	26.8
Magnesium	50	1,370	2,610	984	836	977	<597	--	--	4,400	--
Manganese[3]	1	316	458	391	631	227	990	2,044	156	330	2,543
Mercury[4]	0.1	0.150	<0.12	<0.12	<0.12	<0.12	<0.12	30.7	2.35	0.058	0.13
Nickel	3	15.4	14	36.7	9	9.3	5.8	2,044	156	2	62.8
Potassium	500	1,290	1,240	1,100	1,020	1,560	644	--	--	--	--
Selenium	40	<32.6	<30.5	<30.2	<30.2	<30.3	<29.8	511	39.1	1.8	--
Silver	4	<1.3	<1.2	<1.2	<1.2	<1.2	<1.2	511	39	0.0000098	--
Sodium	500	<652	<609	<603	<605	<605	<597	--	--	--	--
Vanadium	1	63.5	54.6	54.4	52.8	38.7	49.8	102	7.8	0.5	108
Zinc	2	60.5	58.9	57.2	44.1	36.2	25.8	30,660	2,346	10	202

Table 8-2 (Continued)
Summary of Detected Analytes for Soil Samples Collected at SWMU 68
Modified from ICF Kaiser Engineers, Inc. SWMU 68 Closure Report
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

SITE ID		68TP04A	68TP04B	68TP05A	68TP05B	68TP06A	68TP06B	Adjusted Soil Industrial RBC	Adjusted Soil Residential RBC	Draft BTAG Screening Level	Facility-Wide Background Point Estimates[A]
SAMPLE DATE		23-Jul-97	23-Jul-97	23-Jul-97	23-Jul-97	23-Jul-97	23-Jul-97				
DEPTH (ft bgs)		4-4.5	4-4.5	4-4.5	4-4.5	4-4.5	4-4.5				
MATRIX	PQLs	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL				
UNITS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
TAL Metals											
Aluminum	10	23,200	25,700	29,800	30,100	29,300	30,000	102,200	7,821	1	40,041
Antimony	20	0.76L	1.1L	1.3L	<0.67L	0.96L	<0.66L	40.9	3.13	0.48	--
Arsenic	30	**4.0**	**4.8**	**4.4**	**2.4**	**3.5**	**4.2**	1.91	0.43	328	15.8
Barium	1	47.2	44.6	81.6	28.6	28.8	27.3	7,154	548	440	209
Beryllium	0.2	1.10	0.98	1.10	0.96	0.98	1.40	204	16	0.02	1.02
Cadmium	2	0.96	1.0	0.8	0.68	0.77	0.74	102	7.82	2.5	0.69
Calcium	50	2,600L	1,540L	2,190L	<668L	1,170L	697L	--	--	--	--
Chromium[1]	4	13.6K	18.9K	21.4K	15.7K	25K	22.9K	307	23.0	0.0075	65.3
Cobalt	0.8	11.2	7.0	29.9	3.8	4.4	4.8	2,044	156	100	72.3
Copper	2	16.20	21.5	19.5	14.1	39.6	14.5	4,088	313	15	53.5
Iron	10	**35,200**	**33,800**	**41,600**	**38,800**	**43,600**	**38,100**	30,660	2,346	12	50,962
Lead[2]	2	<13.4	<14	16.3	<13.4	<13.7	<13.3	1,000	400	0.01	26.8
Magnesium	50	1,110	1,130	1,660	1,170	1,390	2,030	--	--	4,400	--
Manganese[3]	1	694	216	1,420	111	86	57	2,044	156	330	2,543
Mercury[4]	0.1	<0.13	<0.14	<0.13	<0.13	<0.14	<0.13	30.7	2.35	0.058	0.13
Nickel	3	11.2	11.4	31.3	12.8	11.8	11.4	2,044	156	2	62.8
Potassium	500	1,850	1,990	3,460	2,080	1,670	4,060	--	--	--	--
Selenium	40	<33.6	<35	<33.4	<33.4	<34.2	<33.2	511	39.1	1.8	--
Silver	4	<1.3	<1.4	<1.3	<1.3	<1.4	<1.3	511	39	0.0000098	--
Sodium	500	<671	<699	<668	<668	1170	<664	--	--	--	--
Vanadium	1	28.5	35.9	36.1	29.1	48.4	28.7	102	7.8	0.5	108
Zinc	2	31.6	37.7	31.8	22.4	26	20.3	30,660	2,346	10	202

Table 8-2 (Continued)
Summary of Detected Analytes for Soil Samples Collected at SWMU 68
Modified from ICF Kaiser Engineers, Inc. SWMU 68 Closure Report
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

SITE ID		68TP07A	68TP07B	68TP08A	68TP08B	68TP09A	68TP09B	Adjusted Soil Industrial RBC	Adjusted Soil Residential RBC	Draft BTAG Screening Level	Facility-Wide Background Point Estimates[A]
SAMPLE DATE		23-Jul-97	23-Jul-97	23-Jul-97	23-Jul-97	23-Jul-97	23-Jul-97				
DEPTH (ft bgs)		4-4.5	4-4.5	4-4.5	4-4.5	4-4.5	4-4.5				
MATRIX	PQLs	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL				
UNITS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
TAL Metals											
Aluminum	10	39,300	25,000	34,800	32,900	26,800	23,200	102,200	7,821	1	40,041
Antimony	20	<0.64L	0.81L	<0.65L	<0.64L	<0.63L	<0.66L	40.9	3.13	0.48	--
Arsenic	30	**2.6**	**2.8**	**2.8**	**3.5**	**2.4**	**2.7**	1.91	0.43	328	15.8
Barium	1	76.1	40.4	64.0	51.1	44.9	28.2	7,154	548	440	209
Beryllium	0.2	0.56	0.38	0.48	0.55	0.56	0.95	204	16	0.02	1.02
Cadmium	2	<0.64	<0.63	<0.65	0.81	<0.63	<0.66	102	7.82	2.5	0.69
Calcium	50	1,210L	816L	1,240L	1,180L	798L	1,270L	--	--	--	--
Chromium[1]	4	25.7K	22.1K	26.6K	29K	20.4K	26K	307	23.0	0.0075	65.3
Cobalt	0.8	7.6	3.8	4.5	12.5	5.0	9.3	2,044	156	100	72.3
Copper	2	17.5	13.4	15.4	15.6	13.8	8.2	4,088	313	15	53.5
Iron	10	29,700	21,500	30,100	24,700	**30,700**	**40,900**	30,660	2,346	12	50,962
Lead[2]	2	<12.7	<12.6	<13	<12.8	<12.6	<13.2	1,000	400	0.01	26.8
Magnesium	50	1,930	857	1,360	1,110	1,100	1,080	--	--	4,400	--
Manganese[3]	1	242	78	79.7	398	103	339	2,044	156	330	2,543
Mercury[4]	0.1	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	30.7	2.35	0.058	0.13
Nickel	3	18	11.4	14.4	13.6	12.3	10.5	2,044	156	2	62.8
Potassium	500	2,080	948	1,470	1,110	1,200	1,910	--	--	--	--
Selenium	40	<31.8	<31.4	<32.6	<31.9	<31.6	<33	511	39.1	1.8	--
Silver	4	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	511	39	0.0000098	--
Sodium	500	<637	<629	<651	<639	<631	<660	--	--	--	--
Vanadium	1	74.9	44.3	74.1	49.2	72.8	29	102	7.8	0.5	108
Zinc	2	55.6	38.2	49.1	57.7	39.6	21.7	30,660	2,346	10	202

Table 8-2 (Continued)
Summary of Detected Analytes for Soil Samples Collected at SWMU 68
Modified from ICF Kaiser Engineers, Inc. SWMU 68 Closure Report
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

SITE ID		68TP10A	68TP10B	68TP11A	68TP11B	68TP12A	68TP12B	68SB01	Adjusted Soil Industrial RBC	Adjusted Soil Residential RBC	Draft BTAG Screening Level	Facility-Wide Background Point Estimates[A]
SAMPLE DATE		24-Jul-97	24-Jul-97	24-Jul-97	24-Jul-97	24-Jul-97	24-Jul-97	23-Jul-97				
DEPTH (ft bgs)		4-4.5	4-4.5	4-4.5	4-4.5	4-4.5	4-4.5	8.0-8.5				
MATRIX	PQLs	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL				
UNITS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
TAL Metals												
Aluminum	10	39,000	29,500	28,000	40,300	24,100	28,600	14,900	102,200	7,821	1	40,041
Antimony	20	<0.69L	0.94L	<0.61L	0.80L	<0.61L	<0.66L	<0.63	40.9	3.13	0.48	--
Arsenic	30	8.90	4.0	3.6	10.4	2.2	3.3	4.6	1.91	0.43	328	15.8
Barium	1	45.4	28.1	51.7	52.9	44.4	<26.2	17.1	7,154	548	440	209
Beryllium	0.2	1.10	1.10	0.49	0.98	0.45	1.10	0.80	204	16	0.02	1.02
Cadmium	2	1.90	1.2	<0.61	1.2	<0.61	0.74	<0.63	102	7.82	2.5	0.69
Calcium	50	1350	1,510L	<606	<775L	<608	<655L	200	--	--	--	--
Chromium[1]	4	52.9K	31.4K	35.4K	34.6K	21.5K	19.7K	12.1	307	23.0	0.0075	65.3
Cobalt	0.8	8.5	5.5	13.9	9.9	6.1	8.6	14.0	2,044	156	100	72.3
Copper	2	37.3	14.2	17.5	37.9	10.7	34.3	14.0	4,088	313	15	53.5
Iron	10	**53,300**	**43,900**	26,400	**55,100**	22,700	**37,300**	25,000	30,660	2,346	12	50,962
Lead[2]	2	14	<13.8	13.9	15.6	<12.2	<13.1	<6.3	1,000	400	0.01	26.8
Magnesium	50	2,740	1,540	909	6,900	816	1,690	942	--	--	4,400	--
Manganese[3]	1	160	80	349	170	181	359	165	2,044	156	330	2,543
Mercury[4]	0.1	<0.14	<0.14	<0.12	<0.16	<0.12	<0.13	<0.13	30.7	2.35	0.058	0.13
Nickel	3	25.3	15.6	13.4	32.8	13	8.7	12.8	2,044	156	2	62.8
Potassium	500	2,060	2,510	859	3,980	1,040	3,590	1,270	--	--	--	--
Selenium	40	<34.6	<34.4	<30.3	<38.8	<30.4	<32.8	<25.1	511	39.1	1.8	--
Silver	4	<1.4	<1.4	<1.2	<1.6	<1.2	<1.3	<1.3	511	39	0.0000098	--
Sodium	500	<692	<689	726	<775	<608	1510	877	102	7.8	--	--
Vanadium	1	77	42.5	40.7	78.7	50.6	24.3	17.8	102	7.8	0.5	108
Zinc	2	82.9	46.1	29.9	42.6	31.6	17.4	12	30,660	2,346	10	202

Notes:

ft bgs = Feet below ground surface

K = Data is biased high

L = Data is biased low

mg/kg = Milligrams per kilogram

PQL = Practical quantitation limit; the lowest concentration that can be reliably detected at a defined level of precision for a given analytical method

RBC = Risk-Based Concentration

USEPA = United States Environmental Protection Agency

USEPA Region III Risk-Based Concentration (RBC) values from the April 14, 2004, RBC Table

Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens

BTAG = USEPA Region III Draft, Biological Technical Assistance Group Screening Level

TAL = Target Analyte List

[A] = Facility-Wide Background Point Estimate as Reported in the Facility-Wide Background Study Report (IT 2001a)

[1] = Chromium VI RBC value used

[2] = Lead criteria are Action Levels; see USEPA Region III guidance

[3] = Manganese-nonfood RBC value used

[4] = Mercuric chloride RBC value used

bold = Concentration exceeds Industrial RBC

= Concentration exceeds Residential RBC

= Concentration exceeds Draft BTAG Screening Level

underline = Concentration exceeds Facility-Wide Background Point Estimate

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Table 8-3
Detected Analytes for SWMU 68
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	SSL DAF 20	Draft BTAG Screening Level	68SB1A 10/6/2003 0-1		MDL	RL	68SB1B 10/6/2003 7-9		MDL	RL	68SB1C 10/6/2006 18-20		MDL	RL	68SB2A 10/6/2003 0-1		MDL	RL	68SB2B 10/6/2003 7-9		MDL	RL
								Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
TAL Metals (mg/kg)																											
Aluminum	7429-90-5	--	40,041	--	--	--	1	34,500		5.1	2,500	19,200		1.83	50	28,500		5.1	12,500	30,700		5.1	250	26,200		5.1	250
Antimony	7440-36-0	N	--	3.13	40.9	13.2	0.48	<0.5	U	0.0518	0.5	1.4		0.0518	0.5	0.063	J	0.0518	0.5	<0.5	U	0.0518	0.5	0.15	J	0.0518	0.5
Arsenic	7440-38-2	C	15.8	0.426	1.91	0.026	328	***3.2***		0.0232	0.4	***0.8***		0.0232	0.4	***7.8***		0.0232	0.4	***2.5***		0.0232	0.4	***3.1***		0.0232	0.4
Barium	7440-39-3	N	209	1,564	20,440	6,015	440	78	,L,m	0.106	5	20	L,m	0.106	5	51	L,m	0.106	5	86	L,m	0.106	5	31	L,m	0.106	5
Beryllium	7440-41-7	N	1.02	15.64	204.4	1,154	0.02	1.1		0.0391	1	1.2		0.0391	1	2.3		0.0391	1	0.76	J	0.0391	1	1.1		0.0391	1
Cadmium	7440-43-9	N	0.69	3.91	51.1	27.45	2.5	2.2		0.182	1	2.1		0.182	1	1.9		0.182	1	1.8		0.182	1	2.3		0.182	1
Calcium	7440-70-2	--	--	--	--	--	--	661	K,m	16.6	250	1,130	K,m	16.6	250	<250	U	16.6	250	1,230	K,m	16.6	250	1,140	K,m	16.6	250
Chromium [1]	7440-47-3	N	65.3	23.46	306.6	42.05	0.0075	20		0.912	5	6.9		0.912	5	37		0.912	5	21		0.912	5	19		0.912	5
Cobalt	7440-48-4	--	72.3	--	--	--	100	22	J,s	0.208	1	3.4	J,s	0.208	1	16	J,s	0.208	1	24	J,s	0.208	1	4.6	J,s	0.208	1
Copper	7440-50-8	N	53.5	312.86	4,088	10,518	15	15		0.368	1	4.6		0.368	1	24		0.368	1	14		0.368	1	4.3		0.368	1
Iron	7439-89-6	N	50,962	2,346	30,660	--	12	33,100		35.8	500	38,400		35.8	500	38,500		35.8	500	29,300		21.2	500	56,600		71.6	1,000
Lead [2]	7439-92-1	--	26.8	400	750	--	0.01	8.9		0.0218	1	2.9		0.0218	1	9.7		0.0218	1	7.9		0.0218	1	6.5		0.0218	1
Magnesium	7439-95-4	--	--	--	--	--	4,400	8,010		3.21	250	1,650		3.21	250	22,900		3.21	250	5,740		3.21	250	1,580		3.21	250
Manganese	7439-96-5	N	2,543	156.43	2,044	951.9	330	532		0.264	5	213		0.264	5	484		0.264	5	613		0.264	5	91		0.264	5
Mercury [3]	7439-97-6	--	0.13	2.35	30.66	--	0.06	0.02	J	0.0077	0.1	0.016	J	0.0077	0.1	0.022	J	0.0077	0.1	0.022	J	0.0077	0.1	0.042	J	0.0077	0.1
Nickel	7440-02-0	N	62.8	156.43	2,044	--	2	17		0.0356	0.5	8		0.0356	0.5	55		0.356	5	14		0	0.5	9.1		0.0356	0.5
Potassium	7440-09-7	--	--	--	--	--	--	3,800		5	100	2,490		5	100	5,460		5	100	2,970		5	100	2,610		5	100
Selenium	7782-49-2	N	--	39.11	511	18.98	1.8	0.89	J	0.0502	1	0.55	J	0.0502	1	0.21	J,B,p	0.0502	1	0.64	J	0.0502	1	0.72	J	0.0502	1
Silver	7440-22-4	N	--	39.11	511	31.03	0.0000098	0.11	J	0.0044	3	0.047	J,B,p	0.0044	3	0.16	J	0.0044	3	0.084	J	0.0044	3	0.058	J	0.0044	3
Sodium	7440-23-5	--	--	--	--	--	--	36	J	8.92	100	31	J	8.92	100	213		8.92	100	25	J	8.92	100	83	J	8.92	100
Thallium	7440-28-0	N	2.11	0.548	7.15	3.64	0.001	0.25	J	0.027	0.5	0.081	J	0.027	0.5	0.23	J	0.027	0.5	0.2	J	0.027	0.5	0.098	J	0.027	0.5
Vanadium	7440-62-2	N	108	7.82	102.2	730.1	0.5	53		0.207	1	16		0.207	1	54		0.207	1	49		0.207	1	26		0.207	1
Zinc	7440-66-6	N	202	2,346	30,660	13,622	10	38	B,x	0.517	4	14	B,x	0.517	4	38	B,x	0.517	4	34	B,x	0.517	4	27	B,x	0.517	4
TCL Pesticides/PCBs (µg/kg)																											
Aroclor 1254 [4]	11097-69-1	C	--	1.6E+02	1.4E+03	1.1E+03	--	8.7	J	3.9	42	NT				NT				NT				NT			
TCL VOCs (µg/kg)																											
2-Butanone	78-93-3	N	--	4.7E+06	6.1E+07	2.9E+04	--	30		6.4	26	24	J	6.95	28	<26	U	6.65	26	30		6.4	26	24	J	6.85	28
Acetone	67-64-1	N	--	7.0E+06	9.2E+07	2.2E+04	--	79	B,z	6.4	26	51	B,z	6.95	28	42	B,z	6.65	26	100	B,z	6.4	26	55	B,z	6.85	28
Methylene chloride	75-09-2	C	--	8.5E+04	3.8E+05	1.9E+01	300	<26	U,UJ,c	3.6	26	<28	U,UJ,c	3.91	28	<26	U,UJ,c	3.74	26	<26	U,UJ,c	3.6	26	<28	U,UJ,c	3.85	28
TCL SVOCs (µg/kg)																											
4-Chloro-3-Methylphenol	59-50-7	--	--	--	--	--	--	19	J,B,x	6.77	220	22	J,B,x	7.29	240	27	J,B,x	6.77	220	9	J,B,x	6.77	220	26	J,B,x	7.29	240
Benzo(a)pyrene	50-32-8	C	--	2.2E+01	3.9E+02	1.2E+02	100	<220	U	7.42	220	<240	U	7.99	240	<220	U	7.42	220	25	J	7.42	220	<240	U	7.99	240
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	100	<220	U	12.7	220	<240	U	13.7	240	<220	U	12.7	220	45	J,J,l	12.7	220	<240	U	13.7	240
Bis(2-ethylhexyl)phthalate	117-81-7	C	--	4.6E+04	2.0E+05	2.9E+06	--	54	J	2.69	220	53	J	2.9	240	58	J	2.69	220	54	J,B,z	2.69	220	50	J	2.9	240
Butylbenzylphthalate	85-68-7	N	--	1.6E+06	2.0E+07	1.7E+07	--	41	J,B,x	5.82	220	46	J,B,x	6.27	240	<220	U	5.82	220	42	J,B,x	5.82	220	<240	U	6.27	240
Caprolactam	105-60-2	N	--	3.9E+06	5.1E+07	--	--	<460	U	8.29	460	<460	U	8.93	460	<460	U	8.29	460	<430	U	8.29	430	90	J	8.93	460
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	100	<220	U	13.3	220	<240	U	14.3	240	<220	U	13.3	220	<220	U	13.3	220	<240	U	14.3	240
Diethylphthalate	84-66-2	N	--	6.3E+06	8.2E+07	4.5E+05	--	4	J,B,x	2.47	220	4	J,B,x	2.66	240	6	J,B,x	2.47	220	4	J,B,x	2.47	220	5	J,B,x	2.66	240
Di-n-butylphthalate	84-74-2	N	--	7.8E+05	1.0E+07	5.0E+06	--	110	J	4.97	220	75	J	5.35	240	180	J	4.97	220	29	J,B,z	4.97	220	5.6	J	5.35	240
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	100	<220	U	3.06	220	4	J	3.29	240	<220	U	3.06	220	14	J	3.06	220	<240	U	3.29	240
Indeno(1,2,3-cd)pyrene	193-39-5	C	--	2.2E+02	3.9E+03	4.2E+03	100	<220	U	5.1	220	<240	U	5.49	240	<220	U	5.1	220	36	J,J,l	5.1	220	<240	U	5.49	240
Phenanthrene [5]	85-01-8	N	--	2.3E+05	3.1E+06	--	100	<220	U	2.99	220	<240	U	3.22	240	<220	U	2.99	220	6	J	2.99	220	<240	U	3.22	240
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	100	<220	U	1.92	220	<240	U	2.07	240	<220	U	1.92	220	12	J	1.92	220	<240	U	2.07	240
SVOC TICs (µg/kg)																											
(Z)-9-Octadecenamide	301-02-0	--	--	--	--	--	--	780	E,B,x	0	100	NI				210	E,B,x	0	100	590	E,B,x	0	100	260	E,B,x	0	100
1-Heptadecanol	1454-85-9	--	--	--	--	--	--	NI				NI				NI				NI				NI			
1-Hexadecanol	36653-82-4	--	--	--	--	--	--	NI				NI				NI				NI				NI			
1,2-Benzenedicarboxylicacid, bis(2-methy	84-69-5	--	--	--	--	--	--	23	E,B,x	0	100	160	E,B,x	0	100	370	E,B,x	0	100	44	E,B,x	0	100	NI			
1,2-Benzenedicarboxylic acid, butyl 2-me	17851-53-5	--	--	--	--	--	--	NI				NI				NI				NI				85	E,NJ,t	0	10
2(5H)-Furanone, 5,5-dimethyl-	20019-64-1	--	--	--	--	--	--	NI				NI				210	E,NJ,t	0	100	NI				NI			
2-Ethyl-1-Hexanol	104-76-7	--	--	--	--	--	--	NI				NI				NI				NI				27	E,NJ,t	0	1,700
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	--	--	--	--	--	--	110	E,NJ,t	0	100	110	E,NJ,t	0	100	120	E,NJ,t	0	100	NI				NI			
3-Eicosene, (E)-	74685-33-9	--	--	--	--	--	--	NI				NI				NI				NI				NI			
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,	10001-439-24	--	--	--	--	--	--	23	E,NJ,t	0	1	NI				NI				NI				32	E,NJ,t	0	1
Eicosane	112-95-8	--	--	--	--	--	--	NI				NI				NI				NI				NI			
Erucylamide	112-84-5	--	--	--	--	--	--	NI				750	E,B,x	0	10	840	E,B,x	0	10	NI				850	E,B,x	0	10
Ethanol, 2-(hexadecyloxy)-	2136-71-2	--	--	--	--	--	--	NI				NI				NI				NI				NI			
Octadecanal	638-66-4	--	--	--	--	--	--	NI				NI				NI				NI				NI			
Phsophoric acid, tris(3-methylphenyl) es	563-04-2	--	--	--	--	--	--	NI				NI				NI				NI				NI			
Stearic Acid	57-11-4	--	--	--	--	--	--	NI				NI				NI				NI				NI			

Table 8-3
Detected Analytes for SWMU 68
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	SSL DAF 20	Draft BTAG Screening Level	68SB1A 10/6/2003 0-1		MDL	RL	68SB1B 10/6/2003 7-9		MDL	RL	68SB1C 10/6/2006 18-20		MDL	RL	68SB2A 10/6/2003 0-1		MDL	RL	68SB2B 10/6/2003 7-9		MDL	RL
								Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
PAHs (µg/kg)																											
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	100	<27	U,UL,s	0.91	27	<30	U,UL,s	0.98	30	<27	U,UL,s	0.91	27	7.1	J,L,s	0.84	26	<29	U,UL,s	0.98	29
Benzo(a)anthracene	56-55-3	C	--	2.2E+02	3.9E+03	4.8E+02	100	<27	U,UL,s	1.04	27	<30	U,UL,s	1.12	30	<27	U,UL,s	1.04	27	14	J,L,s	0.96	26	<29	U,UL,s	1.12	29
Benzo(a)pyrene	50-32-8	C	--	2.2E+01	3.9E+02	1.2E+02	100	<27	U,UL,s	1.3	27	<30	U,UL,s	1.4	30	<27	U,UL,s	1.3	27	15	J,L,s	1.2	26	<29	U,UL,s	1.4	29
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	100	<27	U,UL,s	1.69	27	<30	U,UL,s	1.82	30	<27	U,UL,s	1.69	27	9.5	J,L,s	1.56	26	<29	U,UL,s	1.82	29
Benzo(k)fluoranthene	207-08-9	C	--	2.2E+03	3.9E+04	1.5E+04	100	<27	U,UL,s	1.3	27	<30	U,UL,s	1.4	30	<27	U,UL,s	1.3	27	6.7	J,L,s	1.2	26	<29	U,UL,s	1.4	29
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	100	<27	U,UL,s	1.56	27	<30	U,UL,s	1.68	30	<27	U,UL,s	1.56	27	12	J,L,s	1.44	26	<29	U,UL,s	1.68	29
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	100	2.8	J,L,s	2.21	27	<30	U,UL,s	2.38	30	<27	U,UL,s	2.21	27	38	L,s	2.04	26	<29	U,UL,s	2.38	29
Fluorene	86-73-7	N	--	3.1E+05	4.1E+06	1.4E+05	100	<27	U,UL,s	1.69	27	<30	U,UL,s	1.82	30	<27	U,UL,s	1.69	27	3.1	J,L,s	1.56	26	<29	U,UL,s	1.82	29
Indeno(1,2,3-cd)pyrene	193-39-5	C	--	2.2E+02	3.9E+03	4.2E+03	100	<27	U,UL,s	0.91	27	<30	U,UL,s	0.98	30	<27	U,UL,s	0.91	27	8.6	J,L,s	0.84	26	<29	U,UL,s	0.98	29
Phenanthrene [(5)]	85-01-8	N	--	2.3E+05	3.1E+06	--	100	<27	U,UL,s	0.78	27	<30	U,UL,s	0.84	30	<27	U,UL,s	0.78	27	30	L,s	0.72	26	<29	U,UL,s	0.84	29
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	100	2.1	J,L,s	1.17	27	<30	U,UL,s	1.26	30	<27	U,UL,s	1.17	27	130	L,s	1.08	26	<29	U,UL,s	1.26	29
Cyanide (mg/kg)																											
Cyanide	57-12-5	N	--	1.6E+02	2.0E+03	1.5E+02	0.005	<0.5	U	0.0356	0.5	<0.5	U	0.0356	0.5	<0.5	U	0.0356	0.5	<0.5	U	0.0356	0.5	<0.5	U	0.0356	0.5
Percent Solids (%)							--																				
Percent Solids	--	--	--	--	--	--	--	78		0.1	0.1	72		0.1	0.1	75		0.1	0.1	78		0.1	0.1	73		0.1	0.1

Table 8-3
Detected Analytes for SWMU 68
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	SSL DAF 20	Draft BTAG Screening Level	68SB2C 10/6/2003 21-23		MDL	RL	68SB2C-DUP(SBD5) 10/6/2003 21-23		MDL	RL	68SB3A 10/7/2003 0-1		MDL	RL	68SB3B 10/7/2003 8-10		MDL	RL	68SB3C 10/7/2003 18-20		MDL	RL
								Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
TAL Metals (mg/kg)																											
Aluminum	7429-90-5	--	40,041	--	--	--	1	29,300		5.1	2,500	21,400		1.83	50	12,200		1.83	50	20,400		1.83	50	28,600		9.15	250
Antimony	7440-36-0	N	--	3.13	40.9	13.2	0.48	0.91		0.0518	0.5	0.64		0.0518	0.5	13		0.0518	0.5	1.7		0.0518	0.5	0.094	J	0.0518	0.5
Arsenic	7440-38-2	C	15.8	0.426	1.91	0.026	328	***11***		0.0232	0.4	***9.2***		0.0232	0.4	***2.1***		0.0232	0.4	***6.9***		0.0232	0.4	***7.9***		0.0232	0.4
Barium	7440-39-3	N	209	1,564	20,440	6,015	440	44	L,m	0.106	5	46	L,m	0.106	5	111		0.106	5	25		0.106	5	70		0.106	5
Beryllium	7440-41-7	N	1.02	15.64	204.4	1,154	0.02	2.7		0.0391	1	2.6		0.0391	1	0.63	J,J,s	0.0391	1	0.91	J,J,s	0.0391	1	2.7	J,s	0.0391	1
Cadmium	7440-43-9	N	0.69	3.91	51.1	27.45	2.5	1.9		0.182	1	2		0.182	1	5.6		0.182	1	1.4		0.182	1	1.6		0.182	1
Calcium	7440-70-2	--	--	--	--	--	--	810	K,m	16.6	250	787	K,m	16.6	250	1,600		16.6	250	248	J	16.6	250	<250	U	16.6	250
Chromium [1]	7440-47-3	N	65.3	23.46	306.6	42.05	0.0075	38		0.912	5	36		0.912	5	40		0.912	5	18		0.912	5	31		0.912	5
Cobalt	7440-48-4	--	72.3	--	--	--	100	15	J,s	0.208	1	17	J,s	0.208	1	10	J,s	0.208	1	9.8	J,s	0.208	1	20	J,s	0.208	1
Copper	7440-50-8	N	53.5	312.86	4,088	10,518	15	24		0.368	1	25		0.368	1	8.6		0.368	1	20		0.368	1	21		0.368	1
Iron	7439-89-6	N	50,962	2,346	30,660	--	12	39,400		35.8	500	39,200		35.8	500	16,600		17.9	250	45,100		71.6	1,000	42,700		71.6	1,000
Lead [2]	7439-92-1	--	26.8	400	750	--	0.01	9.9		0.0218	1	8.6		0.0218	1	23		0.0218	1	8.6		0.0218	1	10		0.0218	1
Magnesium	7439-95-4	--	--	--	--	--	4,400	31,900		10.7	12,500	23,900		16.1	1,250	789		3.21	250	1,220		3.21	250	20,600		3.21	250
Manganese	7439-96-5	N	2,543	156.43	2,044	951.9	330	534		0.264	5	524		0.264	5	939		2.06	25	135		0.264	5	497		0.264	5
Mercury [3]	7439-97-6	--	0.13	2.35	30.66	--	0.06	<0.1	U	0.0077	0.1	<0.1	U	0.0077	0.1	0.028	J	0.0077	0.1	0.04	J	0.0077	0.1	0.03	J	0.0077	0.1
Nickel	7440-02-0	N	62.8	156.43	2,044	--	2	52		0.356	5	45		0.0356	0.5	8.8		0.0356	0.5	20		0.0356	0.5	46		0.0356	0.5
Potassium	7440-09-7	--	--	--	--	--	--	7,750	J,f	5	100	5,380	J,f	5	100	640	J,s	5	100	1,360	J,s	5	100	4,130	J,s	5	100
Selenium	7782-49-2	N	--	39.11	511	18.98	1.8	0.35	J	0.0502	1	0.43	J	0.0502	1	0.65	J	0.0502	1	0.67	J	0.0502	1	0.78	J	0.0502	1
Silver	7440-22-4	N	--	39.11	511	31.03	0.0000098	0.17	J	0.0044	3	0.16	J	0.0044	3	0.054	J	0.0044	3	0.04	J	0.0044	3	0.11	J	0.0044	3
Sodium	7440-23-5	--	--	--	--	--	--	108		8.92	100	107		8.92	100	28	J,B,p	8.92	100	151		8.92	100	69	J	8.92	100
Thallium	7440-28-0	N	2.11	0.548	7.15	3.64	0.001	0.23	J	0.027	0.5	0.21	J	0.027	0.5	0.16	J	0.027	0.5	0.14	J	0.027	0.5	0.23	J	0.027	0.5
Vanadium	7440-62-2	N	108	7.82	102.2	730.1	0.5	59		0.207	1	56		0.207	1	31		0.207	1	44		0.207	1	57		0.207	1
Zinc	7440-66-6	N	202	2,346	30,660	13,622	10	37	B,x	0.517	4	33	B,x	0.517	4	128		2.59	20	21		0.517	4	38		0.517	4
TCL Pesticides/PCBs (µg/kg)																											
Aroclor 1254 [4]	11097-69-1	C	--	1.6E+02	1.4E+03	1.1E+03	--	NT				NT				NT				NT				NT			
TCL VOCs (µg/kg)																											
2-Butanone	78-93-3	N	--	4.7E+06	6.1E+07	2.9E+04	--	<28	U	7.05	28	<26	U	6.6	26	33		5.95	24	22	J	6.65	26	24	J	6.85	28
Acetone	67-64-1	N	--	7.0E+06	9.2E+07	2.2E+04	--	52	B,z	7.05	28	43	B,z	6.6	26	150	B,z	5.95	24	49	B,B,z	6.65	26	50	B,B,z	6.85	28
Methylene chloride	75-09-2	C	--	8.5E+04	3.8E+05	1.9E+01	300	<28	U,UJ,c	3.96	28	<26	U,UJ,c	3.71	26	<24	U	3.34	24	<26	U	3.74	26	5	J	3.85	28
TCL SVOCs (µg/kg)																											
4-Chloro-3-Methylphenol	59-50-7	--	--	--	--	--	--	19	J,B,x	7.29	240	<220	U	6.77	220	35	J	6.25	200	31	J	6.77	220	30	J	7.29	240
Benzo(a)pyrene	50-32-8	C	--	2.2E+01	3.9E+02	1.2E+02	100	<240	U	7.99	240	<220	U	7.42	220	11	J	6.85	200	<220	U	7.42	220	<240	U	7.99	240
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	100	<240	U	13.7	240	<220	U	12.7	220	23	J	11.7	200	<220	U	12.7	220	<240	U	13.7	240
Bis(2-ethylhexyl)phthalate	117-81-7	C	--	4.6E+04	2.0E+05	2.9E+06	--	55	J	2.9	240	100	J	2.69	220	49	J	2.48	200	20	J	2.69	220	24	J	2.9	240
Butylbenzylphthalate	85-68-7	N	--	1.6E+06	2.0E+07	1.7E+07	--	<240	U	6.27	240	<220	U	5.82	220	<200	U	5.38	200	11	J	5.82	220	14	J	6.27	240
Caprolactam	105-60-2	N	--	3.9E+06	5.1E+07	--	--	<460	U	8.93	460	<460	U	8.29	460	94	J	7.66	400	21	J	8.29	400	18	J	8.93	460
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	100	<240	U	14.3	240	<220	U	13.3	220	15	J	12.2	200	<220	U	13.3	220	<240	U	14.3	240
Diethylphthalate	84-66-2	N	--	6.3E+06	8.2E+07	4.5E+05	--	4	J,B,x	2.66	240	6	J,B,x	2.47	220	13	J,B,x	2.28	200	10	J,B,x	2.47	220	11	J,B,x	2.66	240
Di-n-butylphthalate	84-74-2	N	--	7.8E+05	1.0E+07	5.0E+06	--	55	J	5.35	240	100	J	4.97	220	190	J	4.58	200	210	J	4.97	220	380		5.35	240
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	100	<240	U	3.29	240	<220	U	3.06	220	23	J	1.82	200	<220	U	3.06	220	<240	U	3.29	240
Indeno(1,2,3-cd)pyrene	193-39-5	C	--	2.2E+02	3.9E+03	4.2E+03	100	<240	U	5.49	240	<220	U	5.1	220	9	J	4.7	200	<220	U	5.1	220	<240	U	5.49	240
Phenanthrene [5]	85-01-8	N	--	2.3E+05	3.1E+06	--	100	<240	U	3.22	240	<220	U	2.99	220	12	J	2.76	200	<220	U	2.99	220	<240	U	3.22	240
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	100	<240	U	2.07	240	<220	U	1.92	220	23	J	1.78	200	<220	U	1.92	220	<240	U	2.07	240
SVOC TICs (µg/kg)																											
(Z)-9-Octadecenamide	301-02-0	--	--	--	--	--	--	NI				540	E,B,x	0	100	NI				48	E,NJ,t	0	100	41	E,NJ,t	0	100
1-Heptadecanol	1454-85-9	--	--	--	--	--	--	NI				NI				NI				42	E,NJ,t	0	10	30	E,NJ,t	0	10
1-Hexadecanol	36653-82-4	--	--	--	--	--	--	NI				NI				120	E,NJ,t	0	100	NI				NI			
1,2-Benzenedicarboxylicacid, bis(2-methy	84-69-5	--	--	--	--	--	--	100	E,B,x	0	100	90	E,B,x	0	100	NI				320	E,NJ,t	0	100	NI			
1,2-Benzenedicarboxylic acid, butyl 2-me	17851-53-5	--	--	--	--	--	--	NI				NI				320	E,NJ,t	0	10	NI				530	E,NJ,t	0	10
2(5H)-Furanone, 5,5-dimethyl-	20019-64-1	--	--	--	--	--	--	NI				NI				NI				NI				NI			
2-Ethyl-1-Hexanol	104-76-7	--	--	--	--	--	--	NI				NI				NI				36	E,NJ,t	0	1,700	39	E,NJ,t	0	1,700
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	--	--	--	--	--	--	120	E,NJ,t	0	100	82	E,NJ,t	0	100	140	E,NJ,t	0	100	120	E,NJ,t	0	100	120	E,NJ,t	0	100
3-Eicosene, (E)-	74685-33-9	--	--	--	--	--	--	NI				NI				140	E,NJ,t	0	10	NI				NI			
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,	10001-439-24	--	--	--	--	--	--	NI				NI				NI				NI				NI			
Eicosane	112-95-8	--	--	--	--	--	--	NI				NI				100	E,NJ,t	0	1,000	NI				NI			
Erucylamide	112-84-5	--	--	--	--	--	--	820	E,B,x	0	10	NI				NI				NI				NI			
Ethanol, 2-(hexadecyloxy)-	2136-71-2	--	--	--	--	--	--	70	E,NJ,t	0	10	NI				NI				NI				NI			
Octadecanal	638-66-4	--	--	--	--	--	--	NI				NI				79	E,NJ,t	0	10	NI				NI			
Phsophoric acid, tris(3-methylphenyl) es	563-04-2	--	--	--	--	--	--	NI				NI				200	E,NJ,t	0	100	NI				NI			
Stearic Acid	57-11-4	--	--	--	--	--	--	NI				NI				NI				45	E,NJ,t	0	1	50	E,NJ,t	0	1

Table 8-3
Detected Analytes for SWMU 68
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	SSL DAF 20	Draft BTAG Screening Level	68SB2C 10/6/2003 21-23		MDL	RL	68SB2C-DUP(SBD5) 10/6/2003 21-23		MDL	RL	68SB3A 10/7/2003 0-1		MDL	RL	68SB3B 10/7/2003 8-10		MDL	RL	68SB3C 10/7/2003 18-20		MDL	RL
								Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
PAHs (µg/kg)																											
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	100	<30	U,UL,s	0.98	30	<28	U	0.91	28	<25	U,UL,s	0.84	25	<28	U,UL,s	0.91	28	<27	U,UL,s	0.91	27
Benzo(a)anthracene	56-55-3	C	--	2.2E+02	3.9E+03	4.8E+02	100	<30	U,UL,s	1.12	30	<28	U	1.04	28	<25	U,UL,s	0.96	25	<28	U,UL,s	1.04	28	<27	U,UL,s	1.04	27
Benzo(a)pyrene	50-32-8	C	--	2.2E+01	3.9E+02	1.2E+02	100	<30	U,UL,s	1.4	30	<28	U	1.3	28	<25	U,UL,s	1.2	25	<28	U,UL,s	1.3	28	<27	U,UL,s	1.3	27
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	100	<30	U,UL,s	1.82	30	<28	U	1.69	28	<25	U,UL,s	1.56	25	<28	U,UL,s	1.69	28	<27	U,UL,s	1.69	27
Benzo(k)fluoranthene	207-08-9	C	--	2.2E+03	3.9E+04	1.5E+04	100	<30	U,UL,s	1.4	30	<28	U	1.3	28	<25	U,UL,s	1.2	25	<28	U,UL,s	1.3	28	<27	U,UL,s	1.3	27
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	100	<30	U,UL,s	1.68	30	<28	U	1.56	28	2	J,L,s	1.44	25	<28	U,UL,s	1.56	28	<27	U,UL,s	1.56	27
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	100	<30	U,UL,s	2.38	30	<28	U	2.21	28	5.2	J,L,s	2.04	25	<28	U,UL,s	2.21	28	<27	U,UL,s	2.21	27
Fluorene	86-73-7	N	--	3.1E+05	4.1E+06	1.4E+05	100	<30	U,UL,s	1.82	30	<28	U	1.69	28	<25	U,UL,s	1.56	25	<28	U,UL,s	1.69	28	<27	U,UL,s	1.69	27
Indeno(1,2,3-cd)pyrene	193-39-5	C	--	2.2E+02	3.9E+03	4.2E+03	100	<30	U,UL,s	0.98	30	<28	U	0.91	28	<25	U,UL,s	0.84	25	<28	U,UL,s	0.91	28	<27	U,UL,s	0.91	27
Phenanthrene [5]	85-01-8	N	--	2.3E+05	3.1E+06	--	100	<30	U,UL,s	0.84	30	<28	U	0.78	28	<25	U,UL,s	0.72	25	<28	U,UL,s	0.78	28	<27	U,UL,s	0.78	27
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	100	<30	U,UL,s	1.26	30	<28	U	1.17	28	5.8	J,L,s	1.08	25	<28	U,UL,s	1.17	28	<27	U,UL,s	1.17	27
Cyanide (mg/kg)																											
Cyanide	57-12-5	N	--	1.6E+02	2.0E+03	1.5E+02	0.005	<0.5	U	0.0356	0.5	<0.5	U	0.0356	0.5	0.16	J	0.0356	0.5	<0.5	U	0.0356	0.5	<0.5	U	0.0356	0.5
Percent Solids (%)							--																				
Percent Solids	--	--	--	--	--	--	--	71		0.1	0.1	76		0.1	0.1	84		0.1	0.1	75		0.1	0.1	73		0.1	0.1

Notes:

CAS = Chemical Abstracts Service
ft bgs = Feet Below Ground Surface
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyl
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon
TIC = Tentatively Identified Compound
MDL = Method Detection Limit
RL = Reporting Limit
LQ = Laboratory Qualifier
VQ = Validation Qualifier
r = Reason Code
NT = Not Tested
NI = Not Identified
NA = Not Applicable

[1] = Chromium VI RBC value was used
[2] = Lead criteria are Action Levels; see USEPA Region III guidance
[3] = Mercuric chloride soil RBC value used
[4] = Noncarcinogenic Residential RBC value for Aroclor 1254 was used for screening
[5] = RBC value for pyrene was used for these compounds
[A] = Facility-Wide Background Point Estimate as Reported in the Facility-Wide Background Study Report (IT 2001a)
RBC = USEPA Region III Risk-Based Concentration (RBC) values from the October 31, 2006, RBC Table and October 10, 2006, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
C = Carcinogenic per EPA RBC Table (October 2006)
N = Noncarcinogenic per EPA RBC Table (October 2006)
SSL DAF20 = Soil Screening Level at a Dilution Attenuation Factor of 20
BTAG = Biological Technical Assistance Group Screening Level, Draft 1995

= Concentration Exceeds Adjusted Soil Residential RBC

= Concentration Exceeds Adjusted Soil Industrial RBC

underline = Concentration Exceeds Site Background Values

bold italic = Concentration Exceeds SSL DAF20

= Concentration Exceeds BTAG Screening Level

Laboratory Qualifiers

U	The compound was analyzed for but not detected. The reporting limit will be adjusted to reflect any dilution, and for soil, the percent moisture.
J	Estimated value.
B	Analyte found in associated blank as well as in the sample.
E	Concentration exceeded the upper level of the calibration range of the instrument for that specific analysis. For TICs, compound not present in calibration standard, calculated using total peak areas ion chromatographs and response factor of 1.

Validation Qualifiers

B	Not detected substantially above the level reported in laboratory or field blanks.
N	Tentative Identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.
J	Analyte present. Reported value may not be accurate or precise.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
UL	Not detected, quantitation limit is probably higher.

Reason Codes

GC/MS Organics

c	Calibration failure; poor (RRF) or unstable (%D) response
s	Surrogate failure
t	Tentatively identified Compound
x	Field and/or equipment blank contamination
z	Method blank and/or storage blank contamination

GC and HPLC Organics

c	Calibration failure; poor or unstable (%D) response
s	No confirmation column
x	Trip blank contamination
z	Method blank and/or storage blank contamination

Inorganics and Conventionals

f	Field duplicate imprecision
m	MS/MSD recovery failure
p	Preparation blank contamination
s	Serial dilution failure
x	CRDL standard recovery failure

Table 8-4
HHRS COPC Selection (Surface Soil) for SWMU 68
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	C/N	Adjusted RBC Residential	Adjusted RBC Industrial	COPC Flag (Y/N)	Rationale for Selection or Deletion
	TAL Metals (mg/kg)												
7429905	Aluminum	12,200	34,500	mg/kg	68SB1A	3/3	1.83 - 5.1	34,500	--	--	--	Y	NSV
7440360	Antimony	13.00	13	mg/kg	68SB3A	1/3	0.0518 - 0.0518	13.0	N	3.13	40.9	Y	**ARES**
7440382	Arsenic	2.1	3.20	mg/kg	68SB1A	3/3	0.0232 - 0.0232	3	C	0.43	1.91	Y	***ARES/IND***
7440393	Barium	78	111	mg/kg	68SB3A	3/3	0.106 - 0.106	111	N	1,564	20,440	N	BSL
7440417	Beryllium	0.63	1.10	mg/kg	68SB1A	3/3	0.0391 - 0.0391	1.10	N	15.64	204	N	BSL
7440439	Cadmium	1.8	5.60	mg/kg	68SB3A	3/3	0.182 - 0.182	5.60	N	3.91	51	Y	**ARES**
7440702	Calcium	661	1,600	mg/kg	68SB3A	3/3	16.6 - 16.6	1,600	--	Nutrient	Nutrient	N	Nutrient
7440473	Chromium[1]	20	40	mg/kg	68SB3A	3/3	0.912 - 0.912	40	N	23.5	306.6	Y	**ARES**
7440484	Cobalt	10	24	mg/kg	68SB2A	3/3	0.208 - 0.208	24	--	--	--	Y	NSV
7440508	Copper	9	15	mg/kg	68SB1A	3/3	0.368 - 0.368	15	N	312.9	4,088	N	BSL
7439896	Iron	16,600	33,100	mg/kg	68SB1A	3/3	17.9 - 35.8	33,100	N	2,346	30,660	Y	***ARES/IND***
7439921	Lead[2]	8	23	mg/kg	68SB3A	3/3	0.0218 - 0.0218	23	--	400	750	N	BSL
7439954	Magnesium	789	8,010	mg/kg	68SB1A	3/3	3.21 - 3.21	8,010	--	Nutrient	Nutrient	N	Nutrient
7439965	Manganese	532	939	mg/kg	68SB3A	3/3	0.264 - 2.06	939	N	156.4	2,044	Y	**ARES**
7439976	Mercury[3]	0.02	0.03	mg/kg	68SB3A	3/3	0.0077 - 0.0077	0.03	--	0.782	10.22	N	BSL
7440020	Nickel	9	17	mg/kg	68SB1A	3/3	0.0356 - 0.0356	17	N	156	2,044	N	BSL
7440097	Potassium	640	3,800	mg/kg	68SB1A	3/3	5 - 5	3,800	--	Nutrient	Nutrient	N	Nutrient
7782492	Selenium	0.64	0.89	mg/kg	68SB1A	3/3	0.0502 - 0.0502	0.89	N	39	511	N	BSL
7440224	Silver	0.05	0.11	mg/kg	68SB1A	3/3	0.0044 - 0.0044	0.11	N	39	511	N	BSL
7440235	Sodium	25	36	mg/kg	68SB1A	3/3	8.92 - 8.92	36	--	Nutrient	Nutrient	N	Nutrient
7440280	Thallium	0.16	0.25	mg/kg	68SB1A	3/3	0.027 - 0.027	0.25	N	0.548	7.15	N	BSL
7440622	Vanadium	31	53	mg/kg	68SB1A	3/3	0.207 - 0.207	53	N	7.8	102	Y	**ARES**
7440666	Zinc	34	128	mg/kg	68SB3A	3/3	0.517 - 2.59	128	N	2,346	30,660	N	BSL
	TCL Pesticides/PCBs (µg/kg)												
11097691	Aroclor 1254[4]	8.7E+00	8.7E+00	µg/kg	68SB1A	1/1	3.9 - 3.9	8.7E+00	C	1.6E+02	1.4E+03	N	BSL
	TCL VOCs (µg/kg)												
78933	2-Butanone	3.0E+01	3.3E+01	µg/kg	68SB3A	3/3	5.95 - 6.4	3.3E+01	N	4.7E+06	6.1E+07	N	BSL
67641	Acetone	7.9E+01	1.5E+02	µg/kg	68SB3A	3/3	5.95 - 6.4	1.5E+02	N	7.0E+06	9.2E+07	N	BSL
	TCL SVOCs (µg/kg)												
59507	4-Chloro-3-Methylphenol	9.0E+00	3.5E+01	µg/kg	68SB3A	3/3	6.25 - 6.77	3.5E+01	--	--	--	Y	NSV
50328	Benzo(a)pyrene	1.1E+01	2.5E+01	µg/kg	68SB2A	2/3	6.85 - 7.42	2.5E+01	C	2.2E+01	3.9E+02	Y	**ARES**
205992	Benzo(b)fluoranthene	2.3E+01	4.5E+01	µg/kg	68SB2A	2/3	11.7 - 12.7	4.5E+01	C	2.2E+02	3.9E+03	N	BSL
117817	Bis(2-ethylhexyl)phthalate	4.9E+01	5.4E+01	µg/kg	68SB1A	3/3	2.48 - 2.69	5.4E+01	C	4.6E+04	2.0E+05	N	BSL
85687	Butylbenzylphthalate	4.1E+01	4.2E+01	µg/kg	68SB2A	2/3	5.38 - 5.82	4.2E+01	N	1.6E+06	2.0E+07	N	BSL
105602	Caprolactam	9.4E+01	9.4E+01	µg/kg	68SB3A	1/3	7.66 - 8.29	9.4E+01	N	3.9E+06	5.1E+07	N	BSL
218019	Chrysene	1.5E+01	1.5E+01	µg/kg	68SB3A	1/3	12.2 - 13.3	1.5E+01	C	2.2E+04	3.9E+05	N	BSL
84662	Diethylphthalate	4.0E+00	1.3E+01	µg/kg	68SB3A	3/3	2.28 - 2.47	1.3E+01	N	6.3E+06	8.2E+07	N	BSL
84742	Di-n-butylphthalate	2.9E+01	1.9E+02	µg/kg	68SB3A	3/3	4.58 - 4.97	1.9E+02	N	7.8E+05	1.0E+07	N	BSL
206440	Fluoranthene	1.4E+01	2.3E+01	µg/kg	68SB3A	2/3	1.82 - 3.06	2.3E+01	N	3.1E+05	4.1E+06	N	BSL
193395	Indeno(1,2,3-cd)pyrene	9.0E+00	3.6E+01	µg/kg	68SB2A	2/3	4.7 - 5.1	3.6E+01	C	2.2E+02	3.9E+03	N	BSL
85018	Phenanthrene[5]	6.0E+00	1.2E+01	µg/kg	68SB3A	2/3	2.76 - 2.99	1.2E+01	N	2.3E+05	3.1E+06	N	BSL
129000	Pyrene	1.2E+01	2.3E+01	µg/kg	68SB3A	2/3	1.78 - 1.92	2.3E+01	N	2.3E+05	3.1E+06	N	BSL
	SVOC TICs (µg/kg)												
301020	(Z)-9-Octadecenamide	5.9E+02	7.8E+02	µg/kg	68SB1A	2/3	0 - 0	7.8E+02	--	--	--	Y	NSV
36653824	1-Hexadecanol	1.2E+02	1.2E+02	µg/kg	68SB3A	1/3	0 - 0	1.2E+02	--	--	--	Y	NSV
84695	1,2-Benzenedicarboxylicacid, bis(2-methy	2.3E+01	4.4E+01	µg/kg	68SB2A	2/3	0 - 0	4.4E+01	--	--	--	Y	NSV
17851535	1,2-Benzenedicarboxylic acid, butyl 2-me	3.2E+02	3.2E+02	µg/kg	68SB3A	1/3	0 - 0	3.2E+02	--	--	--	Y	NSV
101371	2,4,6-Triallyloxy-1,3,5-triazine	1.1E+02	1.4E+02	µg/kg	68SB3A	2/3	0 - 0	1.4E+02	--	--	--	Y	NSV
74685339	3-Eicosene, (E)-	1.4E+02	1.4E+02	µg/kg	68SB3A	1/3	0 - 0	1.4E+02	--	--	--	Y	NSV
1000143924	7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,	2.3E+01	2.3E+01	µg/kg	68SB1A	1/3	0 - 0	2.3E+01	--	--	--	Y	NSV
112958	Eicosane	1.0E+02	1.0E+02	µg/kg	68SB3A	1/3	0 - 0	1.0E+02	--	--	--	Y	NSV
638664	Octadecanal	7.9E+01	7.9E+01	µg/kg	68SB3A	1/3	0 - 0	7.9E+01	--	--	--	Y	NSV
563042	Phsophoric acid, tris(3-methylphenyl) es	2.0E+02	2.0E+02	µg/kg	68SB3A	1/3	0 - 0	2.0E+02	--	--	--	Y	NSV

Table 8-4
HHRS COPC Selection (Surface Soil) for SWMU 68
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	C/N	Adjusted RBC Residential	Adjusted RBC Industrial	COPC Flag (Y/N)	Rationale for Selection or Deletion
	PAHs (µg/kg)												
120127	Anthracene	7.1E+00	7.1E+00	µg/kg	68SB2A	1/3	0.84 - 0.91	7.1E+00	N	2.3E+06	3.1E+07	N	BSL
56553	Benzo(a)anthracene	1.4E+01	1.4E+01	µg/kg	68SB2A	1/3	0.96 - 1.04	1.4E+01	C	2.2E+02	3.9E+03	N	BSL
50328	Benzo(a)pyrene	1.5E+01	1.5E+01	µg/kg	68SB2A	1/3	1.2 - 1.3	1.5E+01	C	2.2E+01	3.9E+02	N	BSL
205992	Benzo(b)fluoranthene	9.5E+00	9.5E+00	µg/kg	68SB2A	1/3	1.56 - 1.69	9.5E+00	C	2.2E+02	3.9E+03	N	BSL
207089	Benzo(k)fluoranthene	6.7E+00	6.7E+00	µg/kg	68SB2A	1/3	1.2 - 1.3	6.7E+00	C	2.2E+03	3.9E+04	N	BSL
218019	Chrysene	2.0E+00	1.2E+01	µg/kg	68SB2A	2/3	1.44 - 1.56	1.2E+01	C	2.2E+04	3.9E+05	N	BSL
206440	Fluoranthene	2.8E+00	3.8E+01	µg/kg	68SB2A	3/3	2.04 - 2.21	3.8E+01	N	3.1E+05	4.1E+06	N	BSL
86737	Fluorene	3.1E+00	3.1E+00	µg/kg	68SB2A	1/3	1.56 - 1.69	3.1E+00	N	3.1E+05	4.1E+06	N	BSL
193395	Indeno(1,2,3-cd)pyrene	8.6E+00	8.6E+00	µg/kg	68SB2A	1/3	0.84 - 0.91	8.6E+00	C	2.2E+02	3.9E+03	N	BSL
85018	Phenanthrene[5]	3.0E+01	3.0E+01	µg/kg	68SB2A	1/3	0.72 - 0.78	3.0E+01	N	2.3E+05	3.1E+06	N	BSL
129000	Pyrene	2.1E+00	1.3E+02	µg/kg	68SB2A	3/3	1.08 - 1.17	1.3E+02	N	2.3E+05	3.1E+06	N	BSL
	Cyanide (mg/kg)												
57125	Cyanide	1.6E-01	1.6E-01	mg/kg	68SB3A	1/3	0.0356 - 0.0356	1.6E-01	N	1.6E+02	2.0E+03	N	BSL

Notes:

CAS = Chemical Abstracts Service
COPC = Chemical of Potential Concern
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyls
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
PAH = Polynuclear Aromatic Compound
TIC = Tentatively Identified Compound
[1] = Chromium VI RBC value was used
[2] = Lead criteria are Action Levels; see USEPA Region III guidance
[3] = Mercuric chloride soil RBC value used
[4] = Noncarcinogenic Residential RBC value for Aroclor 1254 was used for screening
[5] = RBC value for pyrene was used for these compounds

RBC = USEPA Region III Risk-Based Concentration (RBC) values from the October 31, 2006, RBC Table and October 10, 2006, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
C = Carcinogenic per EPA RBC Table (October 2006)
N = Noncarcinogenic per EPA RBC Table (October 2006)

ARES = Above Residential RBC
ARES/IND = Above Residential RBC/Industrial RBC
BSL = Below Residential/Industrial RBC Screening Levels
NSV = No Screening Value Available

Table 8-5
HHRS COPC Selection (Total Soil) for SWMU 68
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	C/N	Adjusted RBC Residential	Adjusted RBC Industrial	COPC Flag (Y/N)	Rationale for Selection or Deletion
	TAL Metals (mg/kg)												
7429905	Aluminum	12,200	34,500	mg/kg	68SB1A	9/9	1.83 - 9.15	34,500	--	--	--	Y	NSV
7440360	Antimony	0.063	13	mg/kg	68SB3A	7/9	0.0518 - 0.0518	13	N	3.13	40.9	Y	**ARES**
7440382	Arsenic	0.8	10.1	mg/kg	68SB2C-AVG DUP	9/9	0.0232 - 0.0232	10.1	C	0.43	1.91	Y	***ARES/IND***
7440393	Barium	20	111	mg/kg	68SB3A	9/9	0.106 - 0.106	111	N	1,564	20,440	N	BSL
7440417	Beryllium	0.63	2.7	mg/kg	68SB3C	9/9	0.0391 - 0.0391	2.7	N	15.64	204	N	BSL
7440439	Cadmium	1.4	5.6	mg/kg	68SB3A	9/9	0.182 - 0.182	5.6	N	3.91	51	Y	**ARES**
7440702	Calcium	248	1,600	mg/kg	68SB3A	7/9	16.6 - 16.6	1,600	--	Nutrient	Nutrient	N	Nutrient
7440473	Chromium[1]	6.9	40	mg/kg	68SB3A	9/9	0.912 - 0.912	40	N	23.5	306.6	Y	**ARES**
7440484	Cobalt	3.4	24	mg/kg	68SB2A	9/9	0.208 - 0.208	24	--	--	--	Y	NSV
7440508	Copper	4.3	24.5	mg/kg	68SB2C-AVG DUP	9/9	0.368 - 0.368	24.5	N	312.9	4,088	N	BSL
7439896	Iron	16,600	56,600	mg/kg	68SB2B	9/9	17.9 - 71.6	56,600	N	2,346	30,660	Y	***ARES/IND***
7439921	Lead[2]	2.9	23	mg/kg	68SB3A	9/9	0.0218 - 0.0218	23	--	400	750	N	BSL
7439954	Magnesium	789	27,900	mg/kg	68SB2C-AVG DUP	9/9	3.21 - 10.7	27,900	--	Nutrient	Nutrient	N	Nutrient
7439965	Manganese	91	939	mg/kg	68SB3A	9/9	0.264 - 2.06	939	N	156.4	2,044	Y	**ARES**
7439976	Mercury[3]	0.016	0.042	mg/kg	68SB2B	8/9	0.0077 - 0.0077	0.042	--	0.782	10.22	N	BSL
7440020	Nickel	8	55	mg/kg	68SB1C	9/9	0.0356 - 0.356	55	N	156	2,044	N	BSL
7440097	Potassium	640	6,565	mg/kg	68SB2C-AVG DUP	9/9	5 - 5	6,565	--	Nutrient	Nutrient	N	Nutrient
7782492	Selenium	0.21	0.89	mg/kg	68SB1A	9/9	0.0502 - 0.0502	0.89	N	39	511	N	BSL
7440224	Silver	0.04	0.165	mg/kg	68SB2C-AVG DUP	9/9	0.0044 - 0.0044	0.165	N	39	511	N	BSL
7440235	Sodium	25	213	mg/kg	68SB1C	9/9	8.92 - 8.92	213	--	Nutrient	Nutrient	N	Nutrient
7440280	Thallium	0.081	0.25	mg/kg	68SB1A	9/9	0.027 - 0.027	0.25	N	0.548	7.15	N	BSL
7440622	Vanadium	16	58	mg/kg	68SB2C-AVG DUP	9/9	0.207 - 0.207	58	N	7.8	102	Y	**ARES**
7440666	Zinc	14	128	mg/kg	68SB3A	9/9	0.517 - 2.59	128	N	2,346	30,660	N	BSL
	TCL Pesticides/PCBs (µg/kg)												
11097691	Aroclor 1254[4]	8.7E+00	8.7E+00	µg/kg	68SB1A	1/1	3.9 - 3.9	8.7E+00	C	1.6E+02	1.4E+03	N	BSL
	TCL VOCs (µg/kg)												
78933	2-Butanone	2.2E+01	3.3E+01	µg/kg	68SB3A	7/9	5.95 - 7.05	3.3E+01	N	4.7E+06	6.1E+07	N	BSL
67641	Acetone	4.2E+01	1.5E+02	µg/kg	68SB3A	9/9	5.95 - 7.05	1.5E+02	N	7.0E+06	9.2E+07	N	BSL
75092	Methylene chloride	5.0E+00	5.0E+00	µg/kg	68SB3C	1/9	3.34 - 3.96	5.0E+00	C	8.5E+04	3.8E+05	N	BSL
	TCL SVOCs (µg/kg)												
59507	4-Chloro-3-Methylphenol	9.0E+00	3.5E+01	µg/kg	68SB3A	9/9	6.25 - 7.29	3.5E+01	--	--	--	Y	NSV
50328	Benzo(a)pyrene	1.1E+01	2.5E+01	µg/kg	68SB2A	2/9	6.85 - 7.99	2.5E+01	C	2.2E+01	3.9E+02	Y	**ARES**
205992	Benzo(b)fluoranthene	2.3E+01	4.5E+01	µg/kg	68SB2A	2/9	11.7 - 13.7	4.5E+01	C	2.2E+02	3.9E+03	N	BSL
117817	Bis(2-ethylhexyl)phthalate	2.0E+01	7.8E+01	µg/kg	68SB2C-AVG DUP	9/9	2.48 - 2.9	7.8E+01	C	4.6E+04	2.0E+05	N	BSL
85687	Butylbenzylphthalate	1.1E+01	4.6E+01	µg/kg	68SB1B	5/9	5.38 - 6.27	4.6E+01	N	1.6E+06	2.0E+07	N	BSL
105602	Caprolactam	1.8E+01	9.4E+01	µg/kg	68SB3A	4/9	7.66 - 8.93	9.4E+01	N	3.9E+06	5.1E+07	N	BSL
218019	Chrysene	1.5E+01	1.5E+01	µg/kg	68SB3A	1/9	12.2 - 14.3	1.5E+01	C	2.2E+04	3.9E+05	N	BSL
84662	Diethylphthalate	4.0E+00	1.3E+01	µg/kg	68SB3A	9/9	2.28 - 2.66	1.3E+01	N	6.3E+06	8.2E+07	N	BSL
84742	Di-n-butylphthalate	5.6E+00	3.8E+02	µg/kg	68SB3C	9/9	4.58 - 5.35	3.8E+02	N	7.8E+05	1.0E+07	N	BSL
206440	Fluoranthene	4.0E+00	2.3E+01	µg/kg	68SB3A	3/9	1.82 - 3.29	2.3E+01	N	3.1E+05	4.1E+06	N	BSL
193395	Indeno(1,2,3-cd)pyrene	9.0E+00	3.6E+01	µg/kg	68SB2A	2/9	4.7 - 5.49	3.6E+01	C	2.2E+02	3.9E+03	N	BSL
85018	Phenanthrene[5]	6.0E+00	1.2E+01	µg/kg	68SB3A	2/9	2.76 - 3.22	1.2E+01	N	2.3E+05	3.1E+06	N	BSL
129000	Pyrene	1.2E+01	2.3E+01	µg/kg	68SB3A	2/9	1.78 - 2.07	2.3E+01	N	2.3E+05	3.1E+06	N	BSL
	SVOC TICs (µg/kg)												
301020	(Z)-9-Octadecenamide	4.1E+01	7.8E+02	µg/kg	68SB1A	7/9	0 - 0	7.8E+02	--	--	--	Y	NSV
1454859	1-Heptadecanol	3.0E+01	4.2E+01	µg/kg	68SB3B	2/9	0 - 0	4.2E+01	--	--	--	Y	NSV
36653824	1-Hexadecanol	1.2E+02	1.2E+02	µg/kg	68SB3A	1/9	0 - 0	1.2E+02	--	--	--	Y	NSV
84695	1,2-Benzenedicarboxylicacid, bis(2-methy	2.3E+01	3.7E+02	µg/kg	68SB1C	6/9	0 - 0	3.7E+02	--	--	--	Y	NSV
17851535	1,2-Benzenedicarboxylic acid, butyl 2-me	8.5E+01	5.3E+02	µg/kg	68SB3C	3/9	0 - 0	5.3E+02	--	--	--	Y	NSV
20019641	2(5H)-Furanone, 5,5-dimethyl-	2.1E+02	2.1E+02	µg/kg	68SB1C	1/9	0 - 0	2.1E+02	--	--	--	Y	NSV
104767	2-Ethyl-1-Hexanol	2.7E+01	3.9E+01	µg/kg	68SB3C	3/9	0 - 0	3.9E+01	--	--	--	Y	NSV
101371	2,4,6-Triallyloxy-1,3,5-triazine	1.0E+02	1.4E+02	µg/kg	68SB3A	7/9	0 - 0	1.4E+02	--	--	--	Y	NSV
74685339	3-Eicosene, (E)-	1.4E+02	1.4E+02	µg/kg	68SB3A	1/9	0 - 0	1.4E+02	--	--	--	Y	NSV

Table 8-5
HHRS COPC Selection (Total Soil) for SWMU 68
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	C/N	Adjusted RBC Residential	Adjusted RBC Industrial	COPC Flag (Y/N)	Rationale for Selection or Deletion
1000143924	7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,	2.3E+01	3.2E+01	µg/kg	68SB2B	2/9	0 - 0	3.2E+01	--	--	--	Y	NSV
112958	Eicosane	1.0E+02	1.0E+02	µg/kg	68SB3A	1/9	0 - 0	1.0E+02	--	--	--	Y	NSV
112845	Erucylamide	7.5E+02	8.5E+02	µg/kg	68SB2B	4/9	0 - 0	8.5E+02	--	--	--	Y	NSV
2136712	Ethanol, 2-(hexadecyloxy)-	7.0E+01	7.0E+01	µg/kg	68SB2C-AVG DUP	1/9	0 - 0	7.0E+01	--	--	--	Y	NSV
638664	Octadecanal	7.9E+01	7.9E+01	µg/kg	68SB3A	1/9	0 - 0	7.9E+01	--	--	--	Y	NSV
563042	Phsophoric acid, tris(3-methylphenyl) es	2.0E+02	2.0E+02	µg/kg	68SB3A	1/9	0 - 0	2.0E+02	--	--	--	Y	NSV
57114	Stearic Acid	4.5E+01	5.0E+01	µg/kg	68SB3C	2/9	0 - 0	5.0E+01	--	--	--	Y	NSV
	PAHs (µg/kg)												
120127	Anthracene	7.1E+00	7.1E+00	µg/kg	68SB2A	1/9	0.84 - 0.98	7.1E+00	N	2.3E+06	3.1E+07	N	BSL
56553	Benzo(a)anthracene	1.4E+01	1.4E+01	µg/kg	68SB2A	1/9	0.96 - 1.12	1.4E+01	C	2.2E+02	3.9E+03	N	BSL
50328	Benzo(a)pyrene	1.5E+01	1.5E+01	µg/kg	68SB2A	1/9	1.2 - 1.4	1.5E+01	C	2.2E+01	3.9E+02	N	BSL
205992	Benzo(b)fluoranthene	9.5E+00	9.5E+00	µg/kg	68SB2A	1/9	1.56 - 1.82	9.5E+00	C	2.2E+02	3.9E+03	N	BSL
207089	Benzo(k)fluoranthene	6.7E+00	6.7E+00	µg/kg	68SB2A	1/9	1.2 - 1.4	6.7E+00	C	2.2E+03	3.9E+04	N	BSL
218019	Chrysene	2.0E+00	1.2E+01	µg/kg	68SB2A	2/9	1.44 - 1.68	1.2E+01	C	2.2E+04	3.9E+05	N	BSL
206440	Fluoranthene	2.8E+00	3.8E+01	µg/kg	68SB2A	3/9	2.04 - 2.38	3.8E+01	N	3.1E+05	4.1E+06	N	BSL
86737	Fluorene	3.1E+00	3.1E+00	µg/kg	68SB2A	1/9	1.56 - 1.82	3.1E+00	N	3.1E+05	4.1E+06	N	BSL
193395	Indeno(1,2,3-cd)pyrene	8.6E+00	8.6E+00	µg/kg	68SB2A	1/9	0.84 - 0.98	8.6E+00	C	2.2E+02	3.9E+03	N	BSL
85018	Phenanthrene[5]	3.0E+01	3.0E+01	µg/kg	68SB2A	1/9	0.72 - 0.84	3.0E+01	N	2.3E+05	3.1E+06	N	BSL
129000	Pyrene	2.1E+00	1.3E+02	µg/kg	68SB2A	3/9	1.08 - 1.26	1.3E+02	N	2.3E+05	3.1E+06	N	BSL
	Cyanide (mg/kg)												
57125	Cyanide	1.6E-01	1.6E-01	mg/kg	68SB3A	1/9	0.0356 - 0.0356	1.6E-01	N	1.6E+02	2.0E+03	N	BSL

Notes:

CAS = Chemical Abstracts Service
COPC = Chemical of Potential Concern
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyls
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
PAH = Polynuclear Aromatic Compound
TIC = Tentatively Identified Compound
[1] = Chromium VI RBC value was used
[2] = Lead criteria are Action Levels; see USEPA Region III guidance
[3] = Mercuric chloride soil RBC value used
[4] = Noncarcinogenic Residential RBC value for Aroclor 1254 was used for screening
[5] = RBC value for pyrene was used for these compounds

DUP AVG = results for duplicate samples averaged
RBC = USEPA Region III Risk-Based Concentration
(RBC) values from the October 31, 2006,
RBC Table and October 10, 2006, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
C = Carcinogenic per EPA RBC Table (October 2006)
N = Noncarcinogenic per EPA RBC Table (October 2006)

ARES = Above Residential RBC
ARES/IND = Above Residential RBC/Industrial RBC
BSL = Below Residential/Industrial RBC Screening Levels
NSV = No Screening Value Available

Table 8-6
Cumulative HHRS for SWMU 68 (Surface Soil)
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Units	MDC	C/N	RBC Residential	RBC Industrial	Non Carcinogenic HI (RBC_{Res})	Excess Cancer Risk (RBC_{Res})	Non Carcinogenic HI (RBC_{Ind})	Excess Cancer Risk (RBC_{Ind})
	TAL Metals									
7429905	Aluminum	mg/kg	3.45E+04	--	--	--	--	--	--	--
7440360	Antimony	mg/kg	1.30E+01	N	3.13E+01	4.09E+02	4.E-01	--	3.E-02	--
7440382	Arsenic	mg/kg	3.20E+00	C	4.26E-01	1.91E+00	--	8.E-06	--	2.E-06
7440382	Arsenic	mg/kg	3.20E+00	N	2.35E+01	3.07E+02	1.E-01	--	1.E-02	--
7440439	Cadmium	mg/kg	5.60E+00	N	3.91E+01	5.11E+02	1.E-01	--	1.E-02	--
7440473	Chromium[1]	mg/kg	4.00E+01	N	2.35E+02	3.07E+03	2.E-01	--	1.E-02	--
7440484	Cobalt	mg/kg	2.40E+01	--	--	--	--	--	--	--
7439896	Iron	mg/kg	3.31E+04	N	2.35E+04	3.07E+05	1.E+00	--	1.E-01	--
7439965	Manganese	mg/kg	9.39E+02	N	1.56E+03	2.04E+04	6.E-01	--	5.E-02	--
7440622	Vanadium	mg/kg	5.30E+01	N	7.82E+01	1.02E+03	7.E-01	--	5.E-02	--
	TCL SVOCs									
59507	4-Chloro-3-Methylphenol	µg/kg	3.50E+01	--	--	--	--	--	--	--
50328	Benzo(a)pyrene	µg/kg	2.50E+01	C	2.20E+01	3.92E+02	--	1.E-06	--	6.E-08
	SVOC TICs									
301020	(Z)-9-Octadecenamide	µg/kg	7.80E+02	--	--	--	--	--	--	--
36653824	1-Hexadecanol	µg/kg	1.20E+02	--	--	--	--	--	--	--
84695	1,2-Benzenedicarboxylicacid, bis(2-methy	µg/kg	4.40E+01	--	--	--	--	--	--	--
17851535	1,2-Benzenedicarboxylic acid, butyl 2-me	µg/kg	3.20E+02	--	--	--	--	--	--	--
101371	2,4,6-Triallyloxy-1,3,5-triazine	µg/kg	1.40E+02	--	--	--	--	--	--	--
74685339	3-Eicosene, (E)-	µg/kg	1.40E+02	--	--	--	--	--	--	--
1000143924	7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,	µg/kg	2.30E+01	--	--	--	--	--	--	--
112958	Eicosane	µg/kg	1.00E+02	--	--	--	--	--	--	--
638664	Octadecanal	µg/kg	7.90E+01	--	--	--	--	--	--	--
563042	Phsophoric acid, tris(3-methylphenyl) es	µg/kg	2.00E+02	--	--	--	--	--	--	--
						Cumulative Risk	4.E+00	9.E-06	3.E-01	2.E-06

Notes:

CAS = Chemical Abstracts Service
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
TIC = Tentatively Identified Compound
[1] = Chromium VI RBC value was used

MDC = Maximum Detected Concentration
HI = Hazard Index
RBC = USEPA Region III Risk-Based Concentration
(RBC) values from the October 31, 2006,
RBC Table and October 10, 2006, Alternate RBC Table
C = Carcinogenic per EPA RBC Table (October 2006)
N = Noncarcinogenic per EPA RBC Table (October 2006)

Table 8-7
Exposure Point Concentration Summary for SWMU 68
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Medium:	Total Soil
Exposure Medium:	Total Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic (1)	Rationale (2)
Total Soil	Aluminum	mg/kg	2.51E+04	2.93E+04	3.5E+04	2.93E+04	mg/kg	95% UCL (Student's t)	85% < FOD, Normal
	Antimony	mg/kg	6.52E-01	3.88E+00	1.3E+01	3.88E+00	mg/kg	95% UCL (Chebyshev)	50% < FOD < 85%, Lognormal
	Arsenic	mg/kg	1.93E+00	6.95E+00	1.0E+01	6.95E+00	mg/kg	95% UCL (Student's t)	85% < FOD, Normal
	Cadmium	mg/kg	--	--	5.6E+00	5.60E+00	mg/kg	--	--
	Chromium	mg/kg	2.55E+01	3.25E+01	4.0E+01	3.25E+01	mg/kg	95% UCL (Student's t)	85% < FOD, Normal
	Cobalt	mg/kg	--	--	2.4E+01	2.40E+01	mg/kg	--	--
	Iron	mg/kg	3.77E+04	4.46E+04	5.7E+04	4.46E+04	mg/kg	95% UCL (Student's t)	85% < FOD, Normal
	Manganese	mg/kg	4.48E+02	6.13E+02	9.4E+02	6.13E+02	mg/kg	95% UCL (Student's t)	85% < FOD, Normal
	Vanadium	mg/kg	4.31E+01	5.24E+01	5.8E+01	5.24E+01	mg/kg	95% UCL (Student's t)	85% < FOD, Normal
	Benzo(a)pyrene	ug/kg	7.01E+00	1.74E+01	2.5E+01	1.74E+01	ug/kg	95% UCL (Chebyshev)	50% < FOD < 85%, Lognormal

Notes:
UCL = Upper Confidence Limit
mg/kg = Milligram Per Kilogram

(1) See Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites (OSWER Directive 9285.6-10, December 2002) for details on the following methods for calculating the 95% UCL:
95% UCL (Bounding) = The frequency of detection is less than 50%; therefore, the 95% UCL is calculated by the bounding method.
95% UCL (Student's t, adj) = The frequency of detection is between 50% and 85%, and the underlying distribution (detects only) is normal; therefore, Aitchison's Method is used to adjust the detects-only mean and standard deviaiton, and the 95% UCL is calculated using the Student's t method.
95% UCL (Land, adj) = The frequency of detection is between 50% and 85%, and the underlying distribution (detects only) is lognormal; therefore, Aitchison's Method is used to adjust the detects-only mean and standard deviation, and the 95% UCL is calculated using Land's method.
95% UCL (Student's t) = The frequency of detection is greater than 85%, and the distribution is normal.; therefore, the 95% UCL is calculated using the Student's t method.
95% UCL (Chebyshev) = The frequency of detection is between 50% and 85% and the underlying distribution (detects only) is neither normal nor lognormal, OR the frequency of detection is greater than 85% and the distribution (with non-detects represented by half of the detection limit) is neither normal nor lognormal; therefore, the 95% UCL is calculated using Hall's bootstrap method.
Maximum: The 95% UCL exceeds the maximum detected concentration; therefore, the maximum detected concentration is used to represent the 95% UCL.

(2) FOD = Frequency of detection
FOD < 50%: Frequency of detection is less than 50%
50% < FOD < 85%, Normal: Frequency of detection is between 50% and 85%, and the underlying distribution (detects only) is normal.
50% < FOD < 85%, Lognormal: Frequency of detection is between 50% and 85%, and the underlying distribution (detects only) is lognormal.
50% < FOD < 85%, Unknown: Frequency of detection is between 50% and 85%, and the underlying distribution (detects only) is neither normal nor lognormal.
85% < FOD, Normal: Frequency of detection is greater than 85%, and the distribution is normal.
85% < FOD, Lognormal: Frequency of detection is greater than 85%, and the distribution is lognormal.
85% < FOD, Unknown: Frequency of detection is greater than 85%, and the distribution is neither normal nor lognormal.

Table 8-8
Cumulative HHRS for SWMU 68 (Total Soil)
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Units	Maximum EPC	C/N	RBC Residential	RBC Industrial	Non Carcinogenic HI (RBC_{Res})	Excess Cancer Risk (RBC_{Res})	Non Carcinogenic HI (RBC_{Ind})	Excess Cancer Risk (RBC_{Ind})
	TAL Metals									
7429905	Aluminum	mg/kg	2.93E+04	--	--	--	--	--	--	--
7440360	Antimony	mg/kg	3.88E+00	N	3.13E+01	4.09E+02	1.E-01	--	9.E-03	--
7440382	Arsenic	mg/kg	6.95E+00	C	4.26E-01	1.91E+00	--	2.E-05	--	4.E-06
7440382	Arsenic	mg/kg	6.95E+00	N	2.37E+01	3.07E+02	3.E-01	--	2.E-02	--
7440439	Cadmium	mg/kg	5.60E+00	N	3.91E+01	5.11E+02	1.E-01	--	1.E-02	--
7440473	Chromium[1]	mg/kg	3.25E+01	N	2.35E+02	3.07E+03	1.E-01	--	1.E-02	--
7440484	Cobalt	mg/kg	3.35E+01	--	--	--	--	--	--	--
7439896	Iron	mg/kg	4.46E+04	N	2.35E+04	3.07E+05	2.E+00	--	1.E-01	--
7439965	Manganese	mg/kg	6.13E+02	N	1.56E+03	2.04E+04	4.E-01	--	3.E-02	--
7440622	Vanadium	mg/kg	5.24E+01	N	7.82E+01	1.02E+03	7.E-01	--	5.E-02	--
	TCL SVOCs									
59507	4-Chloro-3-Methylphenol	µg/kg	3.50E+01	--	--	--	--	--	--	--
50328	Benzo(a)pyrene	µg/kg	1.74E+01	C	2.20E+01	3.92E+02	--	8.E-07	--	4.E-08
	SVOC TICs									
301020	(Z)-9-Octadecenamide	µg/kg	7.80E+02	--	--	--	--	--	--	--
1454859	1-Heptadecanol	µg/kg	4.20E+01	--	--	--	--	--	--	--
36653824	1-Hexadecanol	µg/kg	1.20E+02	--	--	--	--	--	--	--
84695	1,2-Benzenedicarboxylicacid, bis(2-methy	µg/kg	3.70E+02	--	--	--	--	--	--	--
17851535	1,2-Benzenedicarboxylic acid, butyl 2-me	µg/kg	5.30E+02	--	--	--	--	--	--	--
20019641	2(5H)-Furanone, 5,5-dimethyl-	µg/kg	2.10E+02	--	--	--	--	--	--	--
104767	2-Ethyl-1-Hexanol	µg/kg	3.90E+01	--	--	--	--	--	--	--
101371	2,4,6-Triallyloxy-1,3,5-triazine	µg/kg	1.40E+02	--	--	--	--	--	--	--
74685339	3-Eicosene, (E)-	µg/kg	1.40E+02	--	--	--	--	--	--	--
1000143924	7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,	µg/kg	3.20E+01	--	--	--	--	--	--	--
112958	Eicosane	µg/kg	1.00E+02	--	--	--	--	--	--	--
112845	Erucylamide	µg/kg	8.50E+02	--	--	--	--	--	--	--
2136712	Ethanol, 2-(hexadecyloxy)-	µg/kg	7.00E+01	--	--	--	--	--	--	--
638664	Octadecanal	µg/kg	7.90E+01	--	--	--	--	--	--	--
563042	Phsophoric acid, tris(3-methylphenyl) es	µg/kg	2.00E+02	--	--	--	--	--	--	--
57114	Stearic Acid	µg/kg	5.00E+01	--	--	--	--	--	--	--
						Cumulative Risk	4.E+00	2.E-05	3.E-01	4.E-06

Notes:

CAS = Chemical Abstracts Service
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
TIC = Tentatively Identified Compound
[1] = Chromium VI RBC value was used

MDC = Maximum Detected Concentration
HI = Hazard Index
RBC = USEPA Region III Risk-Based Concentration (RBC) values from the October 31, 2006, RBC Table and October 10, 2006, Alternate RBC Table
C = Carcinogenic per EPA RBC Table (October 2006)
N = Noncarcinogenic per EPA RBC Table (October 2006)

Table 8-9
HHRS SSL Comparison for SWMU 68
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Soil to Groundwater SSL (DAF 20)	COPC Flag (Y/N)	Rationale for Selection or Deletion
	TAL Metals (mg/kg)										
7429905	Aluminum	19,200	28,600	mg/kg	68SB3C	6/6	1.83 - 9.15	28,600	--	Y	NSV
7440360	Antimony	0.06	2	mg/kg	68SB3B	6/6	0.0518 - 0.0518	2	13.2	N	BSL
7440382	Arsenic	0.8	10	mg/kg	68SB2C-AVG DUP	6/6	0.0232 - 0.0232	10.1	0.026	Y	**ASSL**
7440393	Barium	20	70	mg/kg	68SB3C	6/6	0.106 - 0.106	70	6,015.2	N	BSL
7440417	Beryllium	0.91	2.7	mg/kg	68SB3C	6/6	0.0391 - 0.0391	2.70	1,153.7	N	BSL
7440439	Cadmium	1.4	2.3	mg/kg	68SB2B	6/6	0.182 - 0.182	2.30	27.4	N	BSL
7440702	Calcium	248	1,140	mg/kg	68SB2B	4/6	16.6 - 16.6	1,140	Nutrient	N	Nutrient
7440473	Chromium[1]	7	37	mg/kg	68SB1C	6/6	0.912 - 0.912	37	42	N	BSL
7440484	Cobalt	3.4	20	mg/kg	68SB3C	6/6	0.208 - 0.208	20	--	Y	NSV
7440508	Copper	4.3	25	mg/kg	68SB2C-AVG DUP	6/6	0.368 - 0.368	25	10,517.8	N	BSL
7439896	Iron	38,400	56,600	mg/kg	68SB2B	6/6	35.8 - 71.6	56,600	--	Y	NSV
7439921	Lead	2.9	10	mg/kg	68SB3C	6/6	0.0218 - 0.0218	10	--	Y	NSV
7439954	Magnesium	1,220	27,900	mg/kg	68SB2C-AVG DUP	6/6	3.21 - 10.7	27,900	Nutrient	N	Nutrient
7439965	Manganese	91	529	mg/kg	68SB2C-AVG DUP	6/6	0.264 - 0.264	529	951.9	N	BSL
7439976	Mercury	0.02	0.04	mg/kg	68SB2B	5/6	0.0077 - 0.0077	0.04	--	Y	NSV
7440020	Nickel	8	55	mg/kg	68SB1C	6/6	0.0356 - 0.356	55	--	Y	NSV
7440097	Potassium	1,360	6,565	mg/kg	68SB2C-AVG DUP	6/6	5 - 5	6,565	Nutrient	N	Nutrient
7782492	Selenium	0.21	0.78	mg/kg	68SB3C	6/6	0.0502 - 0.0502	0.78	19	N	BSL
7440224	Silver	0.04	0.17	mg/kg	68SB2C-AVG DUP	6/6	0.0044 - 0.0044	0.17	31	N	BSL
7440235	Sodium	31	213	mg/kg	68SB1C	6/6	8.92 - 8.92	213	Nutrient	N	Nutrient
7440280	Thallium	0.08	0.23	mg/kg	68SB1C	6/6	0.027 - 0.027	0.23	3.6	N	BSL
7440622	Vanadium	16	58	mg/kg	68SB2C-AVG DUP	6/6	0.207 - 0.207	58	730	N	BSL
7440666	Zinc	14	38	mg/kg	68SB1C	6/6	0.517 - 0.517	38	13,622	N	BSL
	TCL Pesticides/PCBs (µg/kg) *										
11097691	Aroclor 1254	8.7E+00	8.7E+00	µg/kg	68SB1A	1/1	3.9 - 3.9	8.7E+00	1.1E+03	N	BSL
	TCL VOCs (µg/kg)										
78933	2-Butanone	2.2E+01	2.4E+01	µg/kg	68SB1B	4/6	6.65 - 7.05	2.4E+01	2.9E+04	N	BSL
67641	Acetone	4.2E+01	5.5E+01	µg/kg	68SB2B	6/6	6.65 - 7.05	5.5E+01	2.2E+04	N	BSL
75092	Methylene chloride	5.0E+00	5.0E+00	µg/kg	68SB3C	1/6	3.74 - 3.96	5.0E+00	1.9E+01	N	BSL
	TCL SVOCs (µg/kg)										
59507	4-Chloro-3-Methylphenol	1.9E+01	3.1E+01	µg/kg	68SB3B	6/6	6.77 - 7.29	3.1E+01	--	Y	NSV
117817	Bis(2-ethylhexyl)phthalate	2.0E+01	7.8E+01	µg/kg	68SB2C-AVG DUP	6/6	2.69 - 2.9	7.8E+01	2.9E+06	N	BSL
85687	Butylbenzylphthalate	1.1E+01	4.6E+01	µg/kg	68SB1B	3/6	5.82 - 6.27	4.6E+01	1.7E+07	N	BSL
105602	Caprolactam	1.8E+01	9.0E+01	µg/kg	68SB2B	3/6	8.29 - 8.93	9.0E+01	--	Y	NSV
84662	Diethylphthalate	4.0E+00	1.1E+01	µg/kg	68SB3C	6/6	2.47 - 2.66	1.1E+01	4.5E+05	N	BSL
84742	Di-n-butylphthalate	5.6E+00	3.8E+02	µg/kg	68SB3C	6/6	4.97 - 5.35	3.8E+02	5.0E+06	N	BSL
206440	Fluoranthene	4.0E+00	4.0E+00	µg/kg	68SB1B	1/6	3.06 - 3.29	4.0E+00	6.3E+06	N	BSL
	SVOC TICs (µg/kg)										
301020	(Z)-9-Octadecenamide	4.1E+01	5.4E+02	µg/kg	68SB2C-AVG DUP	5/6	0 - 0	5.4E+02	--	Y	NSV
1454859	1-Heptadecanol	3.0E+01	4.2E+01	µg/kg	68SB3B	2/6	0 - 0	4.2E+01	--	Y	NSV
84695	1,2-Benzenedicarboxylicacid, bis(2-methy	9.5E+01	3.7E+02	µg/kg	68SB1C	4/6	0 - 0	3.7E+02	--	Y	NSV
17851535	1,2-Benzenedicarboxylic acid, butyl 2-me	8.5E+01	5.3E+02	µg/kg	68SB3C	2/6	0 - 0	5.3E+02	--	Y	NSV
20019641	2(5H)-Furanone, 5,5-dimethyl-	2.1E+02	2.1E+02	µg/kg	68SB1C	1/6	0 - 0	2.1E+02	--	Y	NSV
104767	2-Ethyl-1-Hexanol	2.7E+01	3.9E+01	µg/kg	68SB3C	3/6	0 - 0	3.9E+01	--	Y	NSV
101371	2,4,6-Triallyloxy-1,3,5-triazine	1.0E+02	1.2E+02	µg/kg	68SB1C	5/6	0 - 0	1.2E+02	--	Y	NSV
1000143924	7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,	3.2E+01	3.2E+01	µg/kg	68SB2B	1/6	0 - 0	3.2E+01	--	Y	NSV
112845	Erucylamide	7.5E+02	8.5E+02	µg/kg	68SB2B	4/6	0 - 0	8.5E+02	--	Y	NSV
2136712	Ethanol, 2-(hexadecyloxy)-	7.0E+01	7.0E+01	µg/kg	68SB2C-AVG DUP	1/6	0 - 0	7.0E+01	--	Y	NSV
57114	Stearic Acid	4.5E+01	5.0E+01	µg/kg	68SB3C	2/6	0 - 0	5.0E+01	--	Y	NSV

Table 8-9
HHRS SSL Comparison for SWMU 68
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Notes:

CAS = Chemical Abstracts Service
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyls
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
TIC = Tentatively Identified Compound
[1] = Chromium VI SSL DAF20 value was used
[2] = Lead criteria are Action Levels; see USEPA Region III guidance
[3] = Mercuric chloride soil RBC value used
[4] = Noncarcinogenic Residential RBC value for Aroclor 1254 was used for screening

DUP AVG = results for duplicate samples averaged
SSL DAF20 = Soil Screening Levels at a Dilution Attenuation Factor of 20 Per (SSL) values from the October 31, 2006, RBC Table

ASSL = Above Soil Screening Level
BSL = Below Soil Screening Levels
NSV = No Screening Value Available
* = Surface Soil Detections used for SSL Screening due to testing of one surface soil sample for PCB/Pesticides/Herbicides

Table 8-10
COPC/Background Comparison for SWMU 68
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Surface Soil COPC/Background Comparison

CAS #	Chemical	Minimum Concentration Surface Soil	Maximum Concentration Surface Soil	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Point Estimate[A]	Background Comparison
	TAL Metals (mg/kg)									
7429905	Aluminum	12,200	34,500	mg/kg	68SB1A	3/3	1.83 - 5.1	34,500	40,041	N
7440360	Antimony	13	13	mg/kg	68SB3A	1/3	0.0518 - 0.0518	13	--	NBE
7440382	Arsenic	2.1	3.2	mg/kg	68SB1A	3/3	0.0232 - 0.0232	3.2	15.8	N
7440439	Cadmium	1.8	5.6	mg/kg	68SB3A	3/3	0.182 - 0.182	5.60	0.69	**Y**
7440473	Chromium	20	40	mg/kg	68SB3A	3/3	0.912 - 0.912	40	65.3	N
7440484	Cobalt	10	24	mg/kg	68SB2A	3/3	0.208 - 0.208	24	72	N
7439896	Iron	16,600	33,100	mg/kg	68SB1A	3/3	17.9 - 35.8	33,100	50,962	N
7439965	Manganese	532	939	mg/kg	68SB3A	3/3	0.264 - 2.06	939	2,543	N
7440622	Vanadium	31	53	mg/kg	68SB1A	3/3	0.207 - 0.207	53	108	N

Total Soil COPC/Background Comparison

CAS #	Chemical	Minimum Concentration Total Soil	Maximum Concentration Total Soil	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Point Estimate[A]	Background Comparison
	TAL Metals (mg/kg)									
7429905	Aluminum	12,200	34,500	mg/kg	68SB1A	9/9	1.83 - 9.15	34,500	40,041	N
7440360	Antimony	0.063	13	mg/kg	68SB3A	7/9	0.0518 - 0.0518	13	--	NBE
7440382	Arsenic	0.8	10.1	mg/kg	68SB2C-AVG DUP	9/9	0.0232 - 0.0232	10.1	15.8	N
7440439	Cadmium	1.4	5.6	mg/kg	68SB3A	9/9	0.182 - 0.182	5.6	0.7	**Y**
7440473	Chromium	6.9	40	mg/kg	68SB3A	9/9	0.912 - 0.912	40	65.3	N
7440484	Cobalt	3.4	24	mg/kg	68SB2A	9/9	0.208 - 0.208	24	72	N
7439896	Iron	16,600	56,600	mg/kg	68SB2B	9/9	17.9 - 71.6	56,600	50,962	**Y**
7439965	Manganese	91	939	mg/kg	68SB3A	9/9	0.264 - 2.06	939	2,543	N
7440622	Vanadium	16	58	mg/kg	68SB2C-AVG DUP	9/9	0.207 - 0.207	58	108	N

Notes:
CAS = Chemical Abstracts Service
TAL = Target Analyte List
mg/kg = Milligram Per Kilogram
[A] = Facility-Wide Background Point Estimate as
Reported in the Facility-Wide Background Study Report (IT 2001a)
AVG DUP = results for duplicate samples averaged
NBE = No Background Point Estimate Available

Table 8-11
Detected Chemicals Occurrence for SWMU 68
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening
	TAL Metals (mg/kg)							
7429905	Aluminum	12,200	34,500	mg/kg	68SB1A	3/3	1.83 - 5.1	34,500
7440360	Antimony	13.00	13.00	mg/kg	68SB3A	1/3	0.0518 - 0.0518	13.00
7440382	Arsenic	2.10	3.20	mg/kg	68SB1A	3/3	0.0232 - 0.0232	3.20
7440393	Barium	78	111	mg/kg	68SB3A	3/3	0.106 - 0.106	111
7440417	Beryllium	0.63	1.10	mg/kg	68SB1A	3/3	0.0391 - 0.0391	1.10
7440439	Cadmium	1.80	5.60	mg/kg	68SB3A	3/3	0.182 - 0.182	5.60
7440702	Calcium	661	1,600	mg/kg	68SB3A	3/3	16.6 - 16.6	1,600
18540299	Chromium	20	40	mg/kg	68SB3A	3/3	0.912 - 0.912	40
7440484	Cobalt	10	24	mg/kg	68SB2A	3/3	0.208 - 0.208	24
7440508	Copper	9	15	mg/kg	68SB1A	3/3	0.368 - 0.368	15
7439896	Iron	16,600	33,100	mg/kg	68SB1A	3/3	17.9 - 35.8	33,100
7439921	Lead	8	23	mg/kg	68SB3A	3/3	0.0218 - 0.0218	23
7439954	Magnesium	789	8,010	mg/kg	68SB1A	3/3	3.21 - 3.21	8,010
7439965	Manganese	532	939	mg/kg	68SB3A	3/3	0.264 - 2.06	939
7439976	Mercury	0.02	0.03	mg/kg	68SB3A	3/3	0.0077 - 0.0077	0.03
7440020	Nickel	9	17	mg/kg	68SB1A	3/3	0.0356 - 0.0356	17
7440097	Potassium	640	3,800	mg/kg	68SB1A	3/3	5 - 5	3,800
7782492	Selenium	0.64	0.89	mg/kg	68SB1A	3/3	0.0502 - 0.0502	0.89
7440224	Silver	0.05	0.11	mg/kg	68SB1A	3/3	0.0044 - 0.0044	0.11
7440235	Sodium	25	36	mg/kg	68SB1A	3/3	8.92 - 8.92	36
7440280	Thallium	0.16	0.25	mg/kg	68SB1A	3/3	0.027 - 0.027	0.25
7440622	Vanadium	31	53	mg/kg	68SB1A	3/3	0.207 - 0.207	53
7440666	Zinc	34	128	mg/kg	68SB3A	3/3	0.517 - 2.59	128
	TCL Pesticides/PCBs (µg/kg)							
11097691	Aroclor 1254	8.7E+00	8.7E+00	µg/kg	68SB1A	1/1	3.9 - 3.9	9.E+00
	TCL VOCs (µg/kg)							
78933	2-Butanone	3.0E+01	3.3E+01	µg/kg	68SB3A	3/3	5.95 - 6.4	3.E+01
67641	Acetone	7.9E+01	1.5E+02	µg/kg	68SB3A	3/3	5.95 - 6.4	2.E+02
	TCL SVOCs[1] (µg/kg)							
59507	4-Chloro-3-Methylphenol	9.0E+00	3.5E+01	µg/kg	68SB3A	3/3	6.25 - 6.77	4.E+01
117817	Bis(2-ethylhexyl)phthalate	4.9E+01	5.4E+01	µg/kg	68SB1A	3/3	2.48 - 2.69	5.E+01
85687	Butylbenzylphthalate	4.1E+01	4.2E+01	µg/kg	68SB2A	2/3	5.38 - 5.82	4.E+01
105602	Caprolactam	9.4E+01	9.4E+01	µg/kg	68SB3A	1/3	7.66 - 8.29	9.E+01
84662	Diethylphthalate	4.0E+00	1.3E+01	µg/kg	68SB3A	3/3	2.28 - 2.47	1.E+01
84742	Di-n-butylphthalate	2.9E+01	1.9E+02	µg/kg	68SB3A	3/3	4.58 - 4.97	2.E+02

Table 8-11
Detected Chemicals Occurrence for SWMU 68
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening
	PAHs[2] (µg/kg)							
120127	Anthracene	7.1E+00	7.1E+00	µg/kg	68SB2A	1/3	0.84 - 0.91	
56553	Benzo(a)anthracene	1.4E+01	1.4E+01	µg/kg	68SB2A	1/3	0.96 - 1.04	1.E+01
50328	Benzo(a)pyrene	1.5E+01	1.5E+01	µg/kg	68SB2A	1/3	1.2 - 1.3	2.E+01
205992	Benzo(b)fluoranthene	9.5E+00	9.5E+00	µg/kg	68SB2A	1/3	1.56 - 1.69	1.E+01
207089	Benzo(k)fluoranthene	6.7E+00	6.7E+00	µg/kg	68SB2A	1/3	1.2 - 1.3	7.E+00
218019	Chrysene	2.0E+00	1.2E+01	µg/kg	68SB2A	2/3	1.44 - 1.56	1.E+01
206440	Fluoranthene	2.8E+00	3.8E+01	µg/kg	68SB2A	3/3	2.04 - 2.21	4.E+01
86737	Fluorene	3.1E+00	3.1E+00	µg/kg	68SB2A	1/3	1.56 - 1.69	3.E+00
193395	Indeno(1,2,3-cd)pyrene	8.6E+00	8.6E+00	µg/kg	68SB2A	1/3	0.84 - 0.91	9.E+00
85018	Phenanthrene	3.0E+01	3.0E+01	µg/kg	68SB2A	1/3	0.72 - 0.78	3.E+01
129000	Pyrene	2.1E+00	1.3E+02	µg/kg	68SB2A	3/3	1.08 - 1.17	1.E+02
	Cyanide (mg/kg)							
57125	Cyanide	1.6E-01	1.6E-01	mg/kg	68SB3A	1/3	0.0356 - 0.0356	2.E-01

Notes:

CAS = Chemical Abstracts Sevice
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
[1] = SVOCs analyzed by USEPA SW-846 8270 Method 8270C
[2] = PAHs analyzed by USEPA SW-846 Method8310

Table 8-12
Non-detected Chemicals for SWMU 68
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Parameter Name	Units	Number of Samples	Minimum MDL	Maximum MDL	TSV	Maximum Detection Limit Exceeds TSV
Inorganics							
7440360	Antimony	mg/kg	2	0.0518	0.0518	5	N
57125	Cyanide	mg/kg	2	0.0356	0.0356	0.005	**Y**
Pesticides/Herbicides							
72548	4,4'-DDD	µg/kg	1	0.309	0.309	--	NS
72559	4,4'-DDE	µg/kg	1	0.228	0.228	100	**Y**
50293	4,4'-DDT	µg/kg	1	0.234	0.234	100	N
309002	Aldrin	µg/kg	1	0.395	0.395	100	N
319846	alpha-BHC	µg/kg	1	0.394	0.394	100	N
5103719	alpha-Chlordane	µg/kg	1	0.564	0.564	100	N
319857	beta-BHC	µg/kg	1	1.47	1.47	100	N
319868	delta-BHC	µg/kg	1	1.06	1.06	100	N
60571	Dieldrin	µg/kg	1	0.402	0.402	100	N
959988	Endosulfan I	µg/kg	1	1.18	1.18	--	NS
33213659	Endosulfan II	µg/kg	1	0.278	0.278	--	NS
1031078	Endosulfan Sulfate	µg/kg	1	0.654	0.654	--	NS
72208	Endrin	µg/kg	1	0.387	0.387	100	N
7421934	Endrin aldehyde	µg/kg	1	1.44	1.44	--	NS
53494705	Endrin ketone	µg/kg	1	0.358	0.358	--	NS
58899	gamma-BHC (Lindane)	µg/kg	1	0.252	0.252	100	N
5103742	gamma-Chlordane	µg/kg	1	0.914	0.914	100	N
76448	Heptachlor	µg/kg	1	0.917	0.917	--	NS
1024573	Heptachlor epoxide	µg/kg	1	0.592	0.592	100	N
72435	Methoxychlor	µg/kg	1	0.364	0.364	100	N
8001352	Toxaphene	µg/kg	1	30.3	30.3	--	NS
93765	2,4,5-T	µg/kg	1	2.6	2.6	--	NS
93721	2,4,5-TP (Silvex)	µg/kg	1	5.2	5.2	--	NS
94757	2,4-D	µg/kg	1	20.8	20.8	--	NS
94826	2,4-DB	µg/kg	1	80.6	80.6	--	NS
75990	Dalapon	µg/kg	1	74.1	74.1	--	NS
1918009	Dicamba	µg/kg	1	2.6	2.6	--	NS
120365	Dichlorprop	µg/kg	1	22.1	22.1	--	NS
88857	Dinoseb	µg/kg	1	27.3	27.3	--	NS
94746	MCPA	µg/kg	1	1810	1810	--	NS
93652	MCPP	µg/kg	1	6570	6570	--	NS
PCBs							
12674112	Aroclor 1016	µg/kg	1	20.8	20.8	--	NS
11104282	Aroclor 1221	µg/kg	1	2.6	2.6	--	NS
11141165	Aroclor 1232	µg/kg	1	6.5	6.5	--	NS
53469219	Aroclor 1242	µg/kg	1	3.9	3.9	--	NS
12672296	Aroclor 1248	µg/kg	1	6.5	6.5	--	NS
11096825	Aroclor 1260	µg/kg	1	9.1	9.1	371	N
VOCs							
71556	1,1,1-Trichloroethane	µg/kg	3	0.507	0.545	300	N
79345	1,1,2,2-Tetrachloroethane	µg/kg	3	0.777	0.836	300	N
76131	1,1,2-Trichloro-1,2,2-trifluoroethane	µg/kg	3	0.903	0.972	--	NS
79005	1,1,2-Trichloroethane	µg/kg	3	0.706	0.759	300	N
75343	1,1-Dichloroethane	µg/kg	3	0.862	0.927	300	N
75354	1,1-Dichloroethene	µg/kg	3	0.872	0.938	--	NS
87616	1,2,3-Trichlorobenzene	µg/kg	3	0.647	0.696	--	NS
120821	1,2,4-Trichlorobenzene	µg/kg	3	0.488	0.525	100	N
96128	1,2-Dibromo-3-chloropropane	µg/kg	3	2.48	2.66	--	NS
106934	1,2-Dibromoethane	µg/kg	3	0.815	0.877	--	NS
95501	1,2-Dichlorobenzene	µg/kg	3	0.576	0.62	100	N
107062	1,2-Dichloroethane	µg/kg	3	0.513	0.552	870,000	N
78875	1,2-Dichloropropane	µg/kg	3	0.697	0.75	700,000	N

Table 8-12
Non-detected Chemicals for SWMU 68
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Parameter Name	Units	Number of Samples	Minimum MDL	Maximum MDL	TSV	Maximum Detection Limit Exceeds TSV
541731	1,3-Dichlorobenzene	µg/kg	3	0.319	0.343	--	NS
106467	1,4-Dichlorobenzene	µg/kg	3	0.845	0.909	100	N
591786	2-Hexanone	µg/kg	3	2.69	2.89	--	NS
108101	4-Methyl-2-pentanone	µg/kg	3	1.74	1.87	--	NS
71432	Benzene	µg/kg	3	0.627	0.675	100	N
74975	Bromochloromethane	µg/kg	3	0.906	0.974	--	NS
75274	Bromodichloromethane	µg/kg	3	0.596	0.641	450,000	N
75252	Bromoform	µg/kg	3	0.688	0.74	--	NS
74839	Bromomethane	µg/kg	3	1.79	1.92	--	NS
75150	Carbon disulfide	µg/kg	3	1.73	1.86	--	NS
56235	Carbon tetrachloride	µg/kg	3	0.555	0.596	300	N
108907	Chlorobenzene	µg/kg	3	0.787	0.846	100	N
75003	Chloroethane	µg/kg	3	1.61	1.73	--	NS
67663	Chloroform	µg/kg	3	0.531	0.571	300	N
74873	Chloromethane	µg/kg	3	0.992	1.07	--	NS
156592	cis-1,2-Dichloroethene	µg/kg	3	0.845	0.909	300	N
10061015	cis-1,3-Dichloropropene	µg/kg	3	0.584	0.628	--	NS
110827	Cyclohexane	µg/kg	3	0.376	0.404	--	NS
124481	Dibromochloromethane	µg/kg	3	0.615	0.662	--	NS
75718	Dichlorodifluoromethane	µg/kg	3	0.795	0.855	--	NS
100414	Ethylbenzene	µg/kg	3	0.503	0.541	100	N
98828	Isopropylbenzene	µg/kg	3	0.65	0.699	--	NS
79209	Methyl acetate	µg/kg	3	4.13	4.44	--	NS
1634044	methyl tert-Butyl ether	µg/kg	3	0.763	0.82	--	NS
108872	Methylcyclohexane	µg/kg	3	1.01	1.08	--	NS
75092	Methylene chloride	µg/kg	3	3.34	3.6	300	N
100425	Styrene	µg/kg	3	0.526	0.566	100	N
127184	Tetrachloroethene	µg/kg	3	0.729	0.785	300	N
108883	Toluene	µg/kg	3	0.552	0.594	100	N
156605	trans-1,2-Dichloroethene	µg/kg	3	0.837	0.9	300	N
10061026	trans-1,3-Dichloropropene	µg/kg	3	0.62	0.667	--	NS
79016	Trichloroethene	µg/kg	3	0.806	0.867	300	N
75694	Trichlorofluoromethane	µg/kg	3	0.884	0.951	--	NS
75014	Vinyl Chloride	µg/kg	3	0.44	0.474	300	N
1330207	Xylenes	µg/kg	3	0.501	0.539	100	N
SVOCs							
92524	1,1'-Biphenyl	µg/kg	3	2.95	3.2	--	NS
95943	1,2,4,5-Tetrachlorobenzene	µg/kg	3	34.4	37.3	--	NS
108601	2,2'-oxybis(1-Chloropropane)	µg/kg	3	1.58	1.72	--	NS
95954	2,4,5-Trichlorophenol	µg/kg	3	4.01	4.34	100	N
88062	2,4,6-Trichlorophenol	µg/kg	3	3.14	3.41	100	N
120832	2,4-Dichlorophenol	µg/kg	3	4.22	4.58	100	N
105679	2,4-Dimethylphenol	µg/kg	3	9.53	10.3	100	N
51285	2,4-Dinitrophenol	µg/kg	3	3.84	4.16	20,000	N
121142	2,4-Dinitrotoluene	µg/kg	3	3.78	4.1	--	NS
606202	2,6-Dinitrotoluene	µg/kg	3	33.2	36	--	NS
91587	2-Chloronaphthalene	µg/kg	3	2.76	2.99	--	NS
95578	2-Chlorophenol	µg/kg	3	2.41	2.61	100	N
91576	2-Methylnaphthalene	µg/kg	3	3.29	3.56	--	NS
95487	2-Methylphenol	µg/kg	3	5.81	6.29	100	N
88744	2-Nitroaniline	µg/kg	3	5.52	5.98	--	NS
88755	2-Nitrophenol	µg/kg	3	2.04	2.21	--	NS
91941	3,3'-Dichlorobenzidine	µg/kg	3	66.5	86.7	--	NS
99092	3-Nitroaniline	µg/kg	3	22	43.3	--	NS
534521	4,6-Dinitro-2-methylphenol	µg/kg	3	5.41	5.86	--	NS
101553	4-Bromophenyl-phenylether	µg/kg	3	4.06	4.39	--	NS

Table 8-12
Non-detected Chemicals for SWMU 68
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Parameter Name	Units	Number of Samples	Minimum MDL	Maximum MDL	TSV	Maximum Detection Limit Exceeds TSV
106478	4-Chloroaniline	µg/kg	3	1.51	1.64	--	NS
7005723	4-Chlorophenyl-phenylether	µg/kg	3	3.92	4.25	--	NS
106445	4-Methylphenol	µg/kg	3	7.64	8.28	100	N
100016	4-Nitroaniline	µg/kg	3	8.7	9.43	--	NS
100027	4-Nitrophenol	µg/kg	3	3.4	3.68	100	N
83329	Acenaphthene	µg/kg	3	2.06	2.24	100	N
208968	Acenaphthylene	µg/kg	3	1.8	1.95	100	N
98862	Acetophenone	µg/kg	3	2.28	2.47	--	NS
120127	Anthracene	µg/kg	3	5.54	6.01	100	N
1912249	Atrazine	µg/kg	3	8.26	8.94	--	NS
100527	Benzaldehyde	µg/kg	3	4.86	5.27	--	NS
56553	Benzo(a)anthracene	µg/kg	3	16	17.3	100	N
50328	Benzo(a)pyrene	µg/kg	1	7.42	7.42	100	N
205992	Benzo(b)fluoranthene	µg/kg	1	12.7	12.7	100	N
191242	Benzo(g,h,i)perylene	µg/kg	3	10.5	11.3	100	N
207089	Benzo(k)fluoranthene	µg/kg	3	16.1	17.4	100	N
111911	Bis(2-chloroethoxy)methane	µg/kg	3	3.77	4.08	--	NS
111444	Bis(2-chloroethyl)ether	µg/kg	3	2.08	2.25	--	NS
85687	Butylbenzylphthalate	µg/kg	1	5.38	5.38	--	NS
105602	Caprolactam	µg/kg	2	8.29	8.29	--	NS
86748	Carbazole	µg/kg	3	7.32	7.93	--	NS
218019	Chrysene	µg/kg	2	13.3	13.3	100	N
53703	Dibenz(a,h)anthracene	µg/kg	3	7.08	7.67	100	N
132649	Dibenzofuran	µg/kg	3	3.79	4.11	--	NS
131113	Dimethylphthalate	µg/kg	3	3.97	4.3	200,000	N
117840	Di-n-octylphthalate	µg/kg	3	3.72	4.03	--	NS
206440	Fluoranthene	µg/kg	1	3.06	3.06	100	N
86737	Fluorene	µg/kg	3	2.02	2.18	100	N
118741	Hexachlorobenzene	µg/kg	3	3.01	3.26	1,000,000	N
87683	Hexachlorobutadiene	µg/kg	3	4.64	5.03	--	NS
77474	Hexachlorocyclopentadiene	µg/kg	3	2.38	2.57	10,000	N
67721	Hexachloroethane	µg/kg	3	2.8	3.03	--	NS
193395	Indeno(1,2,3-cd)pyrene	µg/kg	1	5.1	5.1	100	N
78591	Isophorone	µg/kg	3	2.08	2.25	--	NS
91203	Naphthalene	µg/kg	3	3.3	3.58	100	N
98953	Nitrobenzene	µg/kg	3	3.84	4.16	40,000	N
621647	N-Nitrosodi-n-propylamine	µg/kg	3	3.95	4.28	--	NS
86306	N-Nitrosodiphenylamine	µg/kg	3	5.7	6.18	20,000	N
87865	Pentachlorophenol	µg/kg	3	5.27	5.71	100	N
85018	Phenanthrene	µg/kg	1	2.99	2.99	100	N
108952	Phenol	µg/kg	3	4.75	5.15	100	N
129000	Pyrene	µg/kg	1	1.92	1.92	100	N
PAHs							
83329	Acenaphthene	µg/kg	3	11.3	12.2	100	N
208968	Acenaphthylene	µg/kg	3	13.9	15.1	100	N
120127	Anthracene	µg/kg	2	0.84	0.91	100	N
56553	Benzo(a)anthracene	µg/kg	2	0.96	1.04	100	N
50328	Benzo(a)pyrene	µg/kg	2	1.2	1.3	100	N
205992	Benzo(b)fluoranthene	µg/kg	2	1.56	1.69	100	N
191242	Benzo(g,h,i)perylene	µg/kg	3	15	16.3	100	N
207089	Benzo(k)fluoranthene	µg/kg	2	1.2	1.3	100	N
218019	Chrysene	µg/kg	1	1.56	1.56	100	N
53703	Dibenz(a,h)anthracene	µg/kg	3	1.68	1.82	100	N
86737	Fluorene	µg/kg	2	1.56	1.69	100	N
193395	Indeno(1,2,3-cd)pyrene	µg/kg	2	0.84	0.91	100	N
91203	Naphthalene	µg/kg	3	9.48	10.3	100	N

Table 8-12
Non-detected Chemicals for SWMU 68
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Radford Army Ammunition Plant, Radford, Virginia

CAS #	Parameter Name	Units	Number of Samples	Minimum MDL	Maximum MDL	TSV	Maximum Detection Limit Exceeds TSV
85018	Phenanthrene	µg/kg	2	0.72	0.78	100	N
129000	Pyrene	µg/kg	1	1.26	1.26	100	N
Explosives							
99354	1,3,5-Trinitrobenzene	mg/kg	3	0.14	0.14	--	NS
99650	1,3-Dinitrobenzene	mg/kg	3	0.159	0.159	--	NS
118967	2,4,6-Trinitrotoluene	mg/kg	3	0.167	0.167	--	NS
121142	2,4-Dinitrotoluene	mg/kg	3	0.142	0.142	--	NS
606202	2,6-Dinitrotoluene	mg/kg	3	0.25	0.25	--	NS
35572782	2-Amino-4,6-dinitrotoluene	mg/kg	3	0.151	0.151	--	NS
88722	2-Nitrotoluene	mg/kg	3	0.266	0.266	--	NS
99081	3-Nitrotoluene	mg/kg	3	0.184	0.184	--	NS
1946510	4-Amino-2,6-dinitrotoluene	mg/kg	3	0.162	0.162	--	NS
99990	4-Nitrotoluene	mg/kg	3	0.251	0.251	--	NS
2691410	HMX (Octahydro-1,3,5,7-tetranitro-1,3,5,	mg/kg	3	0.229	0.229	--	NS
98953	Nitrobenzene	mg/kg	3	0.102	0.102	40,000	N
121824	RDX (Hexahydro-1,3,5-trinitro-1,3,5-tria	mg/kg	3	0.131	0.131	--	NS
Nitroglycerin/PETN							
628966	Nitroglycerin	mg/kg	3	0.187	0.228	--	NS
78115	PETN	mg/kg	3	0.258	0.313	--	NS

Notes:
CAS = Chemical Abstracts Service
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
NS = No screening value
TSV = Toxicity Screening Value
MDL = Method Detection Limit

Table 8-13
Preliminary Soil Invertebrate Risk Characterization for SWMU 68
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Chemicals	CAS #	MDC for Surface Soil	Direct Contact TRV	TRV Source[A]	HQ
TAL Metals (mg/kg)					
Aluminum	7429-90-5	34,500	1	BTAG 1995	**34,500**
Antimony	7440-36-0	13.00	78	ECO SSL 2005	<1
Arsenic	7440-38-2	3.20	328	BTAG 1995	<1
Barium	7440-39-3	111	330	ECO SSL 2005	<1
Beryllium	7440-41-7	1.10	40	ECO SSL 2005	<1
Cadmium	7440-43-9	5.60	140	ECO SSL 2005	<1
Chromium	7440-47-3	40	0.0075	BTAG 1995	**5,333**
Cobalt	7440-48-4	24	200	BTAG 1995	<1
Copper	7440-50-8	15	50	ORNL 1997a	<1
Iron	7439-89-6	33,100	12	BTAG 1995	**2,758**
Lead	7439-92-1	23	1,700	ECO SSL 2005	<1
Manganese	7439-96-5	939	330	BTAG 1995	**3**
Mercury	7439-97-6	0.03	0.058	BTAG 1995	<1
Nickel	7440-02-0	17	100	ORNL 1997a	<1
Selenium	7782-49-2	0.89	1.8	BTAG 1995	<1
Silver	7440-22-4	0.11	20	CCME 2004	<1
Thallium	7440-28-0	0.25	1	CCME 2004	<1
Vanadium	7440-62-2	53	58	BTAG 1995	<1
Zinc	7440-66-6	128	100	ORNL 1997a	**1.3**
TCL Pesticides/PCBs (µg/kg)					
Aroclor 1254	11097-69-1	8.7	500	CCME 2004	<1
TCL VOCs (µg/kg)					
2-Butanone	78-93-3	33	NV	--	NC
Acetone	67-64-1	150	NV	--	NC
TCL SVOCs (µg/kg)					
4-Chloro-3-Methylphenol	59-50-7	35	NV	--	NC
Bis(2-ethylhexyl)phthalate	117-81-7	54	NV	--	NC
Butylbenzylphthalate	85-68-7	42	NV	--	NC
Caprolactam		94			
Diethylphthalate	84-66-2	13	NV	--	NC
Di-n-butylphthalate	84-74-2	190	NV	--	NC
PAHs (µg/kg)					
Anthracene	120-12-7	7.1	100	BTAG 1995	<1
Benzo(a)anthracene	56-55-3	14	100	BTAG 1995	<1
Benzo(a)pyrene	50-32-8	15	100	BTAG 1995	<1
Benzo(b)fluoranthene	205-99-2	9.5	100	BTAG 1995	<1
Benzo(k)fluoranthene	207-08-9	6.7	100	BTAG 1995	<1
Chrysene	218-01-9	12	100	BTAG 1995	<1
Fluoranthene	206-44-0	38	100	BTAG 1995	<1
Fluorene	86-73-7	3.1	100	BTAG 1995	<1
Indeno(1,2,3-cd)pyrene	193-39-5	8.6	100	BTAG 1995	<1
Phenanthrene	85-01-8	30	100	BTAG 1995	<1
Pyrene	129-00-0	130	100	BTAG 1995	**1.3**
Cyanide (mg/kg)					
Cyanide	57-12-5	0.16	0.005	BTAG 1995	**32**

Notes:

CAS = Chemical Abstracts Service
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
MDC = Maximum Detected Concentration
TRV = Toxicity Reference Value
NV = No value
HQ = Hazard Quotient
NC = Not Calculated no TRV available
BTAG = Biological Technical Assistance Group Screening Level, Draft 1995
[A] =
Region III BTAG (USEPA 1995)
Oak Ridge National Laboratory (Efroymson et al. 1997a)
USEPA Ecological SSL (ECO-SSL 2005)
Canadian Environmental Quality Guidelines (CCME 2004)

Table 8-14
Inorganic COPEC/Background Comparison for SWMU 68
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Measured Analytes	CAS-Number	MDC for Surface Soil	Background Point Estimate [A]	Maximum Concentration Exceeds Background Point Estimate
TAL METALS (mg/kg)				
ALUMINUM	7429-90-5	34,500	40,041	N
ANTIMONY	7440-36-0	13.00	--	NBE
ARSENIC	7440-38-2	3.20	16	N
CADMIUM	7440-43-9	5.60	0.69	**Y**
CHROMIUM	7440-47-3	40	65	N
COPPER	7440-50-8	15	54	N
IRON	7439-89-6	33,100	50,962	N
LEAD	7439-92-1	23	27	N
MANGANESE	7439-96-5	939	2,543	N
MERCURY	7439-97-6	0.03	0.13	N
SELENIUM	7782-49-2	0.89	--	NBE
ZINC	7440-66-6	128	202	N

Notes:
CAS = Chemical Abstracts Service
mg/kg = Milligram Per Kilogram
MDC = Maximum Detected Concentration
[A] = Facility-Wide Background Point Estimate as Reported in the Facility-Wide Background Study Report (IT 2001a)
NBE = No Background Point Estimate Available

Table 8-15
Preliminary/Refined Wildlife Risk Characterization
Screening Level Ecological Risk Assessment
SSP Report - SWMU 68
Radford Army Ammunition Plant, Radford, Virginia

Preliminary Assessment

Parameter	Maximum Soil Concentration (mg/kg)	Wildlife TRV-Based Soil Concentrations																			
		American Robin				Red-tailed Hawk				Meadow Vole				Red Fox				Short-tailed Shrew			
		NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ
Metals																					
ARSENIC	3.2	1.39E+01	<1	3.46E+01	<1	3.89E+02	<1	9.71E+02	<1	8.99E+00	<1	8.99E+01	<1	1.34E+00	2.4	1.34E+01	<1	3.02E-01	10.6	3.02E+00	1.1
CADMIUM	5.6	6.75E-01	8.3	9.31E+00	<1	3.91E+02	<1	5.40E+03	<1	1.50E+01	<1	1.50E+02	<1	1.48E+01	<1	1.48E+02	<1	1.16E+00	4.8	1.16E+01	<1
CHROMIUM	40	5.27E+00	7.6	2.64E+01	1.5	2.70E+01	1.5	1.35E+02	<1	8.65E+05	<1	8.65E+06	<1	2.38E+04	<1	2.38E+05	<1	1.78E+04	<1	1.78E+05	<1
COPPER	15	1.38E+02	<1	1.82E+02	<1	7.11E+02	<1	9.33E+02	<1	8.34E+02	<1	1.10E+03	<1	7.43E+01	<1	9.78E+01	<1	9.57E+01	<1	1.26E+02	<1
LEAD	23	5.18E+00	4.4	5.18E+01	<1	5.69E+02	<1	5.69E+03	<1	1.05E+03	<1	1.05E+04	<1	4.97E+02	<1	4.97E+03	<1	5.45E+01	<1	5.45E+02	<1
MERCURY	0.03	6.08E-01	<1	1.22E+00	<1	2.62E-01	<1	5.23E-01	<1	4.27E-01	<1	1.74E+00	<1	3.93E-03	7.6	1.60E-02	1.9	8.31E-02	<1	3.39E-01	<1
NICKEL	17	3.86E+02	<1	5.33E+02	<1	1.95E+03	<1	2.70E+03	<1	5.54E+03	<1	1.11E+04	<1	3.23E+02	<1	6.46E+02	<1	2.86E+02	<1	5.71E+02	<1
SELENIUM	0.89	3.13E-01	2.8	6.27E-01	1.4	4.03E+00	<1	8.06E+00	<1	2.73E+00	<1	4.50E+00	<1	6.09E-01	1.5	1.00E+00	<1	5.27E-01	1.7	8.70E-01	1.0
SILVER	0.11	2.31E+01	<1	1.73E+02	<1	8.34E+02	<1	6.26E+03	<1	1.72E+03	<1	1.72E+04	<1	2.89E+02	<1	2.89E+03	<1	5.85E+01	<1	5.85E+02	<1
ZINC	128	1.40E+01	9.1	1.26E+02	1.0	2.19E+01	5.8	1.98E+02	<1	3.38E+03	<1	6.75E+03	<1	8.28E+01	1.5	1.66E+02	<1	4.22E+02	<1	8.44E+02	<1
PCBs																					
Aroclor 1254	0.0087	8.69E-03	1.0	8.69E-02	<1	1.53E+00	<1	1.53E+01	<1	1.17E+01	<1	1.17E+02	<1	5.33E-02	<1	5.33E-01	<1	3.42E-03	2.5	3.42E-02	<1
SVOCs/PAHs																					
ANTHRACENE	0.0071	NC		NC		NC		NC		5.23E+04	<1	5.23E+05	<1	2.14E+04	<1	2.14E+05	<1	2.20E+03	<1	2.20E+04	<1
BENZO(A)ANTHRACENE	0.014	NC		NC		NC		NC		4.78E+01	<1	4.78E+02	<1	2.55E+00	<1	2.55E+01	<1	1.43E+00	<1	1.43E+01	<1
BENZO(A)PYRENE	0.015	3.56E+00	<1	1.78E+01	<1	9.73E+00	<1	4.87E+01	<1	1.66E+02	<1	1.66E+03	<1	3.48E+00	<1	3.48E+01	<1	4.23E+00	<1	4.23E+01	<1
BENZO(B)FLUORANTHENE	0.0095	NC		NC		NC		NC		1.68E+02	<1	1.68E+03	<1	2.87E+00	<1	2.87E+01	<1	5.12E+00	<1	5.12E+01	<1
BENZO(K)FLUORANTHENE	0.0067	NC		NC		NC		NC		1.85E+03	<1	1.85E+04	<1	3.16E+01	<1	3.16E+02	<1	5.65E+01	<1	5.65E+02	<1
CHRYSENE	0.012	NC		NC		NC		NC		2.37E+03	<1	2.37E+04	<1	1.24E+02	<1	1.24E+03	<1	5.65E+01	<1	5.65E+02	<1
FLUORANTHENE	0.038	NC		NC		NC		NC		4.11E+03	<1	2.05E+04	<1	7.02E+02	<1	3.51E+03	<1	1.24E+02	<1	6.22E+02	<1
FLUORENE	0.0031	6.55E+00	<1	3.28E+01	<1	1.56E+03	<1	7.81E+03	<1	4.15E+01	<1	2.07E+02	<1	2.48E+01	<1	1.24E+02	<1	2.27E+00	<1	1.13E+01	<1
INDENO(1,2,3-CD)PYRENE	0.0086	NC		NC		NC		NC		1.92E+03	<1	1.92E+04	<1	1.15E+01	<1	1.15E+02	<1	4.26E+01	<1	4.26E+02	<1
PHENANTHRENE	0.03	8.17E+00	<1	4.08E+01	<1	7.63E+02	<1	3.81E+03	<1	7.32E+02	<1	3.66E+03	<1	2.98E+02	<1	1.49E+03	<1	3.22E+01	<1	1.61E+02	<1
PYRENE	0.13	NC		NC		NC		NC		1.07E+03	<1	5.35E+03	<1	1.85E+02	<1	9.25E+02	<1	3.17E+01	<1	1.58E+02	<1

Refined Assessment

Parameter	Maximum Soil Concentration (mg/kg)	Wildlife TRV-Based Soil Concentrations																			
		American Robin				Red-tailed Hawk				Meadow Vole				Red Fox				Short-tailed Shrew			
		NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ
Metals																					
ARSENIC	3.2	1.09E+03	<1	2.71E+03	<1	1.46E+07	<1	3.64E+07	<1	6.10E+01	<1	6.10E+02	<1	1.48E+04	<1	1.48E+05	<1	1.85E+01	<1	1.85E+02	<1
CADMIUM	5.6	5.55E+01	<1	7.65E+02	<1	1.47E+07	<1	2.02E+08	<1	1.02E+02	<1	1.02E+03	<1	1.79E+05	<1	1.79E+06	<1	7.31E+01	<1	7.31E+02	<1
CHROMIUM	40	3.92E+02	<1	1.96E+03	<1	1.01E+06	<1	5.06E+06	<1	5.87E+06	<1	5.87E+07	<1	2.61E+08	<1	2.61E+09	<1	1.08E+06	<1	1.08E+07	<1
LEAD	23	3.91E+02	<1	3.91E+03	<1	2.13E+07	<1	2.13E+08	<1	7.09E+03	<1	7.09E+04	<1	5.61E+06	<1	5.61E+07	<1	3.29E+03	<1	3.29E+04	<1
MERCURY	0.03	4.90E+01	<1	9.80E+01	<1	9.81E+03	<1	1.96E+04	<1	2.90E+00	<1	1.18E+01	<1	4.31E+01	<1	1.76E+02	<1	5.11E+00	<1	2.09E+01	<1
SELENIUM	0.89	2.56E+01	<1	5.12E+01	<1	1.51E+05	<1	3.02E+05	<1	1.85E+01	<1	3.05E+01	<1	6.82E+03	<1	1.12E+04	<1	3.28E+01	<1	5.42E+01	<1
ZINC	128	1.14E+03	<1	1.03E+04	<1	8.21E+05	<1	7.42E+06	<1	2.29E+04	<1	4.58E+04	<1	9.10E+05	<1	1.82E+06	<1	2.63E+04	<1	5.25E+04	<1
PCBs																					
Aroclor 1254	0.0087	7.21E-01	<1	7.21E+00	<1	5.73E+04	<1	5.73E+05	<1	7.92E+01	<1	7.92E+02	<1	5.85E+02	<1	5.85E+03	<1	2.17E-01	<1	2.17E+00	<1

Notes:
NC = Not Calculated no TRV available
TRV = Toxicity Reference Value
HQ = Hazard Quotient
LOAEL = Lowest observable adverse effects level
NOAEL = No observable adverse effects level
mg/kg = Milligram Per Kilogram
PCB = Polychlorinated Biphenyls
SVOC = Semi-Volatile Organic Compound
PAH = Poly-Aromatic Hydrocarbon

= Indicate HQs greater than 1.0

Refer to Appendix F.2 for detailed description of model parameters and results

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9.0 SWMU 69 – POND BY CHROMIC ACID TREATMENT TANKS

9.1 SITE BACKGROUND – ENVIRONMENTAL SETTING

Physiography

SWMU 69 is an approximate 0.012-acre (543 ft^2) slightly depressed grass area located in the western section of the HSA. It is approximately 20 ft down slope and west of SWMU 68 at an elevation of approximately 1,790 ft msl. The general site area slopes toward a wooded area to the west (Figure 9-1). Historically related buildings are located to the southeast, and several unrelated overhead pipes and associated appurtenances lie between SWMU 68 and SWMU 69 (Figure 9-1).



SWMU 69 – August 2002 – Looking Southeast

Tanks and Structures

Other related tanks or structures are not located on or near the site.

Surface Water

The closest surface water to the site is a perennial stream located approximately 75 ft west of the site. This stream is a tributary of the New River and flows north-northwest into the New River approximately 1,400 ft from the site. Other drainage features, such as manholes, catch basins, storm drains, or ditches, have not been observed in the site area. Drainage in the site area consists of percolation of precipitation into surface soil and diffusion of overland flow over grass and vegetated areas toward the perennial stream (west and northwest).

Soil and Geology

SWMU 69 is underlain by the Braddock loam soil. This soil has moderate permeability and is acidic-to-strongly acidic (IT 2001a). SSP borings, which were completed to the depth of refusal (69SB2 and 69SB3) and to the depth of groundwater (69SB1), indicate that the site is underlain by approximately 15 to 20+ ft of unconsolidated soil (alluvial terrace deposits and saprolite). Unconsolidated soil overlies carbonate bedrock of the Elbrook Formation and consists primarily of sandy clay and clay (CL), with 3 to 4 ft of fill material present in the former pond area. Physical testing of two representative subsurface soil samples at the site indicate neutral to basic CL soil with an organic content in the range of 3.3 to 3.5% and a vertical hydraulic conductivity of 6.6E-09 cm/sec (Table 3-1).

Groundwater

An unconfined aquifer occurs within the unconsolidated soil at the site and in underlying bedrock. Groundwater was encountered at depths ranging from 10 ft bgs (69SB2) to 16 ft bgs (69SB1). Based on surface topography, groundwater flow in the site area is toward the northwest (New River).

9.2 SITE BACKGROUND – HISTORY

This area was once a shallow settling pond that collected treated wastewater containing chromium-hydroxide sludge from SWMU 68, the Chromic Acid Treatment Tanks (Hercules 1958). The pond was bermed and approximately 1 to 2 feet deep. The supernatant from SWMU 69 discharged to a perennial stream that flows to the New River (Hercules 1958).

In accordance with the recommendations included in the 1992 VI Report for SWMU 69, interim measures were implemented and SWMU 69 underwent closure including removal of impacted soil (Dames & Moore 1994a; Appendix C). The SWMU 69 Closure Report was prepared by Dames & Moore and submitted by RFAAP to the USEPA Region III and the VDEQ. Approximately 700 cubic yards of material were excavated during the closure and investigation activities and disposed of at RFAAP Fly Ash Landfill # 2. After confirmatory sampling, the excavation(s) were backfilled with clean fill supplied and graded to reestablish the pre-existing drainageway.

9.3 PREVIOUS INVESTIGATIONS

Four environmental assessments have been performed at SWMU 69 or they included SWMU 69 in their study areas. These assessments include the Verification Investigation (1992), the EPIC Aerial Photo Report (1992), Closure Report (1994), and the New River and Tributaries Study (1997).

9.3.1 Verification Investigation – 1992

In 1992, Dames and Moore collected one sediment sample (69SE1) and one surface water sample (69SW1) from the pond to "evaluate whether the pond (SWMU 69) received hazardous chemicals from past discharges from the chromium tanks at SWMU 68" (Dames and Moore 1992b). Two surface soil samples (69SS1 and 69SS2) were also collected from an area down slope, which "potentially may have been impacted by overflows from the pond" (Dames and Moore 1992b). Samples were analyzed for pH and TAL metals.

Soil

Concentrations of cadmium, chromium, thallium, and zinc in sample 69SS1 exceeded their background point estimate concentrations, adjusted R-RBCs, and BTAG screening levels. Antimony, arsenic, and thallium concentrations also exceeded their I-RBCs in sample 69SS1 (Table 9-1).

Sediment

Concentrations of cadmium, chromium, copper, lead, nickel, thallium, and zinc in sample 69SE1 exceeded their background point estimate concentrations, adjusted R-RBCs, and BTAG screening levels (except for thallium). Antimony, arsenic, cadmium, chromium, iron, lead, and thallium concentrations also exceeded their I-RBCs in sample 69SE1 (Table 9-2).

Surface Water

Concentrations of TAL metals exceeded their adjusted T-RBCs in sample 69SW1, except for barium, calcium, manganese, potassium, silver, and sodium. Antimony, cadmium, chromium, copper, and lead concentrations in 69SW1 were also above their MCLs. Eleven TAL metals exceeded their BTAG screening levels (Table 9-3).

9.3.2 Review of EPIC Aerial Photo Assessment Report – 1992

Activity at SWMU 69 was first noted on a 1962 aerial photograph. The 1962 photograph indicated the presence of a "probable lagoon containing liquid" (USEPA 1992). This area remained unchanged through the 1986 photograph (USEPA 1992).

9.3.3 Closure Report, SWMU 69, Pond by Chromic Acid Treatment Tanks – 1994

Additional investigation was conducted to further delineate potentially impacted soil at the site. X-ray fluorescence (XRF) of soil samples was selected as the field-test method to evaluate the limits of the investigation area. Lead was selected as the field-screening indicator parameter for soil due to the presence of elevated lead concentrations in the pond sediment sample (Dames and Moore 1994a). The

delineation activities consisted of excavation of a test pit, soil sampling and on-site analysis, confirmatory sampling and laboratory analysis, and backfilling and grading operations.

Eight soil samples were collected from the test pit for analysis of TAL metals and the full TCLP parameter list to confirm the field XRF screening data (Table 9-4). One sample (69SO1) was collected from the center of the south wall of the test pit and seven samples (69SO2 through 69SO8) were collected from the floor of the test pit (Figure 9-2). Results indicate that lead-impacted soil had been successfully identified and removed.

Lead concentrations in the soil samples were below the current lead action level of 400 mg/kg. Concentrations of other metals were below background estimates and adjusted R-RBCs, with the exception of thallium (eight samples), cadmium (69SO1), and iron (69SO5). Antimony exceeded its adjusted R-RBC in four samples and its adjusted I-RBC in one sample.

Metals detected at concentrations above their background point estimates (where applicable) and a BTAG screening level included antimony, beryllium, cadmium, chromium, iron, magnesium, and thallium (Table 9-4).

At the completion of sampling, the test pit was backfilled with clean fill supplied by RFAAP (Dames and Moore 1994a).

9.3.4 New River and Tributaries Study – 1997

The New River and Tributaries Study evaluated migration pathways along the New River and its tributaries at RFAAP to assess potential adverse impacts to human health and the environment (Parsons 1997). One sediment sample (NRSE16) was collected from the "unnamed tributary" downgradient of SWMUs 57, 68, and 69 to assess potential impacts from these SWMUs. The sample was analyzed for VOCs, SVOCs, pesticides, PCBs, and TAL metals. Sample results indicated that four metals (aluminum, chromium, iron, and manganese) were present at concentrations above their respective 2004 Residential RBCs. In addition, the concentrations of 10 TAL metals exceeded their BTAG screening level concentrations in sediment Sample NRSE16.

9.4 WORK PLAN DATA GAP ANALYSIS

The data gap analysis presented in Section 1.9.5 in WPA 016 indicated that limited soil sampling and analyses had occurred at the site (URS 2003b). The following data gaps were identified:

- TCL VOCs - surface and subsurface soil;
- TCL SVOCs/PAHs - surface and subsurface soil;
- TCL PCBs and pesticides - surface soil;
- Explosives - surface and subsurface soil;
- TAL inorganics - surface and subsurface soil; and
- Site-specific physical soil testing data.

9.5 SSP FIELD ACTIVITIES

Soil borings 69SB1, 69SB2, and 69SB3 were advanced in and around the site to evaluate the presence or absence of chemicals in surface soil and subsurface soil (Figure 9-1). Borings 69SB1 and 69SB3 were advanced to the depth of groundwater and boring 69SB2 was advanced to refusal using a tractor mounted, direct-push Geoprobe® unit. Discrete samples were collected from surface, intermediate, and terminal intervals for the three borings as summarized below.

SWMU 69 SSP Samples and Boring Information

Boring ID	Total Depth of Boring (ft bgs)	Surface Sample ID	Sample Depth (ft)	Intermediate Sample ID	Sample Depth (ft)	Terminal Sample ID	Sample Depth (ft)
69SB1	22.5	69SB1A	0.0 - 1.0	69SB1B	5.0 - 6.0	69SB1C	14.0 - 15.0
69SB2	24.0	69SB2A	0.0 - 1.0	69SB2B	4.0 - 5.0	69SB2C	9.0 - 10.0
69SB3	24.0	69SB3A	0.0 - 1.0	69SB3B	5.0 - 6.0	69SB3C	11.0 – 12.0

Soil samples were analyzed for TCL VOCs, TCL SVOCs, PAHs, explosives (including nitroglycerin and PETN), and TAL inorganics. Surface soil sample 69SB2A was also analyzed for TCL pesticides, TCL PCBs, and TCL herbicides. SSP analytical results (detected chemicals) are summarized in Table 9-5.

Two soil samples were collected from 69SB1 (11-12 ft bgs) and 69SB3 (7.5-8.5 ft bgs) for physical testing of percent moisture, grain size, pH, TOC, specific gravity, and bulk density. Atterberg limit testing was also conducted on sample 69SB1. Analytical results for these samples are summarized in Table 3-1 and the complete results are presented in Appendix E.

Deviations to the SSP field program outlined in WPA 016 were not required to adjust to field conditions at the site.

9.6 HUMAN HEALTH RISK SCREENING

9.6.1 Identification of COPCs and Cumulative Risk Screen

Tables 9-6 and 9-7 present the results of COPC evaluations for surface soil and total soil, respectively. COPCs identified for surface soil and total soil included:

- *TAL metals:* aluminum (NSV), antimony, arsenic, chromium, cobalt (NSV), iron, manganese, and vanadium;
- *TCL PCBs:* Aroclor 1254;
- *VOC TICs:* 1 compound (NSVs);
- *TCL SVOCs:* 4-chloro-3-methylphenol (NSV); and
- *SVOC TICs:* 9 compounds (NSVs) for surface soil and 14 compounds (NSVs) for total soil.

9.6.2 Cumulative Risk Screen

Table 9-8 presents the results of the cumulative risk screen for surface soil. Tables 9-9 and 9-10 present the results of the cumulative risk screen for total soil. A summary of these screening results is presented below.

Cumulative Human Health Risk Screening Results for SWMU 69

	Surface Soil			Total Soil		
Residential Excess Cancer Risk	Fail	1.E-05	Arsenic, Aroclor 1254	Fail	2.E-05	Arsenic, Aroclor 1254
Industrial Excess Cancer Risk	Pass	2.E-06	--	Pass	4.E-06	--
Residential Noncarcinogenic	Fail	4	Sb, As, Cr, Fe, Mn, V, Aroclor 1254	Fail	4	Sb, As, Cr, Fe, Mn, V, Aroclor 1254
Industrial Noncarcinogenic	Pass	0.3	--	Pass	0.3	--

The cumulative human health risk screens failed for residential surface soil (carcinogenic and noncarcinogenic) and residential total soil (carcinogenic and noncarcinogenic). Cumulative risk screenings passed for industrial scenarios.

Noncarcinogenic residential cumulative risk screenings for surface soil and total soil resulted in HIs of 4, which exceeded the EPA target HI of 1. Due to multiple chemicals contributing to an HI greater than 1, the HIs have been segregated based on primary target organs for chronic exposure. The following tables present the results of the HI segregation using data obtained from Oak Ridge National Laboratory's RAIS, which includes data from various sources such as USEPA and the ATSDR:

HI Segregation for Target Organs – SWMU 69 – Surface Soil

Target Organ	Sb	As	Cr	Fe	Mn	V	Aroclor 1254	Total HI
Skin	--	0.2	--	--	--	--	0.1	0.3
CNS	--	0.2	--	--	0.9	--	--	***1***
CV	--	0.2	--	2	--	--	--	***2***
Blood	--	--	--	--	--	0.8	--	***0.8***
Liver	--	--	--	2	--	--	0.1	***2***
Kidney	--	--	--	2	--	0.8	--	***3***
GI	0.5	--	0.2	--	--	0.8	--	***2***
Reproductive	--	--	--	--	0.9	--	--	***0.9***

HI segregation resulted in values equal to or higher than the cumulative SSP HI threshold of 0.5 for a target organ including: the CNS, CV, blood, liver, kidney, GI, and reproductive.

HI Segregation for Target Organs – SWMU 69 – Total Soil

Target Organ	Sb	As	Cr	Fe	Mn	V	Aroclor 1254	Total HI
Skin	--	0.3	--	--	--	--	0.1	0.4
CNS	--	0.3	--	--	0.6	--	--	***0.9***
CV	--	0.3	--	2	--	--	--	***2***
Blood	--	--	--	--	--	0.8	--	***0.8***
Liver	--	--	--	2	--	--	0.1	***2***
Kidney	--	--	--	2	--	0.8	--	***3***
GI	0.4	--	0.2	--	--	0.8	--	***1***
Reproductive	--	--	--	--	0.6	--	--	***0.6***

HI segregation resulted in values equal to or higher than the cumulative SSP HI threshold of 0.5 for a target organ including: the CNS, CV, blood, liver, kidney, GI, and reproductive.

9.6.3 Lead and Iron Screening

The MDC for lead at the site was 24 mg/kg, which was below the action level of 400 mg/kg; therefore, further risk characterization for lead was not required.

Iron concentrations at the site for surface soil and total soil resulted in HQs greater than the iron SSP threshold HQ of 0.5 for the residential scenario, and therefore, the site required further characterization for iron through a margin of exposure evaluation. Appendix H presents the margin of exposure evaluation for surface soil and total soil. A summary of the results for SWMU 69 is presented below.

Iron Margin of Exposure Evaluation – Future Child Resident

	Surface Soil			Total Soil		
		Estimated Site Intake	Exposure Screening Level		Estimated Site Intake	Exposure Screening Level
RDA Screen (mg/day)	Pass	6.6	10	Pass	7.6	10
Provisional Reference Dose (RfD) Screen (mg/kg-day)	Pass	0.44	0.66	Pass	0.51	0.66

The site passed the margin of exposure evaluation for iron in soil. In addition, the MDCs for iron in surface soil and total soil were below the background point estimate.

9.6.4 Comparison to Generic SSLs

MDCs comparisons to generic SSLs (DAF 20) for detected chemicals indicated that arsenic, chromium, manganese, and methylene chloride exceeded their SSLs (Table 9-11). MDCs for arsenic, chromium, and

manganese are below their background point estimates, and therefore, these SSL exceedances are not a concern.

9.6.5 Comparison to Site-Specific SSLs

The MDC for methylene chloride was below the site-specific SSL of 48 µg/kg calculated using the average TOC value from the two physical samples collected at the site during the SSP (Appendix F).

9.6.6 COPC Comparison to Background

MDCs for metals identified as COPCs for surface soil and total soil were below their background point estimates (where applicable) (Table 9-12).

9.6.7 Human Health Risk Screening Summary

COPCs with available screening value were limited to metals and Aroclor 1254. Metals concentrations were below their background point estimates (where applicable). The residential cumulative human health risk screens failed for surface soil (carcinogenic and noncarcinogenic) and total soil (carcinogenic and noncarcinogenic). Cumulative risk screenings for industrial scenarios passed.

Carcinogenic residential risk screening failed for surface soil due to arsenic concentrations below the background point estimate. This screening result is not a concern given that: 1) the risk associated with background levels of arsenic contributes 97% of the cumulative risk of 1E-05, and 2) the other COPC for the site, Aroclor 1254, contributes negligible risk (7E-07) at a concentration below its unadjusted R-RBC.

Carcinogenic residential risk screening failed for total soil due to arsenic concentrations below the background point estimate. This screening result is not a concern given that: 1) the risk associated with background levels of arsenic contributes 96% of the cumulative risk of 1E-05, and 2) the other COPC for the site, Aroclor 1254, contributes negligible risk (7E-07) at a concentration below its unadjusted R-RBC.

Noncarcinogenic residential risk screening failed for surface soil primarily due to metals concentrations below background point estimates. This screening result is not a concern given that the elevated HI (>1) is due to background levels of metals in soil (HI of 3.9) rather than the single metal COPC lacking a background point estimate (antimony) and Aroclor 1254, which result in a site-related HI of 0.7. In addition, the MDCs for antimony and Aroclor 1254 are below their unadjusted R-RBCs.

Noncarcinogenic residential risk screening failed for total soil primarily due to metals concentrations below background point estimates. This screening result is not a concern given that the elevated HI (>1) is due to background levels of metals in soil (HI of 4.0) rather the single metal COPC lacking a background point estimate (antimony) and Aroclor 1254, which result in a site-related HI of 0.5. In addition, the MDCs for antimony and Aroclor 1254 are below their unadjusted R-RBCs.

The site passed the lead screening for soil. Iron concentrations in surface soil and total soil required a margin of exposure evaluation. Surface soil and total soil passed the margin of exposure evaluation for iron.

Generic SSL exceedances were limited to arsenic, chromium, manganese, and methylene chloride. The MDCs for arsenic, chromium, and manganese are below their background point estimates, and therefore, are not a concern. The methylene chloride SSL exceedance is not a concern because the single detection below the RL is an artifact of sampling and analysis and the concentration detected is below the calculated site-specific SSL.

9.7 ECOLOGICAL RISK SCREENING

9.7.1 Problem Formulation

9.7.1.1 Ecological Site Characterization

An overview of the site physiography, water resources, soil, and geology for the site is presented in Section 9.1. SWMU 69 is an approximately 0.012-acre (543-ft^2) grassy area that provides minimal habitat value to wildlife potentially occurring in the area. The site is bordered by a stand of deciduous forest to the north and grassland habitats to the south, east, and west. A complex of buildings related to facility operations is located within 150 ft to the southeast. A network of process pipes and utility lines traverses areas immediately adjacent to the site.

Observations made during the site reconnaissance indicate that a viable community of transitional vegetation occurs at the site (photograph on page 9-1). Signs of chemical vegetative stress were not observed during the reconnaissance. Based on information from the Installation-Wide Biological Survey and observations made during the site reconnaissance, the grassland vegetative community at the site is typical of other meadow-grassed areas that are regularly maintained at RFAAP.

The habitat could support some ecological use (i.e., shelter and foraging) by some smaller common species in the area. . Given its limited size and frequent disturbance by facility operations, few individuals would be expected to utilize the area for a lengthy period.

Threatened, rare, or endangered species were not observed during the site reconnaissance. These species are not likely to be present within the boundaries of the site. Threatened, rare, and endangered species information for RFAAP is discussed in Section 3.3.3.

9.7.2 Ecological Conceptual Site Model

The ECSM for SWMU 69 (and other terrestrial sites for the SSP) is presented on Figure 3-1. The site is a small area unlikely to support important populations of terrestrial receptors although individual receptors may traverse the area from time to time. Soil represents the potential exposure medium to ecological receptors. Based on the site characterization and data, the following complete exposure pathway exists: terrestrial receptor exposure to surface soil.

Detected chemical occurrence and distribution table is presented in Table 9-13. In addition, Table 9-14 summarizes the nondetected chemicals for SWMU 69. Potential ecological receptors may be exposed to COPECs in soil through the following exposure routes:

- Direct contact/absorption from soil;
- Direct ingestion of soil;
- Incidental ingestion of soil; and
- Direct ingestion of biota with accumulated COPECs.

Receptors of concern selected for SWMU 57 include:

- Plants;
- Soil invertebrate/microbial community;
- Omnivorous birds (American Robin; *Turdus migratorius*);
- Carnivorous birds (Red-Tailed Hawk; *Buteo jamaicensis*);
- Herbivorous mammals (Meadow Vole; *Microtus pennsylvanicus*);

- Carnivorous mammals (Short-Tailed Shrew; *Blarina brevicauda*); and
- Omnivorous mammals (Red Fox; *Vulpes vulpes*).

Relevant assessment and measurement endpoints for the identified terrestrial receptors are presented in Section 3.3.6.1.

9.7.3 Preliminary Exposure Estimate and Risk Characterization

The preliminary exposure estimate and ecological effects evaluation considers the most conservative risk scenario. Highly conservative assumptions are used to estimate COPEC exposure to terrestrial receptors for pathways to be quantitatively evaluated. Conservative TRVs are used to evaluate the ecological effects of exposure using the two approaches discussed below.

9.7.3.1 Preliminary Exposure Estimate and Ecological Effects Evaluation

Direct Contact Approach

The MDCs for detected chemicals in soil are used as the preliminary exposure estimate concentrations to develop a conservative risk scenario for the direct contact pathway to soil invertebrates. Table 9-15 presents the preliminary exposure estimates for the direct contact approach.

Dose Rate Modeling Approach

In the dose rate modeling approach, detected bioaccumulative chemicals MDCs, along with assumptions of maximum ingestion rate, minimum body weight, 100% area use, and 100% bioavailability are used in the conservative risk scenario as the preliminary exposure estimate for soil COPECs and compared to the calculated TRVs.

9.7.3.2 Background Concentrations of Metals

Background point estimates for metals were incorporated in the ecological screening to assess site soil concentrations in the context of facility-wide background levels (IT 2001a). Essential nutrients, including calcium, magnesium, potassium, and sodium were not considered COPECs in the risk screening in accordance with the SSP (USEPA 2001a) and the MWP (URS 2003b). The results of the background comparison for SWMU 69 are provided in Table 9-16. The results of this comparison have been incorporated into the risk management decision and ecological summary.

9.7.3.3 Preliminary Risk Characterization

Terrestrial Plants

Qualitative characterization of vegetative communities common to grassed areas at RFAAP is provided in Section 3.3.7.4. Stressed or dead vegetation was not observed during the site reconnaissance, which could be attributed to chemical stress. Reduced plant density is likely due to poor physical substrate quality and not a response to COPEC concentrations in surface soil.

Soil Invertebrates and Microbial Communities

Direct contact HQs calculated for soil invertebrates and microbial communities are presented in Table 9-15. Other potentially complete exposure pathways to soil invertebrate and microbial communities include direct ingestion of soil and biota. However, there is insufficient information to quantify these pathways, and while these pathways exist, they are likely secondary to the direct contact/absorption pathway and should not substantially alter the risk characterization.

Of the detected chemicals for which ecological screening values are available, the concentrations of aluminum, chromium, iron, manganese, mercury, vanadium, and cyanide resulted in HQ values greater

than 1 (Table 9-15). However, MDCs for the metal COPECs were below their background estimates (Table 9-16) with the exception of cyanide for which no background point estimate is available.

Terrestrial Wildlife

Quantitative risk characterization for terrestrial wildlife is limited to direct ingestion of biota and incidental ingestion of soil. The ECSM identifies a potentially complete direct contact exposure pathway to omnivorous birds and herbivorous and carnivorous mammals; however, there is insufficient information to quantify this pathway. This pathway is likely secondary to the direct ingestion pathway; therefore, it should not substantially alter the risk characterization.

The risk to each potential wildlife receptor at the site is presented in Table 9-17 and summarized as follows:

Receptor	NOAEL Only Exceedances	NOAEL and LOAEL Exceedances
American Robin	cadmium, lead, selenium, zinc	chromium, Aroclor 1254
Red-tailed Hawk	chromium, zinc	none
Meadow Vole	none	none
Red Fox	arsenic, Aroclor 1254	mercury
Short-tailed Shrew	cadmium, mercury	arsenic, Aroclor 1254

9.7.4 Refined Exposure Estimate, Ecological Effects Evaluation, and Risk Characterization

9.7.4.1 Refined Exposure Estimate and Ecological Effects Evaluation - Dose Modeling

The conservative assumptions used in the preliminary exposure estimate and ecological effects evaluation were replaced with more environmentally realistic assumptions resulting in a more realistic estimate of potential risk.

Refined exposure estimates and ecological effects were not developed for soil invertebrates and microbial communities because an appropriate 95% UCL could not be calculated using the surface soil data.

The refined exposure estimates and ecological effects are developed for wildlife receptors having complete exposure pathways to be quantitatively evaluated (i.e., omnivorous birds and carnivorous and herbivorous mammals). In the refined model, a realistic area use factor ($AF_{refined}$) was calculated as the ratio of the site area to the average home range of the receptor (Appendix I, Table I-16).

9.7.4.2 Refined Risk Characterization-Terrestrial Wildlife

Based on the refined risk characterization of wildlife ingestion, the HQs for the receptors are less than 1 (Table 9-17).

9.7.4.3 Exposure and Risk Uncertainty Analysis

A discussion of potential risk and exposure uncertainty is provided in Section 3.3.9. While factors such as lack of TSV and wildlife profile assumptions may create limited uncertainty, the very small size and negligible habitat quality of the site in combination with these limited uncertainties has produced a conservative assessment of potential ecological risks associated with the site.

9.7.5 Ecological Risk Screening Summary

The maximum surface soil concentrations for aluminum, antimony, chromium, iron, manganese, mercury, and cyanide in surface soil exceed their respective direct contact TRVs and therefore, pose a potential risk to soil invertebrates and microbes; although the concentration for aluminum, chromium, iron, manganese,

and mercury are below their background point estimates. The refined risk characterization of wildlife ingestion resulted in HQs of less than 1 for the receptors.

Therefore, there is adequate information to conclude that ecological risks are negligible and there is no need for further action at SWMU 69 on the basis of ecological risk.

9.8 CONCEPTUAL SITE MODEL

A refined CSM for SWMU 69 is presented on Figure 9-3. The site consists of a small grassy depression located in the western portion of the HSA formerly used as a settling pond, which collected treated wastewater containing chromium-hydroxide sludge from SWMU 68. In 1994, interim remedial measures were conducted at the site including excavation of approximately 700 cubic yards of soil from the site and backfilling of the excavated areas with clean fill.

Subsurface geology consists of 15 to 20+ ft unconsolidated deposits overlying carbonate bedrock of the Elbrook Formation, with 3 to 4 ft of clean fill material present in the former pond area associated with historical remedial excavation activities. Groundwater is present at 10 to 16 ft bgs within unconsolidated deposits and in underlying bedrock. Based on local surface topography, groundwater flow in the site area is likely toward the northwest and the New River.

Surface water drainage in the immediate site area consists of percolation of precipitation into surface soil and diffuse overland flow over grass and vegetated areas toward a perennial stream located 75 ft north and northwest of the site. Potentially affected media at the site include surface soil, subsurface soil, surface water, and groundwater. COPCs identified in soil with screening values include metals and Aroclor 1254. Metals COPC concentrations are below their background point estimates, with the exception of antimony, which does not have a background point estimate.

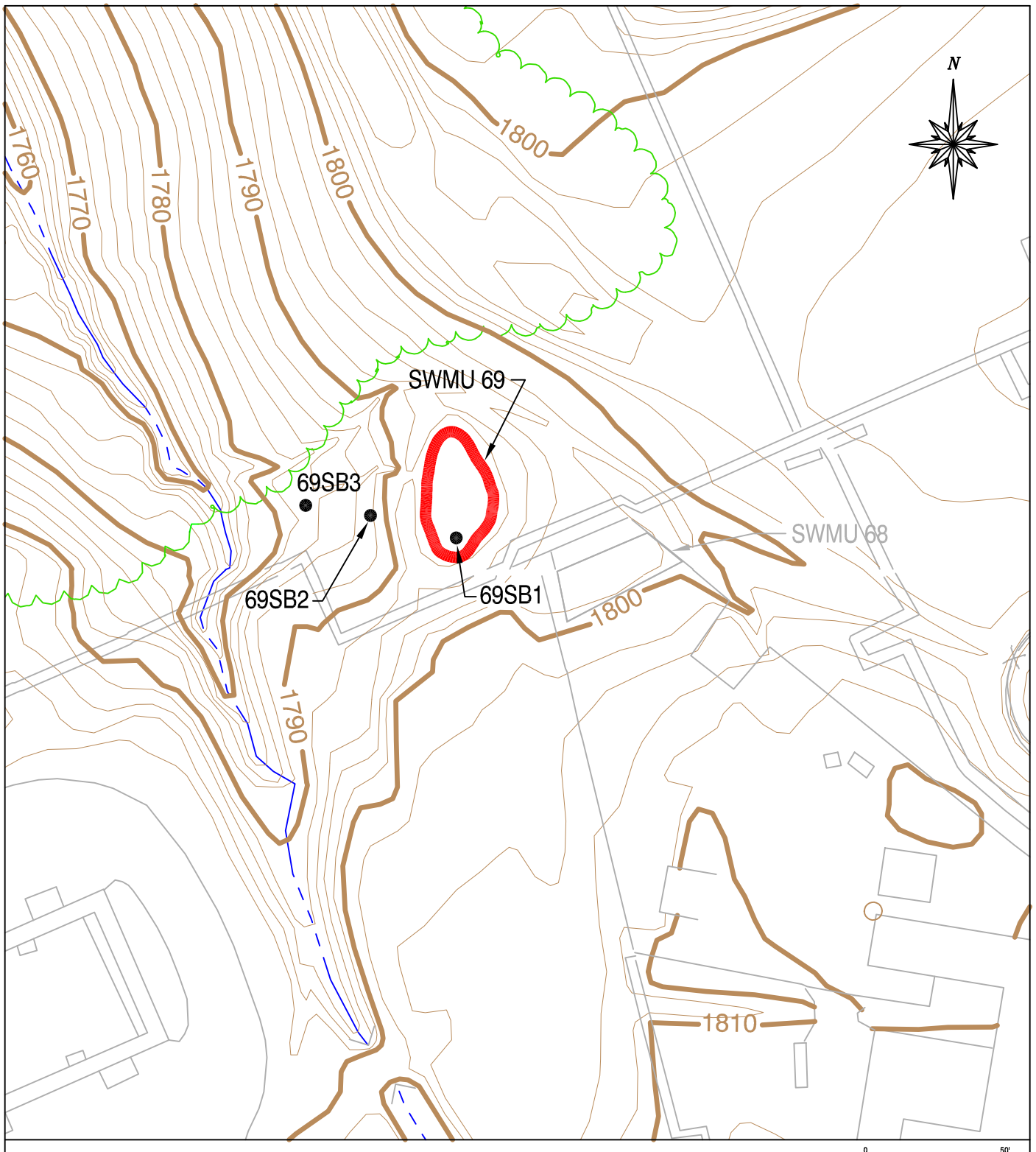
Although current and likely future land-use scenarios are limited to industrial operations, residential and industrial scenarios are evaluated. SWMU 69 is enclosed by the Installation perimeter fence, and, therefore, potential receptors are limited to site workers (more conservative than trespasser scenario), future construction workers, and terrestrial biota. Site workers, construction workers, and terrestrial biota could contact surface soil. Leaching of chemicals is considered a potential release mechanism to subsurface soil that may be contacted by construction workers during excavation activities. The lack of SSL exceedances in subsurface soil indicates that the leaching of chemicals groundwater at levels of concern is unlikely.

9.9 RECOMMENDATION FOR FUTURE ACTION

No further action is recommended for SWMU 69 based on the following results of the SSP screening:

- Cumulative risk and hazard screenings for industrial scenarios passed;
- Site-related cumulative risk and hazard screenings for residential scenarios passed;
- The MDC for lead is below the SSP screening level of 400 mg/kg;
- Surface soil and total soil passed the margin of exposure evaluation for iron;
- Arsenic, chromium, manganese, and methylene chloride are detected chemicals with MDCs exceeding generic SSLs, however, the metals MDCs are below their background point estimates;
- The methylene chloride SSL exceedance is not a concern because the single detection below the RL is an artifact of sampling and analysis and the concentration detected is below the calculated site-specific SSL; and

- Based on the refined risk characterization of wildlife ingestion, which resulted in HQs of less than 1 for the receptors, and the direct contact assessment, there is adequate information to conclude that ecological risks are negligible and therefore there is no need for further action at SWMU 69 on the basis of ecological risk.



(SOURCE: MODIFIED FROM HERCULES, INC., 1992)

0 50'

1 Inch = 50 feet

Legend

- Soil Sampling Location
- SWMU 69 Approximate Boundary
- Aboveground Piping
- Vegetation
- Water

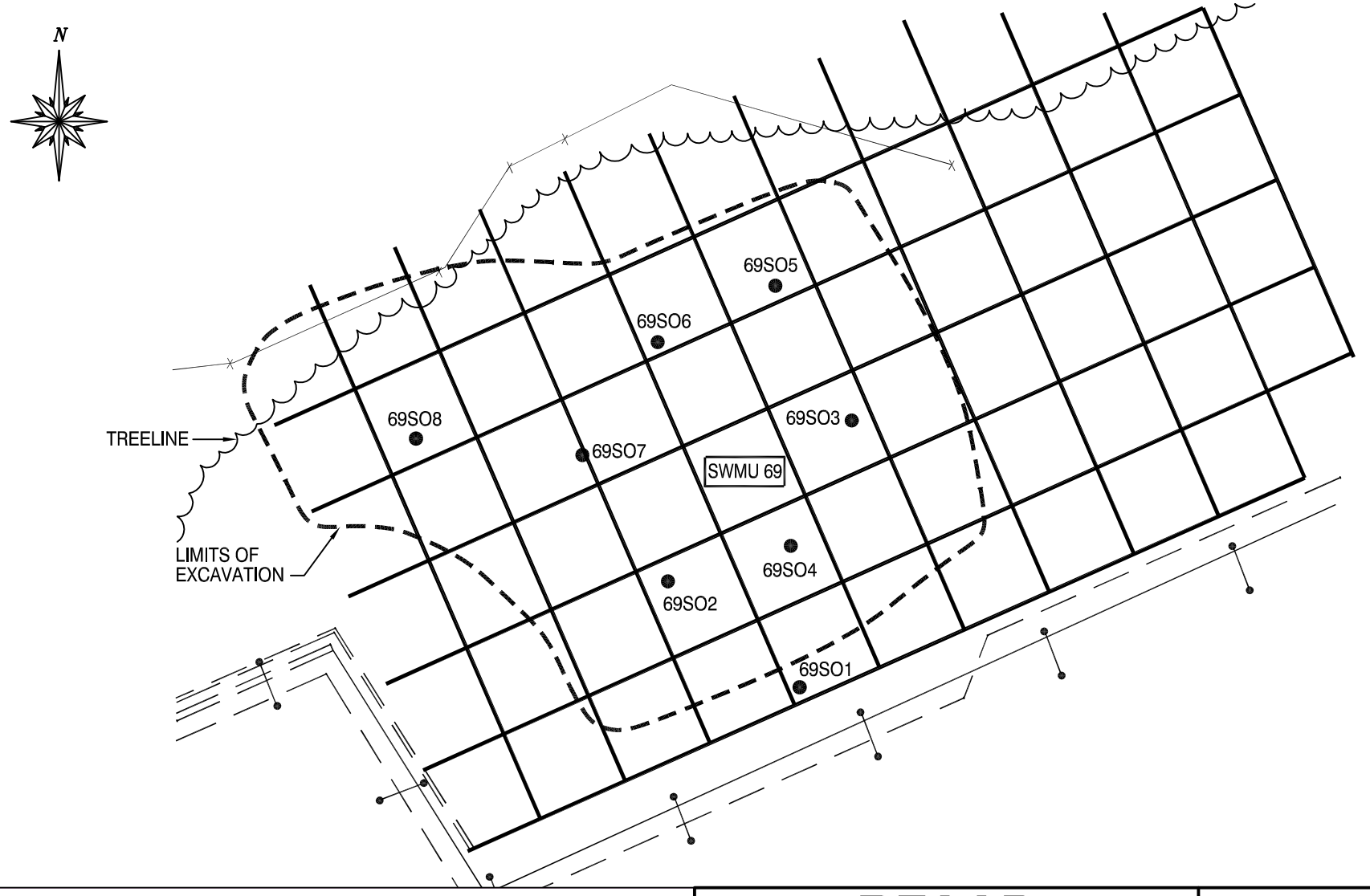
RFAAP

SSP REPORT

Date:	Prepared By:
June 2004	*KDC/TDH*
Scale:	**File Name:**
1"=50'	*15900619*

FIGURE 9-1

SSP SAMPLING LOCATION MAP SWMU 69



Legend

- Soil Sampling Location
- Limits of Excavation
- XRF Sampling Grid

(SOURCE: MODIFIED FROM DAMES & MOORE, 1994)

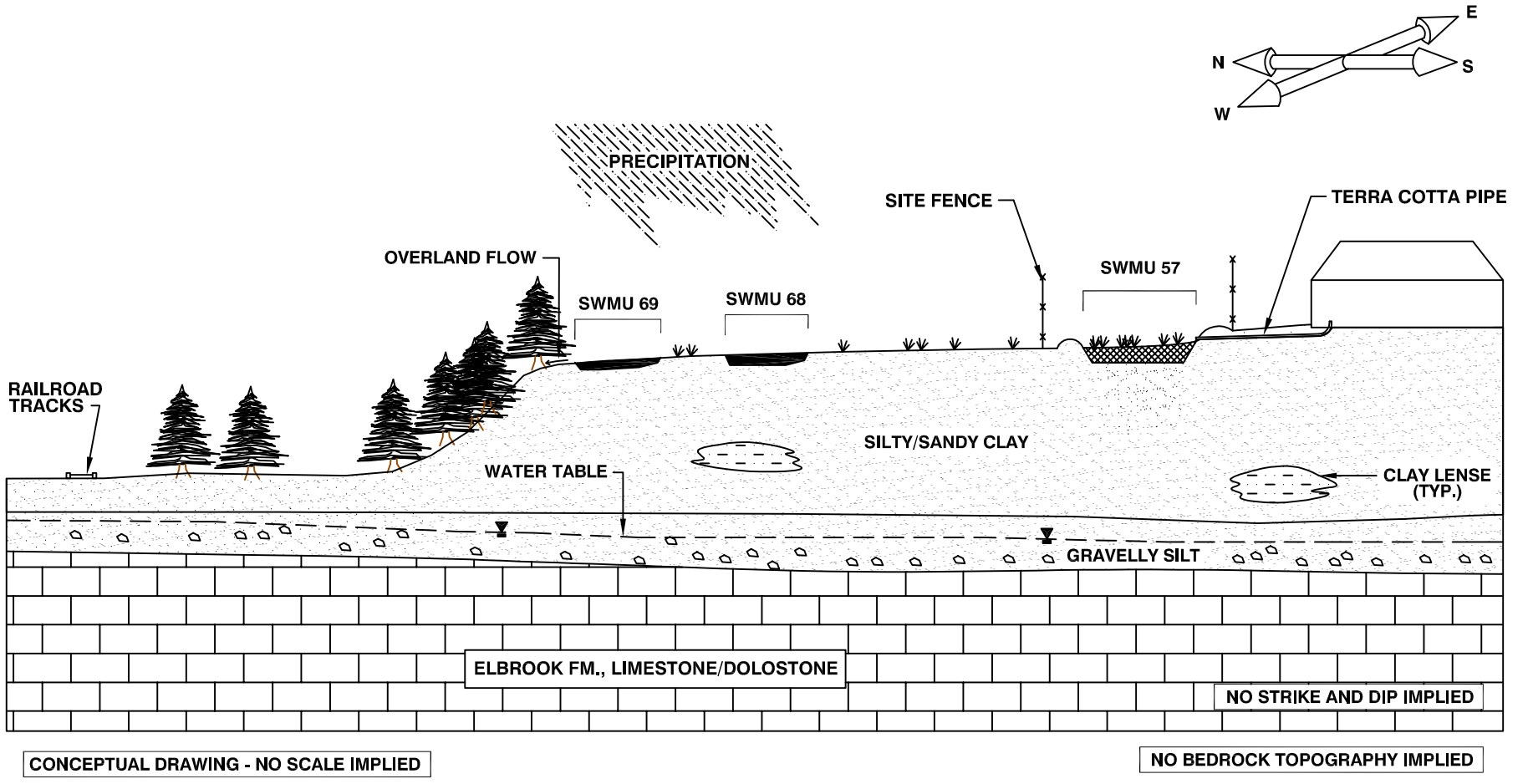
RFAAP

SSP REPORT

Date:	Prepared By:
June 2004	*KDC/TDH*
Scale:	**File Name:**
Not to Scale	*15900619*

FIGURE 9-2

PREVIOUS INVESTIGATION SAMPLING LOCATIONS SWMU 69



RFAAP

SSP REPORT

Date:	Prepared By:
June 2004	*KDC/TDH*
Scale:	**File Name:**
Not to Scale	*15900619*

FIGURE 9-3

CONCEPTUAL SITE MODEL
SWMU 69

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Table 9-1
Summary of Analytical Data for Soil Samples Collected at SWMU 69
Modified from Dames and Moore Verification Investigation Report
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

SITE ID FIELD ID SAMPLE DATE DEPTH (ft bgs) MATRIX UNITS	PQLs mg/kg	69SS1 RVFS*62 10-Feb-92 0.5 CSO mg/kg	69SS2 RVFS*63 10-Feb-92 0.5 CSO mg/kg	Adjusted Soil Industrial RBC mg/kg	Adjusted Soil Residential RBC mg/kg	Draft BTAG Screening Level mg/kg	Facility-Wide Background Point Estimates [A] mg/kg
TAL Inorganics							
Aluminum	14.1	10,500	9,340	102,200	7,821	1	40,041
Antimony	20	**859**	25.3	40.9	3.13	0.48	--
Arsenic	30	**3.27**	**6.03**	1.91	0.43	328	15.8
Barium	1	138	92.7	7,154	548	440	209
Beryllium	0.2	0.981	<0.5	204	16	0.02	1.02
Cadmium	2	31	3.73	102	7.82	2.5	0.69
Calcium	100	4,930B	1,620B	--	--	--	--
Chromium[1]	4	159	145	307	23.0	0.0075	65.3
Cobalt	3	9.98	6.49	2,044	156	100	72.3
Copper	7	26.6	14.7	4,088	313	15	53.5
Iron	1000	20,600	19,100	30,660	2,346	12	50,962
Lead[2]	2	307	162	750	400	0.01	26.8
Magnesium	50	6,430	972	--	--	4,400	--
Manganese[3]	0.275	765	766	2,044	156	330	2,543
Mercury[4]	0.1	0.117	<0.05	30.7	2.35	0.058	0.13
Nickel	3	46.6	11.7	2,044	156	2	62.8
Potassium	37.5	868	710	--	--	--	--
Silver	4	0.919	<0.589	511	39	0.0000098	--
Sodium	150	334B	208B	--	--	--	--
Thallium	20	**10.6**	<6.62	7.15	0.547	0.001	2.11
Vanadium	0.775	36.3	36.6	102	7.8	0.5	108
Zinc	30.2	2,500	261	30,660	2,346	10	202

Notes:

B = Analyte was detected in corresponding method blank; values are flagged if the sample concentration is less than ten (10) times the method blank concentration for common laboratory constituents and five (5) times for all other constituents

BTAG = USEPA Region III Draft, Biological Technical Assistance Group Screening Level

CSO = Chemical soil

ft bgs = Feet below ground surface

mg/kg = Milligrams per kilogram

PQL = Practical quantitation limit; the lowest concentration that can be reliably detected at a defined level of precision for a given analytical method

TAL = Target Analyte List

RBC = Risk-Based Concentration

USEPA = United States Environmental Protection Agency

USEPA Region III Risk-Based Concentration (RBC) values from the April 14, 2004, RBC Table

Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens

[1] = Chromium VI RBC value used

[2] = Lead criteria are Action Levels; see USEPA Region III guidance

[3] = Manganese-nonfood RBC value used

[4] = Mercuric chloride RBC value was used

[A] = Facility-Wide Background Point Estimate as Reported in the Facility-Wide Background Study Report (IT 2001a)

bold = Concentration exceeds Industrial RBC

= Concentration exceeds Residential RBC

= Concentration exceeds Draft BTAG Screening Level

underline = Concentration exceeds Facility-Wide Background Point Estimate

Table 9-2
Summary of Analytical Data for Sediment Sample Collected at SWMU 69
Modified from Dames and Moore Verification Investigation Report
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

SITE ID FIELD ID SAMPLE DATE DEPTH (ft bgs) MATRIX UNITS	PQLs mg/kg	69SE1 RVFS*61 10-Feb-92 0.5 CSE mg/kg	Adjusted Soil Industrial RBC mg/kg	Adjusted Soil Residential RBC mg/kg	Draft BTAG Screening Level mg/kg	Facility-Wide Background Point Estimates [A] mg/kg
TAL Inorganics						
Aluminum	14.1	10,900	102,200	7,821	--	40,041
Antimony	20	**178**	40.9	3.13	150	--
Arsenic	30	**2.13**	1.91	0.43	0.057	15.8
Barium	1	165	7,154	548	--	209
Cadmium	2	**610**	102	7.82	1.2	0.69
Calcium	100	50,200	--	--	--	--
Chromium[1]	4	**2,040**	307	23.0	0.005	65.3
Cobalt	3	20.7	2,044	156	--	72.3
Copper	7	818	4,088	313	34	53.5
Iron	1000	**34,500**	30,660	2,346	--	50,962
Lead[2]	2	**1,330**	750	400	46.7	26.8
Magnesium	50	2,200	--	--	--	--
Manganese[3]	0.275	621	2,044	156	--	2,543
Nickel	3	77	2,044	156	20.9	62.8
Potassium	37.5	522	--	--	--	--
Silver	4	3.03	511	39	1	--
Sodium	150	7,990	--	--	--	--
Thallium	20	**18.5**	7.15	0.547	--	2.11
Vanadium	0.775	25.1	102	7.8	--	108
Zinc	30.2	10,000	30,660	2,346	150	202

Notes:

BTAG = USEPA Region III Draft, Biological Technical Assistance Group Screening Level
CSE = Chemical Sediment
ft bgs = Feet below ground surface
mg/kg = Milligrams per kilogram
PQL = Practical quantitation limit; the lowest concentration that can be reliably detected at a defined level of precision for a given analytical method
TAL = Target Analyte List
RBC = Risk-Based Concentration
USEPA = United States Environmental Protection Agency
USEPA Region III Risk-Based Concentration (RBC) values from the April 14, 2004, RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens

[1] = Chromium VI RBC value used
[2] = Lead criteria are Action Levels; see USEPA Region III guidance
[3] = Manganese-nonfood RBC value used
[A] = Facility-Wide Background Point Estimate as Reported in the Facility-Wide Background Study Report (IT 2001a)

bold = Concentration exceeds Industrial RBC

= Concentration exceeds Residential RBC

= Concentration exceeds Draft BTAG Screening Level

underline = Concentration exceeds Facility-Wide Background Point Estimate

Table 9-3
Summary of Analytical Data for Surface Water Samples at SWMU 69
Modified from Dames and Moore Verification Investigation Report
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

SITE ID FIELD ID SAMPLE DATE DEPTH (ft bgs) MATRIX UNITS	PQLs µg/L	69SW1 RDWD*2 10-Feb-92 0.0 CSW µg/L	Adjusted Tap Water RBC µg/L	MCL µg/L	Draft BTAG Screening Level µg/L
TAL Metals					
Aluminum	141	9,800	3,650	--	25
Antimony	30	**269**	1.5	6	30
Arsenic	10	3.62	0.045	10	48
Barium	20	159	256	2,000	10,000
Cadmium	1	**2,540**	2	5.0	0.53
Calcium	500	268,000	--	--	--
Chromium(1)	10	**25,000**	11.0	100	2
Cobalt	70	1,640	73.0	--	35,000
Copper	60	**1,450**	146	1,300 (AL)	6.5
Iron	38.1	650,000	1,100	--	320
Lead	10	7,900	--	15 (AL)	3.2
Magnesium	500	29,300	--	--	--
Manganese(2)	2.75	25,300	73	--	14,500
Nickel	50	120,000	73	--	160
Potassium	375	3,210	--	--	--
Silver	2	5.83	18.3	--	0.0001
Sodium	500	950,000	--	--	--
Vandium	40	161	3.7	--	10,000
Zinc	50	61,000	1,095	--	30

Notes:

BTAG = USEPA Region III Draft, Biological Technical Assistance Group Screening Level
CSW = Chemical surface water
ft bgs = Feet below ground surface
MCL = Maximum Contaminant Level
PQL = Practical quantitation limit; the lowest concentration that can be reliably detected at a defined level of precision for a given analytical method
TAL = Target Analyte List
RBC = Risk-Based Concentration
USEPA = United States Environmental Protection Agency
USEPA Region III Risk-Based Concentration (RBC) values from the April 14, 2004, RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
µg/L = Microgram Per Liter
(AL) = Action Level
(1) = Chromium VI RBC value used
(2) = Manganese-nonfood RBC value used

= Concentration exceeds Tap Water RBC

= Concentration exceeds MCL

= Concentration exceeds Draft BTAG Screening Level

bold = Concentration exceeds both the Tap Water RBC and MCL

Table 9-4
Summary of Analytical Data for Sediment and Confirmatory Soil Samples Collected at SWMU 69
Modified from Dames and Moore Closure Report SWMU 69 - Pond by Chromic Acid Treatment Tanks
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

SITE ID		69SE2	69SL1	69SO1	69SO2	69SO3	Adjusted Soil Industrial RBC	Adjusted Soil Residential RBC	Draft BTAG Screening Level (Soil/Sediment)	Facility-Wide Background Point Estimates[A]
FIELD ID		RDSW*27	RDSW*28	RDSX*17	RDSX*18	RDSX*19				
SAMPLE DATE		28-Apr-94	29-Apr-94	2-May-94	3-May-94	3-May-94				
DEPTH (ft bgs)		3.0	3.0	5.0	0.5	0.5				
MATRIX	PQLs	CSE	CSE	CSO	CSO	CSO				
UNITS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
TAL Metals										
Aluminum	14.1	9,500	11,200	30,500	25,300	31,300	102,200	7,821	1/--	40,041
Antimony	20	**60.5**	**83.4**	**64.2**	<7.14	<7.14	40.9	3.13	0.48/150	--
Arsenic	30	1.21	1.77	**3.01**	**3.94**	**4.79**	1.91	0.43	328/0.057	15.8
Barium	1	62.3	90.9	40.6	43.1	45.4	7,154	548	440/--	209
Beryllium	0.2	0.694	1.05	1.49	2.34	2.60	204	15.6	0.02/--	1.02
Cadmium	2	<0.7	65.1	8.79	<0.7	<0.7	102	7.8	2.5/1.2	0.69
Calcium	500	4,480	12,800	3,350	577	1,120	--	--	--	--
Chromium[1]	4	75.9	**443**	50.9	29.9	51.7	307	23.5	0.0075/0.005	65.3
Cobalt	3	3.14	8.7	5.84	7.41	19.7	2,044	156	100/--	72.3
Copper	7	7.04	43.7	21.6	21.3	28.7	4,088	313	15/34	53.5
Iron	1000	16,200	22,600	**38,700**	**44,600**	**46,500**	30,660	2,346	12/--	50,962
Lead[2]	2	<10.5	169	<10.5	<10.5	<10.5	750	400	0.01/46.7	26.8
Magnesium	50	966	997	1,320	4,720	2,350	--	--	4,400/--	--
Manganese[3]	0.275	345	647	328	81.8	132	2,044	156	330/--	2,543
Mercury[4]	0.1	<0.05	0.0703	0.122	<0.05	<0.05	31	2.3	0.058/0.15	0.13
Nickel	3	13.2	27.5	25.6	29.9	32.7	2,044	156	2/20.9	62.8
Potassium	37.5	919	769	1,410	2,620	1,720	--	--	--	--
Selenium	40	<0.5	1.1	<0.5	<0.5	<0.5	511	39	2/--	--
Silver	4	<0.589	<0.589	<0.589	<0.589	<0.589	511	39.1	0.000098/1	--
Sodium	150	1,430	4,020	4,860	3,990	4,500	--	--	--	--
Thallium	4	<6.62	**33.2**	**39.1**	**44.9**	**49.5**	7.15	0.548	0.001/--	2.11
Vanadium	0.775	31.9	43.4	64.8	84.9	68.9	102	7.8	0.5/--	108
Zinc	30.2	160	1,110	119	28.2	32.7	30,660	2,346	10/150	202

Table 9-4 (Continued)
Summary of Analytical Data for Sediment and Confirmatory Soil Samples Collected at SWMU 69
Modified from Dames and Moore Closure Report SWMU 69 - Pond by Chromic Acid Treatment Tanks
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

SITE ID		69SO4	69SO5	69SO6	69SO7	69SO8	Adjusted Soil Industrial RBC	Adjusted Soil Residential RBC	Draft BTAG Screening Level (Soil/Sediment)	Facility-Wide Background Point Estimates[A]
FIELD ID		RDSX*20	RDSX*21	RDSX*22	RDSX*23	RDSX*24				
SAMPLE DATE		3-May-94	3-May-94	3-May-94	3-May-94	3-May-94				
DEPTH (ft bgs)		0.5	0.5	0.5	0.5	0.5				
MATRIX	PQLs	CSO	CSO	CSO	CSO	CSO				
UNITS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
TAL Metals										
Aluminum	14.1	31,700	27,500	23,600	11,400	12,700	102,200	7,821	1	40,041
Antimony	20	24	21.2	<7.14	<7.14	9.91	40.9	3.13	0.48	--
Arsenic	30	**3.16**	**7.98**	**2.78**	**2.44**	**2.7**	1.91	0.43	328	15.8
Barium	1	58.3	47.2	53.5	33.4	38	7,154	548	440	209
Beryllium	0.2	2.51	2.89	2.89	1.05	1.06	204	15.6	0.02	1.02
Cadmium	2	<0.7	6.9	<0.7	<0.7	<0.7	102	7.8	3	0.69
Calcium	500	1,530	604	1,110	214	556	--	--	--	--
Chromium[1]	4	56.7	75.2	41.6	38.2	29.5	307	23.5	0.0075	65.3
Cobalt	3	6.94	9.25	9.69	5.76	10.4	2,044	156	100	72.3
Copper	7	32.4	27.3	25.6	9.12	9.84	4,088	313	15	53.5
Iron	1000	**49,500**	**51,500**	**43,000**	23,600	21,900	30,660	2,346	12	50,962
Lead[2]	2	<10.5	24.5	<10.5	<10.5	18.3	750	400	0.01	26.8
Magnesium	50	2,240	5,540	6,620	654	940	--	--	4,400	--
Manganese[3]	0.275	184	168	243	580	758	2,044	156	330	2,543
Mercury[4]	0.1	0.124	0.0801	<0.05	0.0701	0.0674	31	2.3	0.058	0.13
Nickel	3	29.4	29.9	25.9	6.86	5.87	2,044	156	2	62.8
Potassium	37.5	1,850	3,400	3,260	767	781	--	--	--	--
Selenium	40	<0.5	1	<0.5	<0.5	<0.5	511	39	2	--
Silver	4	<0.589	<0.589	<0.589	<0.589	<0.589	511	39.1	0.000098	--
Sodium	150	4,770	4,720	3,730	2,540	1,400	--	--	--	--
Thallium	4	**53.1**	**54.6**	**62.6**	**27.5**	**22.3**	7.15	0.548	0.001	2.11
Vanadium	0.775	89.8	74.7	83	49.5	47.5	102	7.8	0.5	108
Zinc	30.2	69.1	140	46.8	22.4	33	30,660	2,346	10	202

Table 9-4 (Continued)
Summary of Analytical Data for Sediment and Confirmatory Soil Samples Collected at SWMU 69
Modified from Dames and Moore Closure Report SWMU 69 - Pond by Chromic Acid Treatment Tanks
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Notes:

BTAG = USEPA Region III Draft, Biological Technical Assistance Group Screening Level

CSE = Chemical sediment

CSO = Chemical soil

ft bgs = Feet below ground surface

mg/kg = Milligrams per kilogram

PQL = Practical quantitation limit; the lowest concentration that can be reliably detected at a defined level of precision for a given analytical method

TAL = Target Analyte List

RBC = Risk-Based Concentration

USEPA = United States Environmental Protection Agency

USEPA Region III Risk-Based Concentration (RBC) values from the April 14, 2004, RBC Table

Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens

(A) = Facility-Wide Background Point Estimate as Reported in the Facility-Wide Background Study Report (IT 2001a)

(1) = Chromium VI RBC value used

(2) = Lead criteria are Action Levels; see USEPA Region III guidance

(3) = Manganese-nonfood RBC value used

(4) = Mercuric chloride RBC value used

bold = Concentration exceeds Industrial RBC

= Concentration exceeds Residential RBC

= Concentration exceeds Draft BTAG Screening Level

underline = Concentration exceeds Facility-Wide Background Point Estimate

Table 9-5
Detected Analytes for SWMU 69
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	SSL DAF 20	Draft BTAG Screening Level	69SB1A 10/8/2003 0-1		MDL	RL	69SB1B 10/8/2003 5-6		MDL	RL	69SB1C 10/8/2003 14-16		MDL	RL	69SB2A 10/8/2003 0-1		MDL	RL	69SB2B 10/8/2003 4-5		MDL	RL
								Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
TAL Metals (mg/kg)																											
Aluminum	7429-90-5	--	40,041	--	--	--	1	23,700		1.83	50	17,200		1.83	50	28,400		9.15	250	24,600		5.1	250	34,800		5.1	250
Antimony	7440-36-0	N	--	3.13	40.9	13.2	0.48	0.35	J	0.0518	0.5	9.3		0.0518	0.5	1.7		0.0518	0.5	9.5		0.0518	0.5	8.8		0.0518	0.5
Arsenic	7440-38-2	C	15.8	0.426	1.91	0.026	328	***3.8***		0.0232	0.4	***2.9***		0.0232	0.4	***12***		0.0232	0.4	***0.64***		0.0232	0.4	***6.5***		0.0232	0.4
Barium	7440-39-3	N	209	1,564	20,440	6,015	440	76		0.106	5	50		0.106	5	65		0.106	5	65		0.106	5	70		0.106	5
Beryllium	7440-41-7	N	1.02	15.64	204.4	1,154	0.02	0.34	J,J,s	0.0391	1	0.3	J,J,s	0.0391	1	1.1	J,s	0.0391	1	0.62	J	0.0333	1	0.91	J	0.0333	1
Cadmium	7440-43-9	N	0.69	3.91	51.1	27.4	2.5	0.53	J	0.182	1	0.97	J	0.182	1	1.2		0.182	1	0.57	J	0.182	1	1.5		0.182	1
Calcium	7440-70-2	--	--	--	--	--	--	346		16.6	250	332		16.6	250	155	J	16.6	250	840	J,m	16.6	250	568	J,m	16.6	250
Chromium[(1)]	7440-47-3	N	65.3	23.46	306.6	42.05	0.0075	36		0.912	5	34		0.912	5	35		0.912	5	***50***	J,m	0.912	5	***50***	J,m	0.912	5
Cobalt	7440-48-4	--	72.3	--	--	--	100	14	J,s	0.208	1	15	J,s	0.208	1	9.9	J,s	0.208	1	16	J,s	0.208	1	12	J,s	0.208	1
Copper	7440-50-8	N	53.5	312.9	4,088	10,518	15	10		0.368	1	9.4		0.368	1	25		0.368	1	17	J,s	0.368	2	23	J,s	0.368	2
Iron	7439-89-6	N	50,962	2,346	30,660	--	12	34,600		35.8	500	26,500		35.8	500	32,200		35.8	500	32,700		71.6	1,000	42,400		71.6	1,000
Lead[(2)]	7439-92-1	--	26.8	400	750	--	0.01	19		0.0218	1	15		0.0218	1	17		0.0218	1	<1	U	0.0218	1	14		0.0218	1
Magnesium	7439-95-4	--	--	--	--	--	4,400	793		3.21	250	934		3.21	250	34,600		16.1	1,250	2,270	J,m	3.21	250	6,020	J,m	3.21	250
Manganese	7439-96-5	N	2,543	156.43	2,044	951.9	330	***1,470***		1.32	25	511		0.264	5	247		0.264	5	894		0.264	5	303		0.264	5
Mercury[(3)]	7439-97-6	--	0.13	2.346	30.66	--	0.06	0.13		0.0077	0.1	0.052	J	0.0077	0.1	0.042	J	0.0077	0.1	0.091	J	0.0077	0.1	0.07	J	0.0077	0.1
Nickel	7440-02-0	N	62.8	156.43	2,044	--	2	10		0.0356	0.5	11		0.0356	0.5	33		0.0356	0.5	<0.5	U	0.0356	0.5	30		0.0356	0.5
Potassium	7440-09-7	--	--	--	--	--	--	810	J,s	5	100	1,100	J,s	5	100	8,480	J,s	5	100	1,580		5	100	3,680		5	100
Selenium	7782-49-2	N	--	39.11	511	18.98	1.8	0.36	J	0.0502	1	0.38	J	0.0502	1	0.66	J	0.0502	1	<1	U	0.0502	1	0.47	J	0.0502	1
Silver	7440-22-4	N	--	39.11	511	31.03	0.0000098	0.043	J	0.0044	3	0.036	J	0.0044	3	0.15	J	0.0044	3	0.085	J	0.0044	3	0.1	J	0.0044	3
Sodium	7440-23-5	--	--	--	--	--	--	27	J,B,p	8.92	100	2,010		90.5	500	2,460		90.5	500	114		8.92	100	353		8.92	100
Thallium	7440-28-0	N	2.11	0.548	7.154	3.638	0.001	0.3	J	0.027	0.5	0.2	J	0.027	0.5	0.43	J	0.027	0.5	0.33	J,B,x	0.027	0.5	0.37	J,B,x	0.027	0.5
Vanadium	7440-62-2	N	108	7.821	102.2	730.1	0.5	63		0.207	1	53		0.207	1	66		0.207	1	54		0.207	1	71		0.207	1
Zinc	7440-66-6	N	202	2,346	30,660	13,622	10	38		0.517	4	28		0.517	4	55		0.517	4	51		0.517	4	54		0.517	4
TCL Pesticides/PCBs (µg/kg)																											
Aldrin	309-00-2	C	--	3.8E+01	1.7E+02	7.7E+00	100	NT				NT				NT				1.1	J	0.365	24	NT			
delta-BHC[(4)]	319-86-8	C	--	1.0E+02	4.5E+02	--	100	NT				NT				NT				2.5	J	0.982	24	NT			
Aroclor 1254[(5)]	11097-69-1	C	--	1.6E+02	1.4E+03	1.1E+03	--	NT				NT				NT				220		3.6	40	NT			
TCL VOCs (µg/kg)																											
2-Butanone	78-93-3	N	--	4.7E+06	6.1E+07	2.9E+04	--	31		6.4	13	22		6.1	12	26		6.75	14	30		6	24	23	J	6.3	26
Acetone	67-64-1	N	--	7.0E+06	9.2E+07	2.2E+04	--	100	B,B,z	6.4	13	44	B,B,z	6.1	12	70	B,B,z	6.75	14	110	B,B,z	6	24	65	B,B,z	6.3	26
Methylene chloride	75-09-2	C	--	8.5E+04	3.8E+05	1.9E+01	300	<6.4	U	3.6	6.4	<6.1	U	3.43	6.1	<6.8	U	3.79	6.8	<24	U	3.37	24	<26	U	3.54	26
Toluene	108-88-3	N	--	6.3E+05	8.2E+06	2.7E+04	100	<6.4	U	0.594	6.4	<6.1	U	0.566	6.1	0.89	J	0.626	6.8	<6	U	0.557	6	<6.3	U	0.585	6.3
VOC TICs (µg/kg)																											
4-Isopropyltoluene	1946-51-0	N	--	1.6E+04	2.0E+05	--	--	NI				NI				NI				NI				NI			
Hexanal	66-25-1	--	--	--	--	--	--	NI				NI				NI				17	E,NJ,t	0	1	NI			
TCL SVOCs (µg/kg)																											
4-Chloro-3-Methylphenol	59-50-7	--	--	--	--	--	--	10	J,B,x	6.77	220	27	J	6.25	210	<230	U	7.29	230	12	J	6.25	200	12	J	6.77	220
4-Methylphenol	106-44-5	N	--	3.9E+04	5.1E+05	--	100	<220	U	8.28	220	<210	U	7.64	210	10	J	8.92	230	<200	U	7.64	200	<220	U	8.28	220
Bis(2-ethylhexyl)phthalate	117-81-7	C	--	4.6E+04	2.0E+05	2.9E+06	--	21	J,B,z	2.69	220	19	J,B,z	2.48	210	15	J,B,z	2.9	230	22	J,B,z	2.48	200	15	J,B,z	2.69	220
Butylbenzylphthalate	85-68-7	N	--	1.6E+06	2.0E+07	1.7E+07	--	<220	U	5.82	220	<210	U	5.38	210	<230	U	6.27	230	<200	U	5.38	200	<220	U	5.82	220
Caprolactam	105-60-2	N	--	3.9E+06	5.1E+07	--	--	<420	U	8.29	420	<400	U	7.66	400	<440	U	8.93	440	<400	U	7.66	400	<420	U	8.29	420
Diethylphthalate	84-66-2	N	--	6.3E+06	8.2E+07	4.5E+05	--	8	J,B,x	2.47	220	8	J,B,x	2.28	210	9	J,B,x	2.66	230	6	J,J,l	2.28	200	4	J,J,l	2.47	220
Di-n-butylphthalate	84-74-2	N	--	7.8E+05	1.0E+07	5.0E+06	--	300		4.97	220	63	J,B,z	4.58	210	38	J,B,z	5.35	230	53	J,B,z	4.58	200	50	J,B,z	4.97	220
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	100	<220	U	3.06	220	<210	U	2.82	210	<230	U	3.29	230	8	J	2.82	200	<220	U	3.06	220
Phenanthrene[(6)]	85-01-8	N	--	2.3E+05	3.1E+06	--	100	<220	U	2.99	220	<210	U	2.76	210	<230	U	3.22	230	5	J	2.76	200	<220	U	2.99	220
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	100	<220	U	1.92	220	<210	U	1.78	210	<230	U	2.07	230	9	J	1.78	200	<220	U	1.92	220
SVOC TICs (µg/kg)																											
(Z)-9-Octadecenamide	301-02-0	--	--	--	--	--	--	NI				NI				200	E,NJ,t	0	100	190	E,NJ,t	0	100	57	E,NJ,t	0	100
1,1'-Biphenyl, bis(1-methylethyl)-	69009-90-1	--	--	--	--	--	--	NI				65	E,NJ,t	0	10	NI				NI				NI			
1,2-Benzenedicarboxylicacid, bis(2-methy	84-69-5	--	--	--	--	--	--	28	E,B,x	0	100	52	E,B,x	0	100	38	E,B,x	0	100	NI				34	E,NJ,t	0	100
2,4-bis(1,1-Dimethylethy-l)-phenol	96-76-4	--	--	--	--	--	--	NI				NI				NI				NI				NI			
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	--	--	--	--	--	--	43	E,NJ,t	0	100	74	E,NJ,t	0	100	45	E,NJ,t	0	100	38	E,B,x	0	100	NI			
3-Carene	13466-78-9	--	--	--	--	--	--	NI				NI				NI				NI				NI			
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,	10001-439-24	--	--	--	--	--	--	NI				NI				NI				NI				NI			
beta-Pinene	127-91-3	--	--	--	--	--	--	NI				NI				NI				NI				NI			
D-Friedoolean-14-ene, 3-methoxy-, (3.bet	14021-23-9	--	--	--	--	--	--	NI				NI				NI				210	E,NJ,t	0	100	NI			
Erucylamide	112-84-5	--	--	--	--	--	--	190	E,B,x	0	10	410	E,B,x	0	10	NI				NI				190	E,B,x	0	10
Ethanol, 2-(hexadecyloxy)-	2136-71-2	--	--	--	--	--	--	NI				NI				NI				NI				NI			
Phenol, 2,6-dimethoxy-4-(2-propenyl)-	6627-88-9	--	--	--	--	--	--	NI				NI				NI				NI				NI			
Phenol, (1,1,3,3-tetramethylbutyl)-	27193-28-8	--	--	--	--	--	--	NI				380	E,NJ,t	0	10	NI				NI				NI			
Squalene	7683-64-9	--	--	--	--	--	--	NI				NI				NI				NI				NI			

Table 9-5
Detected Analytes for SWMU 69
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	SSL DAF 20	Draft BTAG Screening Level	69SB1A 10/8/2003 0-1		MDL	RL	69SB1B 10/8/2003 5-6		MDL	RL	69SB1C 10/8/2003 14-16		MDL	RL	69SB2A 10/8/2003 0-1		MDL	RL	69SB2B 10/8/2003 4-5		MDL	RL
								Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
PAHs (µg/kg)																											
Benzo(a)anthracene	56-55-3	C	--	2.2E+02	3.9E+03	4.8E+02	100	<27	U,UL,s	1.04	27	<26	U,UL,s	0.96	26	<28	U,UL,s	1.12	28	2.9	J	0.96	25	<27	U,UL,s	1.04	27
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	100	<27	U,UL,s	1.56	27	<26	U,UL,s	1.44	26	<28	U,UL,s	1.68	28	2.9	J	1.44	25	<27	U,UL,s	1.56	27
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	100	<27	U,UL,s	2.21	27	<26	U,UL,s	2.04	26	<28	U,UL,s	2.38	28	18	J	2.04	25	<27	U,UL,s	2.21	27
Phenanthrene[6]	85-01-8	N	--	2.3E+05	3.1E+06	--	100	<27	U,UL,s	0.78	27	<26	U,UL,s	0.72	26	<28	U,UL,s	0.84	28	7.2	J	0.72	25	<27	U,UL,s	0.78	27
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	100	<27	U,UL,s	1.17	27	<26	U,UL,s	1.08	26	<28	U,UL,s	1.26	28	13	J	1.08	25	<27	U,UL,s	1.17	27
Cyanide (mg/kg)																											
Cyanide	57-12-5	N	--	1.6E+02	2.0E+03	1.5E+02	0.005	<0.5	U	0.0356	0.5	<0.5	U	0.0356	0.5	0.07	J	0.0356	0.5	0.14	J	0.0356	0.5	<0.5	U	0.0356	0.5
Percent Solids (%)																											
Percent Solids	--	--	--	--	--	--	--	78		0.1	0.1	82		0.1	0.1	74		0.1	0.1	83		0.1	0.1	79		0.1	0.1

Table 9-5
Detected Analytes for SWMU 69
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	SSL DAF 20	Draft BTAG Screening Level	69SB2C 10/8/2003 9-10		MDL	RL	69SB3A 10/8/2003 0-1		MDL	RL	69SB3A-DUP(SBD7) 10/8/2003 0-1		MDL	RL	69SB3B 10/8/2003 5-6		MDL	RL	69SB3C 10/8/2003 11-12		MDL	RL
								Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
TAL Metals (mg/kg)																											
Aluminum	7429-90-5	--	40,041	--	--	--	1	31,400		5.1	250	14,000	J,f	1.83	50	20,400	J,f	1.83	50	21,700		1.83	50	30,400		5.1	250
Antimony	7440-36-0	N	--	3.13	40.9	13.2	0.48	7.2		0.0518	0.5	***19***		0.0518	0.5	***14***		0.0518	0.5	12		0.0518	0.5	6.1		0.0518	0.5
Arsenic	7440-38-2	C	15.8	0.426	1.91	0.026	328	***9.9***		0.0232	0.4	***2.9***		0.0232	0.4	***3.3***		0.0232	0.4	***4.4***		0.0232	0.4	***8.3***		0.0232	0.4
Barium	7440-39-3	N	209	1,564	20,440	6,015	440	63		0.106	5	71		0.106	5	90		0.106	5	54		0.106	5	63		0.106	5
Beryllium	7440-41-7	N	1.02	15.64	204.4	1,154	0.02	1		0.0333	1	0.26	J,J,s	0.0391	1	0.48	J,J,s	0.0391	1	0.37	J,J,s	0.0391	1	1.7	J,s	0.167	1
Cadmium	7440-43-9	N	0.69	3.91	51.1	27.4	2.5	0.9	J	0.182	1	2.1		0.182	1	2.5		0.182	1	0.77	J	0.182	1	0.48	J	0.182	1
Calcium	7440-70-2	--	--	--	--	--	--	483	J,m	16.6	250	721		16.6	250	835		16.6	250	521		16.6	250	417		16.6	250
Chromium[1]	7440-47-3	N	65.3	23.46	306.6	42.05	0.0075	41	J,m	0.912	5	22		0.912	5	38		0.912	5	***49***		0.912	5	***56***		0.912	5
Cobalt	7440-48-4	--	72.3	--	--	--	100	16	J,s	0.208	1	11	J,s	0.208	1	10	J,s	0.208	1	23	J,s	0.208	1	16	J,s	0.208	1
Copper	7440-50-8	N	53.5	312.9	4,088	10,518	15	24	J,s	0.368	2	8.7		0.368	1	12		0.368	1	14		0.368	1	27		0.368	2
Iron	7439-89-6	N	50,962	2,346	30,660	--	12	41,200		71.6	1,000	17,100	J,f	17.9	250	24,800	J,f	35.8	500	33,600		35.8	500	46,900		71.6	1,000
Lead[2]	7439-92-1	--	26.8	400	750	--	0.01	15		0.0218	1	25		0.0218	1	22		0.0218	1	17		0.0218	1	13		0.0218	1
Magnesium	7439-95-4	--	--	--	--	--	4,400	8,790	J,m	3.21	250	997		3.21	250	1,040		3.21	250	2,240		3.21	250	17,800		3.21	250
Manganese	7439-96-5	N	2,543	156.43	2,044	951.9	330	585		0.264	5	914		0.264	5	1,010		1.32	25	***1,020***		1.32	25	491		0.264	5
Mercury[3]	7439-97-6	--	0.13	2.346	30.66	--	0.06	0.077	J	0.0077	0.1	0.041	J	0.0077	0.1	0.078	J	0.0077	0.1	0.069	J	0.0077	0.1	0.046	J	0.0077	0.1
Nickel	7440-02-0	N	62.8	156.43	2,044	--	2	25		0.0356	0.5	8.5		0.0356	0.5	11		0.0356	0.5	15		0.0356	0.5	37		0.0356	0.5
Potassium	7440-09-7	--	--	--	--	--	--	4,720		5	100	813	J,s	5	100	879	J,s	5	100	1,510	J,s	5	100	4,180	J,s	5	100
Selenium	7782-49-2	N	--	39.11	511	18.98	1.8	0.45	J	0.0502	1	0.4	J	0.0502	1	0.6	J	0.0502	1	0.29	J	0.0502	1	0.74	J	0.0502	1
Silver	7440-22-4	N	--	39.11	511	31.03	0.0000098	0.11	J	0.0044	3	0.051	J	0.0044	3	0.05	J	0.0044	3	0.045	J	0.0044	3	0.11	J	0.0044	3
Sodium	7440-23-5	--	--	--	--	--	--	434		8.92	100	110		8.92	100	116		18.1	100	393		18.1	100	544		8.92	100
Thallium	7440-28-0	N	2.11	0.548	7.154	3.638	0.001	0.39	J,B,x	0.027	0.5	0.26	J	0.027	0.5	0.23	J	0.027	0.5	0.26	J	0.027	0.5	0.26	J	0.027	0.5
Vanadium	7440-62-2	N	108	7.821	102.2	730.1	0.5	57		0.207	1	35		0.207	1	49		0.207	1	55		0.207	1	59		0.207	1
Zinc	7440-66-6	N	202	2,346	30,660	13,622	10	45		0.517	4	45		0.517	4	61		0.517	4	38		0.517	4	48		0.517	4
TCL Pesticides/PCBs (µg/kg)																											
Aldrin	309-00-2	C	--	3.8E+01	1.7E+02	7.7E+00	100	NT				NT				NT				NT				NT			
delta-BHC[4]	319-86-8	C	--	1.0E+02	4.5E+02	--	100	NT				NT				NT				NT				NT			
Aroclor 1254[5]	11097-69-1	C	--	1.6E+02	1.4E+03	1.1E+03	--	NT				NT				NT				NT				NT			
TCL VOCs (µg/kg)																											
2-Butanone	78-93-3	N	--	4.7E+06	6.1E+07	2.9E+04	--	260	J	27	670	41		5.95	12	35		5.95	12	22		6.1	12	30		6.75	14
Acetone	67-64-1	N	--	7.0E+06	9.2E+07	2.2E+04	--	<670	U,UJ,c	69.6	670	160	B,z	5.95	12	180	B,z	5.95	12	63	B,B,z	6.1	12	74	B,B,z	6.75	14
Methylene chloride	75-09-2	C	--	8.5E+04	3.8E+05	1.9E+01	300	***42***	J,B,z	7.61	67	<6	U	3.34	6	<6	U	3.34	6	<6.1	U	3.43	6.1	<6.8	U	3.79	6.8
Toluene	108-88-3	N	--	6.3E+05	8.2E+06	2.7E+04	100	<67	U	13.9	67	<6	U	0.552	6	1.7	J	0.552	6	<6.1	U	0.566	6.1	<6.8	U	0.626	6.8
VOC TICs (µg/kg)																											
4-Isopropyltoluene	1946-51-0	N	--	1.6E+04	2.0E+05	--	--	NI				NI				1.8	Q,NJ,t	0	10	NI				NI			
Hexanal	66-25-1	--	--	--	--	--	--	NI				NI				17	E,NJ,t	0	1	NI				NI			
TCL SVOCs (µg/kg)																											
4-Chloro-3-Methylphenol	59-50-7	--	--	--	--	--	--	16	J	6.77	230	23	J,B,x	6.25	200	21	J,B,x	6.25	210	28	J	6.25	210	11	J,B,x	7.29	230
4-Methylphenol	106-44-5	N	--	3.9E+04	5.1E+05	--	100	<230	U	8.28	230	<200	U	7.64	200	<210	U	7.64	210	<210	U	7.64	210	<230	U	8.92	230
Bis(2-ethylhexyl)phthalate	117-81-7	C	--	4.6E+04	2.0E+05	2.9E+06	--	16	J,B,z	2.69	230	19	J,B,z	2.48	200	19	J,B,z	2.48	210	20	J,B,z	2.48	210	17	J,B,z	2.9	230
Butylbenzylphthalate	85-68-7	N	--	1.6E+06	2.0E+07	1.7E+07	--	<230	U	5.82	230	6	J	5.38	200	<210	U	5.38	210	<210	U	5.38	210	<230	U	6.27	230
Caprolactam	105-60-2	N	--	3.9E+06	5.1E+07	--	--	<440	U	8.29	440	14	J	7.66	390	<400	U	7.66	400	<400	U	7.66	400	<440	U	8.93	440
Diethylphthalate	84-66-2	N	--	6.3E+06	8.2E+07	4.5E+05	--	5	J,J,l	2.47	230	8	J,B,x	2.28	200	5	J,B,x	2.28	210	6	J,B,x	2.28	210	6	J,B,x	2.66	230
Di-n-butylphthalate	84-74-2	N	--	7.8E+05	1.0E+07	5.0E+06	--	70	J,B,z	4.97	230	61	J,B,z	4.58	200	63	J,B,z	4.58	210	65	J,B,z	4.58	210	80	J,B,z	5.35	230
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	100	<230	U	3.06	230	27	J	2.82	200	6	J	2.82	210	<210	U	2.82	210	<230	U	3.29	230
Phenanthrene[6]	85-01-8	N	--	2.3E+05	3.1E+06	--	100	<230	U	2.99	230	5	J	2.76	200	7	J	2.76	210	<210	U	2.76	210	<230	U	3.22	230
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	100	<230	U	1.92	230	14	J	1.78	200	7	J	1.78	210	<210	U	1.78	210	<230	U	2.07	230
SVOC TICs (µg/kg)																											
(Z)-9-Octadecenamide	301-02-0	--	--	--	--	--	--	76	E,NJ,t	0	100	NI				NI				620	E,NJ,t	0	100	63	E,NJ,t	0	100
1,1'-Biphenyl, bis(1-methylethyl)-	69009-90-1	--	--	--	--	--	--	NI				NI				NI				NI				NI			
1,2-Benzenedicarboxylicacid, bis(2-methy	84-69-5	--	--	--	--	--	--	63	E,NJ,t	0	100	48	E,B,x	0	100	48	E,B,x	0	100	63	E,B,x	0	100	48	E,B,x	0	100
2,4-bis(1,1-Dimethylethy-l)-phenol	96-76-4	--	--	--	--	--	--	NI				NI				20	E,NJ,t	0	10	24	E,NJ,t	0	10	NI			
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	--	--	--	--	--	--	NI				59	E,NJ,t	0	100	NI				78	E,NJ,t	0	100	46	E,NJ,t	0	100
3-Carene	13466-78-9	--	--	--	--	--	--	NI				48	E,NJ,t	0	1,700	NI				NI				NI			
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,	10001-439-24	--	--	--	--	--	--	NI				NI				NI				21	E,NJ,t	0	1	NI			
beta-Pinene	127-91-3	--	--	--	--	--	--	NI				120	E,NJ,t	0	1,700	NI				NI				NI			
D-Friedoolean-14-ene, 3-methoxy-, (3.bet	14021-23-9	--	--	--	--	--	--	NI				NI				NI				NI				NI			
Erucylamide	112-84-5	--	--	--	--	--	--	380	E,B,x	0	10	NI				460	E,B,x	0	10	NI				NI			
Ethanol, 2-(hexadecyloxy)-	2136-71-2	--	--	--	--	--	--	42	E,NJ,t	0	10	NI				NI				NI				NI			
Phenol, 2,6-dimethoxy-4-(2-propenyl)-	6627-88-9	--	--	--	--	--	--	NI				58	E,NJ,t	0	10	NI				NI				NI			
Phenol, (1,1,3,3-tetramethylbutyl)-	27193-28-8	--	--	--	--	--	--	NI				NI				NI				NI				NI			
Squalene	7683-64-9	--	--	--	--	--	--	46	E,NJ,t	0	50	NI				NI				NI				61	E,NJ,t	0	50

Table 9-5
Detected Analytes for SWMU 69
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	SSL DAF 20	Draft BTAG Screening Level	69SB2C 10/8/2003 9-10		MDL	RL	69SB3A 10/8/2003 0-1		MDL	RL	69SB3A-DUP(SBD7) 10/8/2003 0-1		MDL	RL	69SB3B 10/8/2003 5-6		MDL	RL	69SB3C 10/8/2003 11-12		MDL	RL
								Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
PAHs (µg/kg)																											
Benzo(a)anthracene	56-55-3	C	--	2.2E+02	3.9E+03	4.8E+02	100	<28	U,UL,s	1.04	28	<25	U	0.96	25	<25	U,UL,s	0.96	25	<26	U,UL,s	0.96	26	<28	U	1.12	28
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	100	<28	U,UL,s	1.56	28	<25	U	1.44	25	<25	U,UL,s	1.44	25	<26	U,UL,s	1.44	26	<28	U	1.68	28
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	100	<28	U,UL,s	2.21	28	3.8	J	2.04	25	<25	U,UL,s	2.04	25	<26	U,UL,s	2.04	26	<28	U	2.38	28
Phenanthrene[6]	85-01-8	N	--	2.3E+05	3.1E+06	--	100	<28	U,UL,s	0.78	28	1.6	J	0.72	25	<25	U,UL,s	0.72	25	<26	U,UL,s	0.72	26	<28	U	0.84	28
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	100	<28	U,UL,s	1.17	28	2.9	J	1.08	25	<25	U,UL,s	1.08	25	<26	U,UL,s	1.08	26	<28	U	1.26	28
Cyanide (mg/kg)																											
Cyanide	57-12-5	N	--	1.6E+02	2.0E+03	1.5E+02	0.005	0.05	J	0.0356	0.5	0.11	J	0.0356	0.5	0.11	J	0.0356	0.5	0.06	J	0.0356	0.5	<0.5	U	0.0356	0.5
Percent Solids (%)																											
Percent Solids	--	--	--	--	--	--	--	75		0.1	0.1	84		0.1	0.1	84		0.1	0.1	82		0.1	0.1	74		0.1	0.1

Notes:

CAS = Chemical Abstracts Service
ft bgs = Feet Below Ground Surface
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyl
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon
TIC = Tentatively Identified Compound
MDL = Method Detection Limit
RL = Reporting Limit
LQ = Laboratory Qualifier
VQ = Validation Qualifier
r = Reason Code
NA = Not Applicable
NT = Not Tested
NI = Not Identified
(1) = Chromium VI RBC value was used
(2) = Lead criteria are Action Levels; see USEPA Region III guidance
(3) = Mercuric chloride soil RBC value used
(4) = RBC value for alpha BHC was used for these compounds
(5) = Noncarcinogenic Residential RBC value for Aroclor 1254 was used for screening
(6) = RBC value for pyrene was used for these compounds
[A] = Facility-Wide Background Point Estimate as Reported in the Facility-Wide Background Study Report (IT 2001a)
RBC = USEPA Region III Risk-Based Concentration (RBC) values from the October 31, 2006, RBC Table and October 10, 2006, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
C = Carcinogenic per EPA RBC Table (October 2006)
N = Noncarcinogenic per EPA RBC Table (October 2006)
SSL DAF20 = Soil Screening Level at a Dilution Attenuation Factor of 20
BTAG = Biological Technical Assistance Group Screening Level, Draft 1995

= Concentration Exceeds Adjusted Soil Residential RBC

= Concentration Exceeds Adjusted Soil Industrial RBC

underline = Concentration Exceeds Site Background Values

bold italic = Concentration Exceeds SSL DAF20

= Concentration Exceeds BTAG Screening Level

Laboratory Qualifiers

U	The compound was analyzed for but not detected. The reporting limit will be adjusted to reflect any dilution, and for soil, the percent moisture.
J	Estimated value.
B	Analyte found in associated blank as well as in the sample.
E	Concentration exceeded the upper level of the calibration range of the instrument for that specific analysis. For TICs, compound not present in calibration standard, calculated using total peak areas ion chromatographs and response factor of 1.
Q	Not estimated. TIC detected in sample, quantified using a response factor from the initial calibration.

Validation Qualifiers

B	Not detected substantially above the level reported in laboratory or field blanks.
N	Tentative Identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.
J	Analyte present. Reported value may not be accurate or precise.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
UL	Not detected, quantitation limit is probably higher.

Reason Codes

GC/MS Organics

c	Calibration failure; poor (RRF) or unstable (%D) response
l	MS/MSD recovery failure
s	Surrogate failure
t	Tentatively identified Compound
x	Field and/or equipment blank contamination
z	Method blank and/or storage blank contamination

GC and HPLC Organics

c	Calibration failure; poor or unstable (%D) response
l	MS/MSD recovery failure
s	No confirmation column
x	Trip blank contamination
z	Method blank and/or storage blank contamination

Inorganics and Conventionals

f	Field duplicate imprecision
m	MS/MSD recovery failure
p	Preparation blank contamination
s	Serial dilution failure
x	CRDL standard recovery failure

Table 9-6
HHRS COPC Selection (Surface Soil) for SWMU 69
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	C/N	Adjusted RBC Residential	Adjusted RBC Industrial	COPC Flag (Y/N)	Rationale for Selection or Deletion
	TAL Metals (mg/kg)												
7429905	Aluminum	17,200	24,600	mg/kg	69SB2A	3/3	1.83 - 5.1	24,600	--	--	--	Y	NSV
7440360	Antimony	0.35	16.5	mg/kg	69SB3A-DUP AVG	3/3	0.0518 - 0.0518	16.5	N	3.13	40.88	Y	**ARES**
7440382	Arsenic	0.64	3.8	mg/kg	69SB1A	3/3	0.0232 - 0.0232	3.8	C	0.43	1.91	Y	***ARES/IND***
7440393	Barium	65	81	mg/kg	69SB3A-DUP AVG	3/3	0.106 - 0.106	81	N	1,564	20,440	N	BSL
7440417	Beryllium	0.34	0.62	mg/kg	69SB2A	3/3	0.0333 - 0.0391	0.62	N	15.6	204	N	BSL
7440439	Cadmium	0.53	2.30	mg/kg	69SB3A-DUP AVG	3/3	0.182 - 0.182	2.30	N	3.91	51	N	BSL
7440702	Calcium	346	840	mg/kg	69SB2A	3/3	16.6 - 16.6	840	--	Nutrient	Nutrient	N	Nutrient
7440473	Chromium[1]	30	50	mg/kg	69SB2A	3/3	0.912 - 0.912	50	N	23.5	306.6	Y	**ARES**
7440484	Cobalt	11	16	mg/kg	69SB2A	3/3	0.208 - 0.208	16	--	--	--	Y	NSV
7440508	Copper	10	17	mg/kg	69SB2A	3/3	0.368 - 0.368	17	N	312.9	4,088	N	BSL
7439896	Iron	20,950	34,600	mg/kg	69SB1A	3/3	17.9 - 71.6	34,600	N	2,346	30,660	Y	***ARES/IND***
7439921	Lead[2]	19	23.5	mg/kg	69SB3A-DUP AVG	2/3	0.0218 - 0.0218	23.5	--	400	750	N	BSL
7439954	Magnesium	793	2,270	mg/kg	69SB2A	3/3	3.21 - 3.21	2,270	--	Nutrient	Nutrient	N	Nutrient
7439965	Manganese	894	1,470	mg/kg	69SB1A	3/3	0.264 - 1.32	1,470	N	156	2,044	Y	**ARES**
7439976	Mercury[3]	0.06	0.13	mg/kg	69SB1A	3/3	0.0077 - 0.0077	0.13	--	0.782	10.22	N	BSL
7440020	Nickel	10	10	mg/kg	69SB1A	2/3	0.0356 - 0.0356	10	N	156.4	2,044	N	BSL
2023695	Potassium	810	1,580	mg/kg	69SB2A	3/3	5 - 5	1,580	--	Nutrient	Nutrient	N	Nutrient
7782492	Selenium	0.36	0.5	mg/kg	69SB3A-DUP AVG	2/3	0.0502 - 0.0502	0.5	N	39.11	511	N	BSL
7440224	Silver	0.04	0.085	mg/kg	69SB2A	3/3	0.0044 - 0.0044	0.085	N	39.11	511	N	BSL
7440235	Sodium	27	114	mg/kg	69SB2A	3/3	8.92 - 8.92	114	--	Nutrient	Nutrient	N	Nutrient
7440280	Thallium	0.25	0.33	mg/kg	69SB2A	3/3	0.027 - 0.027	0.33	N	0.55	7.15	N	BSL
7440622	Vanadium	42	63	mg/kg	69SB1A	3/3	0.207 - 0.207	63	N	7.8	102	Y	**ARES**
7440666	Zinc	38	53	mg/kg	69SB3A-DUP AVG	3/3	0.517 - 0.517	53	N	2,346	30,660	N	BSL
	TCL Pesticides/PCBs (µg/kg)												
309002	Aldrin	1.1E+00	1.1E+00	µg/kg	69SB2A	1/1	0.365 - 0.365	1.1E+00	C	3.8E+01	1.7E+02	N	BSL
319868	delta-BHC[4]	2.5E+00	2.5E+00	µg/kg	69SB2A	1/1	0.982 - 0.982	2.5E+00	C	4.5E+02	1.0E+02	N	BSL
11097691	Aroclor 1254[5]	2.2E+02	2.2E+02	µg/kg	69SB2A	1/1	3.6 - 3.6	2.2E+02	C	1.6E+02	1.4E+03	Y	**ARES**
	TCL VOCs (µg/kg)												
78933	2-Butanone	3.0E+01	3.8E+01	µg/kg	69SB3A-DUP AVG	3/3	5.95 - 6.4	3.8E+01	N	4.7E+06	6.1E+07	N	BSL
67641	Acetone	1.0E+02	1.7E+02	µg/kg	69SB3A-DUP AVG	3/3	5.95 - 6.4	1.7E+02	N	7.0E+06	9.2E+07	N	BSL
	VOC TICs (µg/kg)												
1946510	4-Isopropyltoluene	1.8E+00	1.8E+00	µg/kg	69SB3A-DUP AVG	1/3	0 - 0	1.8E+00	N	1.6E+04	2.0E+05	N	BSL
66251	Hexanal	1.7E+01	1.7E+01	µg/kg	69SB2A	2/3	0 - 0	1.7E+01	--	--	--	Y	NSV
	TCL SVOCs (µg/kg)												
59507	4-Chloro-3-Methylphenol	1.0E+01	2.2E+01	µg/kg	69SB3A-DUP AVG	3/3	6.25 - 6.77	2.2E+01	--	--	--	Y	NSV
117817	Bis(2-ethylhexyl)phthalate	1.9E+01	2.2E+01	µg/kg	69SB2A	3/3	2.48 - 2.69	2.2E+01	C	4.6E+04	2.0E+05	N	BSL
85687	Butylbenzylphthalate	4.3E+00	4.3E+00	µg/kg	69SB3A-DUP AVG	1/3	5.38 - 5.82	4.3E+00	N	1.6E+06	2.0E+07	N	BSL
105602	Caprolactam	8.9E+00	8.9E+00	µg/kg	69SB3A-DUP AVG	1/3	7.66 - 8.29	8.9E+00	N	3.9E+06	5.1E+07	N	BSL
84662	Diethylphthalate	6.0E+00	8.0E+00	µg/kg	69SB1A	3/3	2.28 - 2.47	8.0E+00	N	6.3E+06	8.2E+07	N	BSL
84742	Di-n-butylphthalate	5.3E+01	3.0E+02	µg/kg	69SB1A	3/3	4.58 - 4.97	3.0E+02	N	7.8E+05	1.0E+07	N	BSL
206440	Fluoranthene	8.0E+00	1.7E+01	µg/kg	69SB3A-DUP AVG	2/3	2.82 - 3.06	1.7E+01	N	3.1E+05	4.1E+06	N	BSL
85018	Phenanthrene[6]	5.0E+00	6.0E+00	µg/kg	69SB3A-DUP AVG	2/3	2.76 - 2.99	6.0E+00	N	2.3E+05	3.1E+06	N	BSL
129000	Pyrene	9.0E+00	1.1E+01	µg/kg	69SB3A-DUP AVG	2/3	1.78 - 1.92	1.1E+01	N	2.3E+05	3.1E+06	N	BSL
	SVOC TICs (µg/kg)												
301020	(Z)-9-Octadecenamide	1.9E+02	1.9E+02	µg/kg	69SB2A	1/3	0 - 0	1.9E+02	--	--	--	Y	NSV
84695	1,2-Benzenedicarboxylicacid, bis(2-methy	2.8E+01	4.8E+01	µg/kg	69SB3A-DUP AVG	2/3	0 - 0	4.8E+01	--	--	--	Y	NSV
96764	2,4-bis(1,1-Dimethylethy-l)-phenol	2.0E+01	2.0E+01	µg/kg	69SB3A-DUP AVG	1/3	0 - 0	2.0E+01	--	--	--	Y	NSV
101371	2,4,6-Triallyloxy-1,3,5-triazine	3.8E+01	5.9E+01	µg/kg	69SB3A-DUP AVG	3/3	0 - 0	5.9E+01	--	--	--	Y	NSV
13466789	3-Carene	4.8E+01	4.8E+01	µg/kg	69SB3A-DUP AVG	1/3	0 - 0	4.8E+01	--	--	--	Y	NSV
127913	beta-Pinene	1.2E+02	1.2E+02	µg/kg	69SB3A-DUP AVG	1/3	0 - 0	1.2E+02	--	--	--	Y	NSV
14021239	D-Friedoolean-14-ene, 3-methoxy-, (3.bet	2.1E+02	2.1E+02	µg/kg	69SB2A	1/3	0 - 0	2.1E+02	--	--	--	Y	NSV
112845	Erucylamide	1.9E+02	4.6E+02	µg/kg	69SB3A-DUP AVG	2/3	0 - 0	4.6E+02	--	--	--	Y	NSV
6627889	Phenol, 2,6-dimethoxy-4-(2-propenyl)-	5.8E+01	5.8E+01	µg/kg	69SB3A-DUP AVG	1/3	0 - 0	5.8E+01	--	--	--	Y	NSV

Table 9-6
HHRS COPC Selection (Surface Soil) for SWMU 69
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	C/N	Adjusted RBC Residential	Adjusted RBC Industrial	COPC Flag (Y/N)	Rationale for Selection or Deletion
	PAHs (µg/kg)												
56553	Benzo(a)anthracene	2.9E+00	2.9E+00	µg/kg	69SB2A	1/3	0.96 - 1.04	2.9E+00	C	2.2E+02	3.9E+03	N	BSL
218019	Chrysene	2.9E+00	2.9E+00	µg/kg	69SB2A	1/3	1.44 - 1.56	2.9E+00	C	2.2E+04	3.9E+05	N	BSL
206440	Fluoranthene	2.4E+00	1.8E+01	µg/kg	69SB2A	2/3	2.04 - 2.21	1.8E+01	N	3.1E+05	4.1E+06	N	BSL
85018	Phenanthrene[6]	9.8E-01	7.2E+00	µg/kg	69SB2A	2/3	0.72 - 0.78	7.2E+00	N	2.3E+05	3.1E+06	N	BSL
129000	Pyrene	1.7E+00	1.3E+01	µg/kg	69SB2A	2/3	1.08 - 1.17	1.3E+01	N	2.3E+05	3.1E+06	N	BSL
	Cyanide (mg/kg)												
57125	Cyanide	1.1E-01	1.4E-01	mg/kg	69SB2A	2/3	0.0356 - 0.0356	1.4E-01	N	1.6E+02	2.0E+03	N	BSL

Notes:

CAS = Chemical Abstracts Service
COPC = Chemical of Potential Concern
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
TIC = Tentatively Identified Compound
PAH = Polynuclear Aromatic Hydrocarbon
[1] = Chromium VI RBC value was used
[2] = Lead criteria are Action Levels; see USEPA Region III guidance
[3] = Mercuric chloride soil RBC value used
[4] = RBC value for alpha BHC was used for these compounds
[5] = Noncarcinogenic Residential RBC value for Aroclor 1254 was used for screening
[6] = RBC value for pyrene was used for these compounds

DUP AVG = results for duplicate samples averaged
RBC = USEPA Region III Risk-Based Concentration
(RBC) values from the October 31, 2006,
RBC Table and October 10, 2006, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
C = Carcinogenic per EPA RBC Table (October 2006)
N = Noncarcinogenic per EPA RBC Table (October 2006)

ARES = Above Residential RBC
ARES/IND = Above Residential RBC/Industrial RBC
BSL = Below Residential/Industrial RBC Screening Levels
NSV = No Screening Value Available

Table 9-7
HHRS COPC Selection (Total Soil) for SWMU 69
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	C/N	Adjusted RBC Residential	Adjusted RBC Industrial	COPC Flag (Y/N)	Rationale for Selection or Deletion
	TAL Metals (mg/kg)												
7429905	Aluminum	17,200	34,800	mg/kg	69SB2B	9/9	1.83 - 9.15	34,800	--	--	--	Y	NSV
7440360	Antimony	0.35	16.50	mg/kg	69SB3A-DUP AVG	9/9	0.0518 - 0.0518	16.50	N	3.13	40.88	Y	**ARES**
7440382	Arsenic	1	12	mg/kg	69SB1C	9/9	0.0232 - 0.0232	12	C	0.43	1.91	Y	***ARES/IND***
7440393	Barium	50	81	mg/kg	69SB3A-DUP AVG	9/9	0.106 - 0.106	81	N	1,564	20,440	N	BSL
7440417	Beryllium	0.30	1.70	mg/kg	69SB3C	9/9	0.0333 - 0.167	1.70	N	15.6	204	N	BSL
7440439	Cadmium	0.48	2.30	mg/kg	69SB3A-DUP AVG	9/9	0.182 - 0.182	2.30	N	3.91	51	N	BSL
7440702	Calcium	155	840	mg/kg	69SB2A	9/9	16.6 - 16.6	840	--	Nutrient	Nutrient	N	Nutrient
7440473	Chromium[1]	30	56	mg/kg	69SB3C	9/9	0.912 - 0.912	56	N	23.5	306.6	Y	**ARES**
7440484	Cobalt	9.90	23	mg/kg	69SB3B	9/9	0.208 - 0.208	23	--	--	--	Y	NSV
7440508	Copper	9.40	27	mg/kg	69SB3C	9/9	0.368 - 0.368	27	N	312.86	4,088	N	BSL
7439896	Iron	20,950	46,900	mg/kg	69SB3C	9/9	17.9 - 71.6	46,900	N	2,346	30,660	Y	***ARES/IND***
7439921	Lead[2]	13.00	24	mg/kg	69SB3A-DUP AVG	8/9	0.0218 - 0.0218	24	--	400	750	N	BSL
7439954	Magnesium	793	34,600	mg/kg	69SB1C	9/9	3.21 - 16.1	34,600	--	Nutrient	Nutrient	N	Nutrient
7439965	Manganese	247	1,470	mg/kg	69SB1A	9/9	0.264 - 1.32	1,470	N	156	2,044	Y	***ARES***
7439976	Mercury[3]	0.04	0.13	mg/kg	69SB1A	9/9	0.0077 - 0.0077	0.13	--	0.782	10.22	N	BSL
7440020	Nickel	9.75	37.00	mg/kg	69SB3C	8/9	0.0356 - 0.0356	37	N	156.43	2,044	N	BSL
2023695	Potassium	810	8,480	mg/kg	69SB1C	9/9	5 - 5	8,480	--	Nutrient	Nutrient	N	Nutrient
7782492	Selenium	0.29	0.74	mg/kg	69SB3C	8/9	0.0502 - 0.0502	0.74	N	39.11	511	N	BSL
7440224	Silver	0.04	0.15	mg/kg	69SB1C	9/9	0.0044 - 0.0044	0.15	N	39.11	511	N	BSL
7440235	Sodium	27	2,460	mg/kg	69SB1C	9/9	8.92 - 90.5	2,460	--	Nutrient	Nutrient	N	Nutrient
7440280	Thallium	0.20	0.43	mg/kg	69SB1C	9/9	0.027 - 0.027	0.43	N	0.55	7.15	N	BSL
7440622	Vanadium	42	71	mg/kg	69SB2B	9/9	0.207 - 0.207	71	N	7.82	102	Y	**ARES**
7440666	Zinc	28	55	mg/kg	69SB1C	9/9	0.517 - 0.517	55	N	2,346	30,660	N	BSL
	TCL Pesticides/PCBs (µg/kg)												
309002	Aldrin	1.1E+00	1.1E+00	µg/kg	69SB2A	1/1	0.365 - 0.365	1.1E+00	C	3.8E+01	1.7E+02	N	BSL
319868	delta-BHC[4]	2.5E+00	2.5E+00	µg/kg	69SB2A	1/1	0.982 - 0.982	2.5E+00	--	4.5E+02	1.0E+02	N	BSL
11097691	Aroclor 1254[5]	2.2E+02	2.2E+02	µg/kg	69SB2A	1/1	3.6 - 3.6	2.2E+02	C	1.6E+02	1.4E+03	Y	**ARES**
	TCL VOCs (µg/kg)												
78933	2-Butanone	2.2E+01	2.6E+02	µg/kg	69SB2C	9/9	5.95 - 27	2.6E+02	N	4.7E+06	6.1E+07	N	BSL
67641	Acetone	4.4E+01	1.7E+02	µg/kg	69SB3A-DUP AVG	8/9	5.95 - 69.6	1.7E+02	N	7.0E+06	9.2E+07	N	BSL
75092	Methylene chloride	4.2E+01	4.2E+01	µg/kg	69SB2C	1/9	3.34 - 7.61	4.2E+01	C	8.5E+04	3.8E+05	N	BSL
108883	Toluene	8.9E-01	8.9E-01	µg/kg	69SB1C	1/9	0.552 - 13.9	8.9E-01	N	6.3E+05	8.2E+06	N	BSL
	VOC TICs (µg/kg)												
1946510	4-Isopropyltoluene	1.8E+00	1.8E+00	µg/kg	69SB3A-DUP AVG	1/9	0 - 0	1.8E+00	N	1.6E+04	2.0E+05	N	BSL
66251	Hexanal	1.7E+01	1.7E+01	µg/kg	69SB2A	2/9	0 - 0	1.7E+01	--	--	--	Y	NSV
	TCL SVOCs (µg/kg)												
59507	4-Chloro-3-Methylphenol	1.0E+01	2.8E+01	µg/kg	69SB3B	8/9	6.25 - 7.29	2.8E+01	--	--	--	Y	NSV
106445	4-Methylphenol	1.0E+01	1.0E+01	µg/kg	69SB1C	1/9	7.64 - 8.92	1.0E+01	N	3.9E+04	5.1E+05	N	BSL
117817	Bis(2-ethylhexyl)phthalate	1.5E+01	2.2E+01	µg/kg	69SB2A	9/9	2.48 - 2.9	2.2E+01	C	4.6E+04	2.0E+05	N	BSL
85687	Butylbenzylphthalate	4.3E+00	4.3E+00	µg/kg	69SB3A-DUP AVG	1/9	5.38 - 6.27	4.3E+00	N	1.6E+06	2.0E+07	N	BSL
105602	Caprolactam	8.9E+00	8.9E+00	µg/kg	69SB3A-DUP AVG	1/9	7.66 - 8.93	8.9E+00	N	3.9E+06	5.1E+07	N	BSL
84662	Diethylphthalate	4.0E+00	9.0E+00	µg/kg	69SB1C	9/9	2.28 - 2.66	9.0E+00	N	6.3E+06	8.2E+07	N	BSL
84742	Di-n-butylphthalate	3.8E+01	3.0E+02	µg/kg	69SB1A	9/9	4.58 - 5.35	3.0E+02	N	7.8E+05	1.0E+07	N	BSL
206440	Fluoranthene	8.0E+00	1.7E+01	µg/kg	69SB3A-DUP AVG	2/9	2.82 - 3.29	1.7E+01	N	3.1E+05	4.1E+06	N	BSL
85018	Phenanthrene[6]	5.0E+00	6.0E+00	µg/kg	69SB3A-DUP AVG	2/9	2.76 - 3.22	6.0E+00	N	2.3E+05	3.1E+06	N	BSL
129000	Pyrene	9.0E+00	1.1E+01	µg/kg	69SB3A-DUP AVG	2/9	1.78 - 2.07	1.1E+01	N	2.3E+05	3.1E+06	N	BSL
	SVOC TICs (µg/kg)												
301020	(Z)-9-Octadecenamide	5.7E+01	6.2E+02	µg/kg	69SB3B	6/9	0 - 0	6.2E+02	--	--	--	Y	NSV
69009901	1,1'-Biphenyl, bis(1-methylethyl)-	6.5E+01	6.5E+01	µg/kg	69SB1B	1/9	0 - 0	6.5E+01	--	--	--	Y	NSV
84695	1,2-Benzenedicarboxylicacid, bis(2-methy	2.8E+01	6.3E+01	µg/kg	69SB2C	8/9	0 - 0	6.3E+01	--	--	--	Y	NSV
96764	2,4-bis(1,1-Dimethylethy-l)-phenol	2.0E+01	2.4E+01	µg/kg	69SB3B	2/9	0 - 0	2.4E+01	--	--	--	Y	NSV
101371	2,4,6-Triallyloxy-1,3,5-triazine	3.8E+01	7.8E+01	µg/kg	69SB3B	7/9	0 - 0	7.8E+01	--	--	--	Y	NSV
13466789	3-Carene	4.8E+01	4.8E+01	µg/kg	69SB3A-DUP AVG	1/9	0 - 0	4.8E+01	--	--	--	Y	NSV
1000143924	7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,	2.1E+01	2.1E+01	µg/kg	69SB3B	1/9	0 - 0	2.1E+01	--	--	--	Y	NSV

Table 9-7
HHRS COPC Selection (Total Soil) for SWMU 69
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	C/N	Adjusted RBC Residential	Adjusted RBC Industrial	COPC Flag (Y/N)	Rationale for Selection or Deletion
127913	beta-Pinene	1.2E+02	1.2E+02	µg/kg	69SB3A-DUP AVG	1/9	0 - 0	1.2E+02	--	--	--	Y	NSV
14021239	D-Friedoolean-14-ene, 3-methoxy-, (3.bet	2.1E+02	2.1E+02	µg/kg	69SB2A	1/9	0 - 0	2.1E+02	--	--	--	Y	NSV
112845	Erucylamide	1.9E+02	4.6E+02	µg/kg	69SB3A-DUP AVG	5/9	0 - 0	4.6E+02	--	--	--	Y	NSV
2136712	Ethanol, 2-(hexadecyloxy)-	4.2E+01	4.2E+01	µg/kg	69SB2C	1/9	0 - 0	4.2E+01	--	--	--	Y	NSV
6627889	Phenol, 2,6-dimethoxy-4-(2-propenyl)-	5.8E+01	5.8E+01	µg/kg	69SB3A-DUP AVG	1/9	0 - 0	5.8E+01	--	--	--	Y	NSV
27193288	Phenol, (1,1,3,3-tetramethylbutyl)-	3.8E+02	3.8E+02	µg/kg	69SB1B	1/9	0 - 0	3.8E+02	--	--	--	Y	NSV
7683649	Squalene	4.6E+01	6.1E+01	µg/kg	69SB3C	2/9	0 - 0	6.1E+01	--	--	--	Y	NSV
	PAHs (µg/kg)												
56553	Benzo(a)anthracene	2.9E+00	2.9E+00	µg/kg	69SB2A	1/9	0.96 - 1.12	2.9E+00	C	2.2E+02	3.9E+03	N	BSL
218019	Chrysene	2.9E+00	2.9E+00	µg/kg	69SB2A	1/9	1.44 - 1.68	2.9E+00	C	2.2E+04	3.9E+05	N	BSL
206440	Fluoranthene	2.4E+00	1.8E+01	µg/kg	69SB2A	2/9	2.04 - 2.38	1.8E+01	N	3.1E+05	4.1E+06	N	BSL
85018	Phenanthrene[6]	9.8E-01	7.2E+00	µg/kg	69SB2A	2/9	0.72 - 0.84	7.2E+00	N	2.3E+05	3.1E+06	N	BSL
129000	Pyrene	1.7E+00	1.3E+01	µg/kg	69SB2A	2/9	1.08 - 1.26	1.3E+01	N	2.3E+05	3.1E+06	N	BSL
	Cyanide (mg/kg)												
57125	Cyanide	5.0E-02	1.4E-01	mg/kg	69SB2A	5/9	0.0356 - 0.0356	1.4E-01	N	1.6E+02	2.0E+03	N	BSL

Notes:

CAS = Chemical Abstracts Service
COPC = Chemical of Potential Concern
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
TIC = Tentatively Identified Compound
PAH = Polynuclear Aromatic Hydrocarbon
[1] = Chromium VI RBC value was used
[2] = Lead criteria are Action Levels; see USEPA Region III guidance
[3] = Mercuric chloride soil RBC value used
[4] = RBC value for alpha BHC was used for these compounds
[5] = Noncarcinogenic Residential RBC value for Aroclor 1254 was used for screening
[6] = RBC value for pyrene was used for these compounds

DUP AVG = results for duplicate samples averaged
RBC = USEPA Region III Risk-Based Concentration
(RBC) values from the October 31, 2006,
RBC Table and October 10, 2006, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
C = Carcinogenic per EPA RBC Table (October 2006)
N = Noncarcinogenic per EPA RBC Table (October 2006)

ARES = Above Residential RBC
ARES/IND = Above Residential RBC/Industrial RBC
BSL = Below Residential/Industrial RBC Screening Levels
NSV = No Screening Value Available

Table 9-8
Cumulative HHRS for SWMU 69 (Surface Soil)
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Units	MDC	C/N	RBC Residential	RBC Industrial	Non Carcinogenic HI (RBC_{Res})	Excess Cancer Risk (RBC_{Res})	Non Carcinogenic HI (RBC_{Ind})	Excess Cancer Risk (RBC_{Ind})
	TAL Metals									
7429905	Aluminum	mg/kg	2.46E+04	--	--	--	--	--	--	--
7440360	Antimony	mg/kg	1.65E+01	N	3.13E+01	4.09E+02	5.E-01	--	4.E-02	--
7440382	Arsenic	mg/kg	3.80E+00	C	4.26E-01	1.91E+00	--	9.E-06	--	2.E-06
7440382	Arsenic	mg/kg	3.80E+00	N	2.35E+01	3.07E+02	2.E-01	--	1.E-02	--
7440473	Chromium[1]	mg/kg	5.00E+01	N	2.35E+02	3.07E+03	2.E-01	--	2.E-02	--
7440484	Cobalt	mg/kg	1.60E+01	--	--	--	--	--	--	--
7439896	Iron	mg/kg	3.46E+04	N	2.35E+04	3.07E+05	1.E+00	--	1.E-01	--
7439965	0	mg/kg	1.47E+03	N	1.56E+03	2.04E+04	9.E-01	--	7.E-02	--
7440622	Aroclor 1254	mg/kg	6.30E+01	N	7.82E+01	1.02E+03	8.E-01	--	6.E-02	--
	TCL Pesticides/PCBs									
11097691	Aroclor 1254 [5]	µg/kg	2.20E+02	C	3.20E+02	1.43E+03	--	7.E-07	--	2.E-07
11097691	Aroclor 1254 [5]	µg/kg	2.20E+02	N	1.56E+03	2.00E+04	1.E-01	--	1.E-02	--
	VOC TICs									
66251	Hexanal	µg/kg	1.70E+01	--	--	--	--	--	--	--
	TCL SVOCs									
59507	4-Chloro-3-Methylphenol	µg/kg	2.20E+01	--	--	--	--	--	--	--
	SVOC TICs									
301020	(Z)-9-Octadecenamide	µg/kg	1.90E+02	--	--	--	--	--	--	--
84695	1,2-Benzenedicarboxylicacid, bis(2-methy	µg/kg	4.80E+01	--	--	--	--	--	--	--
96764	2,4-bis(1,1-Dimethylethy-l)-phenol	µg/kg	2.00E+01	--	--	--	--	--	--	--
101371	2,4,6-Triallyloxy-1,3,5-triazine	µg/kg	5.90E+01	--	--	--	--	--	--	--
127913	beta-Pinene	µg/kg	1.20E+02	--	--	--	--	--	--	--
14021239	D-Friedoolean-14-ene, 3-methoxy-, (3.bet	µg/kg	2.10E+02	--	--	--	--	--	--	--
112845	Erucylamide	µg/kg	4.60E+02	--	--	--	--	--	--	--
						Cumulative Risk	4.E+00	1.E-05	3.E-01	2.E-06

Notes:

CAS = Chemical Abstracts Service
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyls
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
TIC = Tentatively Identified Compound
[1] = Chromium VI RBC value was used
[5] = Noncarcinogenic Residential RBC value for Aroclor 1254 was used for screening

MDC = Maximum Detected Concentration
HI = Hazard Index
RBC = USEPA Region III Risk-Based Concentration
(RBC) values from the October 31, 2006,
RBC Table and October 10, 2006, Alternate RBC Table
C = Carcinogenic per EPA RBC Table (October 2006)
N = Noncarcinogenic per EPA RBC Table (October 2006)

Table 9-9
Exposure Point Concentration Summary for SWMU 69
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Medium:	Total Soil
Exposure Medium:	Total Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic (1)	Rationale (2)
Total Soil	Aluminum	mg/kg	2.55E+03	2.93E+04	3.5E+04	2.93E+04	mg/kg	95% UCL (Student's t)	85% < FOD, Normal
	Antimony	mg/kg	7.93E+00	1.10E+01	1.7E+01	1.10E+01	mg/kg	95% UCL (Student's t)	85% < FOD, Normal
	Arsenic	mg/kg	5.72E+00	8.02E+00	1.2E+01	8.02E+00	mg/kg	95% UCL (Student's t)	85% < FOD, Normal
	Chromium	mg/kg	4.23E+01	4.80E+01	5.6E+01	4.80E+01	mg/kg	95% UCL (Student's t)	85% < FOD, Normal
	Cobalt	mg/kg	--	--	2.3E+01	2.30E+01	mg/kg	--	--
	Iron	mg/kg	3.46E+04	3.95E+04	4.7E+04	3.95E+04	mg/kg	95% UCL (Student's t)	85% < FOD, Normal
	Manganese	mg/kg	7.20E+02	9.65E+02	1.5E+03	9.65E+02	mg/kg	95% UCL (Student's t)	85% < FOD, Normal
	Vanadium	mg/kg	5.78E+01	6.30E+01	7.1E+01	6.30E+01	mg/kg	95% UCL (Student's t)	85% < FOD, Normal
	Aroclor 1254	ug/kg	--	--	2.2E+02	2.20E+02	mg/kg	--	--

Notes:
UCL = Upper Confidence Limit
mg/kg = Milligram Per Kilogram

(1) See Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites (OSWER Directive 9285.6-10, December 2002) for details on the following methods for calculating the 95% UCL:
95% UCL (Bounding) = The frequency of detection is less than 50%; therefore, the 95% UCL is calculated by the bounding method.
95% UCL (Student's t, adj) = The frequency of detection is between 50% and 85%, and the underlying distribution (detects only) is normal; therefore, Aitchison's Method is used to adjust the detects-only mean and standard deviaiton, and the 95% UCL is calculated using the Student's t method.
95% UCL (Land, adj) = The frequency of detection is between 50% and 85%, and the underlying distribution (detects only) is lognormal; therefore, Aitchison's Method is used to adjust the detects-only mean and standard deviation, and the 95% UCL is calculated using Land's method.
95% UCL (Student's t) = The frequency of detection is greater than 85%, and the distribution is normal.; therefore, the 95% UCL is calculated using the Student's t method.
95% UCL (Bootstrap) = The frequency of detection is between 50% and 85% and the underlying distribution (detects only) is neither normal nor lognormal, OR the frequency of detection is greater than 85% and the distribution (with non-detects represented by half of the detection limit) is neither normal nor lognormal; therefore, the 95% UCL is calculated using Hall's bootstrap method.
Maximum: The 95% UCL exceeds the maximum detected concentration; therefore, the maximum detected concentration is used to represent the 95% UCL.

(2) FOD = Frequency of detection
FOD < 50%: Frequency of detection is less than 50%
50% < FOD < 85%, Normal: Frequency of detection is between 50% and 85%, and the underlying distribution (detects only) is normal.
50% < FOD < 85%, Lognormal: Frequency of detection is between 50% and 85%, and the underlying distribution (detects only) is lognormal.
50% < FOD < 85%, Unknown: Frequency of detection is between 50% and 85%, and the underlying distribution (detects only) is neither normal nor lognormal.
85% < FOD, Normal: Frequency of detection is greater than 85%, and the distribution is normal.
85% < FOD, Lognormal: Frequency of detection is greater than 85%, and the distribution is lognormal.
85% < FOD, Unknown: Frequency of detection is greater than 85%, and the distribution is neither normal nor lognormal.

Table 9-10
Cumulative HHRS for SWMU 69 (Total Soil)
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Units	Maximum EPC	C/N	RBC Residential	RBC Industrial	Non Carcinogenic HI (RBC_{Res})	Excess Cancer Risk (RBC_{Res})	Non Carcinogenic HI (RBC_{Ind})	Excess Cancer Risk (RBC_{Ind})
	TAL Metals									
7429905	Aluminum	mg/kg	2.93E+04	--	--	--	--	--	--	--
7440360	Antimony	mg/kg	1.10E+01	N	3.13E+01	4.09E+02	4.E-01	--	3.E-02	--
7440382	Arsenic	mg/kg	8.02E+00	C	4.26E-01	1.91E+00	--	2.E-05	--	4.E-06
7440382	Arsenic	mg/kg	8.02E+00	N	2.35E+01	3.07E+02	3.E-01	--	3.E-02	--
7440473	Chromium[1]	mg/kg	4.80E+01	N	2.35E+02	3.07E+03	2.E-01	--	2.E-02	--
7440484	Cobalt	mg/kg	2.30E+01	--	--	--	--	--	--	--
7439896	Iron	mg/kg	3.95E+04	N	2.35E+04	3.07E+05	2.E+00	--	1.E-01	--
7439965	Manganese	mg/kg	9.65E+02	N	1.56E+03	2.04E+04	6.E-01	--	5.E-02	--
7440622	Vanadium	mg/kg	6.30E+01	N	7.82E+01	1.02E+03	8.E-01	--	6.E-02	--
	TCL Pesticides/PCBs									
11097691	Aroclor 1254 [5]	µg/kg	2.20E+02	C	3.20E+02	1.43E+03	--	7.E-07	--	2.E-07
11097691	Aroclor 1254 [5]	µg/kg	2.20E+02	N	1.56E+03	2.00E+04	1.E-01	--	1.E-02	--
	VOC TICs									
66251	Hexanal	µg/kg	1.70E+01	--	--	--	--	--	--	--
	TCL SVOCs						--	--	--	--
59507	4-Chloro-3-Methylphenol	µg/kg	2.80E+01	--	--	--	--	--	--	--
	SVOC TICs									
301020	(Z)-9-Octadecenamide	µg/kg	6.20E+02	--	--	--	--	--	--	--
69009901	1,1'-Biphenyl, bis(1-methylethyl)-	µg/kg	6.50E+01	--	--	--	--	--	--	--
84695	1,2-Benzenedicarboxylicacid, bis(2-methy	µg/kg	6.30E+01	--	--	--	--	--	--	--
96764	2,4-bis(1,1-Dimethylethy-l)-phenol	µg/kg	2.40E+01	--	--	--	--	--	--	--
101371	2,4,6-Triallyloxy-1,3,5-triazine	µg/kg	7.80E+01	--	--	--	--	--	--	--
127913	beta-Pinene	µg/kg	1.20E+02	--	--	--	--	--	--	--
14021239	D-Friedoolean-14-ene, 3-methoxy-, (3.bet	µg/kg	2.10E+02	--	--	--	--	--	--	--
112845	Erucylamide	µg/kg	4.60E+02	--	--	--	--	--	--	--
2136712	Ethanol, 2-(hexadecyloxy)-	µg/kg	4.20E+01	--	--	--	--	--	--	--
27193288	Phenol, (1,1,3,3-tetramethylbutyl)-	µg/kg	3.80E+02	--	--	--	--	--	--	--
7683649	Squalene	µg/kg	6.10E+01	--	--	--	--	--	--	--
						Cumulative Risk	4.E+00	2.E-05	3.E-01	4.E-06

Notes:

CAS = Chemical Abstracts Service
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyls
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
TIC = Tentatively Identified Compound
[1] = Chromium VI RBC value was used
[5] = Noncarcinogenic Residential RBC value for Aroclor 1254 was used for screening

MDC = Maximum Detected Concentration
HI = Hazard Index
RBC = USEPA Region III Risk-Based Concentration (RBC) values from the October 31, 2006, RBC Table and October 10, 2006, Alternate RBC Table
C = Carcinogenic per EPA RBC Table (October 2006)
N = Noncarcinogenic per EPA RBC Table (October 2006)

Table 9-11
HHRS SSL Comparison for SWMU 69
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Soil to Groundwater SSL (DAF 20)	COPC Flag (Y/N)	Rationale for Selection or Deletion
	TAL Metals (mg/kg)										
7429905	Aluminum	17,200	34,800	mg/kg	69SB2B	6/6	1.83 - 9.15	34,800	--	Y	NSV
7440360	Antimony	1.7	12	mg/kg	69SB3B	6/6	0.0518 - 0.0518	12	13.2	N	BSL
7440382	Arsenic	2.9	12	mg/kg	69SB1C	6/6	0.0232 - 0.0232	12	0.026	Y	**ASSL**
7440393	Barium	50	70	mg/kg	69SB2B	6/6	0.106 - 0.106	70	6,015.2	N	BSL
7440417	Beryllium	0.3	1.7	mg/kg	69SB3C	6/6	0.0333 - 0.167	1.7	1,153.7	N	BSL
7440439	Cadmium	0.48	1.5	mg/kg	69SB2B	6/6	0.182 - 0.182	1.5	27.4	N	BSL
7440702	Calcium	155	568	mg/kg	69SB2B	6/6	16.6 - 16.6	568	Nutrient	N	Nutrient
7440473	Chromium[1]	34	56	mg/kg	69SB3C	6/6	0.912 - 0.912	56	42	Y	**ASSL**
7440484	Cobalt	9.9	23	mg/kg	69SB3B	6/6	0.208 - 0.208	23	--	Y	NSV
7440508	Copper	9.4	27	mg/kg	69SB3C	6/6	0.368 - 0.368	27	10,517.8	N	BSL
7439896	Iron	26,500	46,900	mg/kg	69SB3C	6/6	35.8 - 71.6	46,900	--	Y	NSV
7439921	Lead[2]	13	17	mg/kg	69SB1C	6/6	0.0218 - 0.0218	17	--	Y	NSV
7439954	Magnesium	934	34,600	mg/kg	69SB1C	6/6	3.21 - 16.1	34,600	Nutrient	N	Nutrient
7439965	Manganese	247	1,020	mg/kg	69SB3B	6/6	0.264 - 1.32	1,020	951.9	Y	**ASSL**
7439976	Mercury[3]	0.042	0.077	mg/kg	69SB2C	6/6	0.0077 - 0.0077	0.077	--	Y	NSV
7440020	Nickel	11	37	mg/kg	69SB3C	6/6	0.0356 - 0.0356	37	--	Y	NSV
2023695	Potassium	1,100	8,480	mg/kg	69SB1C	6/6	5 - 5	8,480	Nutrient	N	Nutrient
7782492	Selenium	0.29	0.74	mg/kg	69SB3C	6/6	0.0502 - 0.0502	0.74	19	N	BSL
7440224	Silver	0.036	0.15	mg/kg	69SB1C	6/6	0.0044 - 0.0044	0.15	31	N	BSL
7440235	Sodium	353	2,460	mg/kg	69SB1C	6/6	8.92 - 90.5	2,460	Nutrient	N	Nutrient
7440280	Thallium	0.2	0.43	mg/kg	69SB1C	6/6	0.027 - 0.027	0.43	3.6	N	BSL
7440622	Vanadium	53	71	mg/kg	69SB2B	6/6	0.207 - 0.207	71	730	N	BSL
7440666	Zinc	28	55	mg/kg	69SB1C	6/6	0.517 - 0.517	55	13,622	N	BSL
	TCL Pesticides/PCBs (µg/kg) *										
309002	Aldrin	1.1E+00	1.1E+00	µg/kg	69SB2A	1/1	0.365 - 0.365	1.1E+00	7.7E+00	N	BSL
319868	delta-BHC[4]	2.5E+00	2.5E+00	µg/kg	69SB2A	1/1	0.982 - 0.982	2.5E+00	--	Y	NSV
11097691	Aroclor 1254[5]	2.2E+02	2.2E+02	µg/kg	69SB2A	1/1	3.6 - 3.6	2.2E+02	1.1E+03	N	BSL
	TCL VOCs (µg/kg)										
78933	2-Butanone	2.2E+01	2.6E+02	µg/kg	69SB2C	6/6	6.1 - 27	2.6E+02	2.9E+04	N	BSL
67641	Acetone	4.4E+01	7.4E+01	µg/kg	69SB3C	5/6	6.1 - 69.6	7.4E+01	2.2E+04	N	BSL
75092	Methylene chloride	4.2E+01	4.2E+01	µg/kg	69SB2C	1/6	3.43 - 7.61	4.2E+01	1.9E+01	Y	**ASSL**
108883	Toluene	8.9E-01	8.9E-01	µg/kg	69SB1C	1/6	0.566 - 13.9	8.9E-01	2.7E+04	N	BSL
	TCL SVOCs (µg/kg)										
59507	4-Chloro-3-Methylphenol	1.1E+01	2.8E+01	µg/kg	69SB3B	5/6	6.25 - 7.29	2.8E+01	--	Y	NSV
106445	4-Methylphenol	1.0E+01	1.0E+01	µg/kg	69SB1C	1/6	7.64 - 8.92	1.0E+01	--	Y	NSV
117817	Bis(2-ethylhexyl)phthalate	1.5E+01	2.0E+01	µg/kg	69SB3B	6/6	2.48 - 2.9	2.0E+01	2.9E+06	N	BSL
84662	Diethylphthalate	4.0E+00	9.0E+00	µg/kg	69SB1C	6/6	2.28 - 2.66	9.0E+00	4.5E+05	N	BSL
84742	Di-n-butylphthalate	3.8E+01	8.0E+01	µg/kg	69SB3C	6/6	4.58 - 5.35	8.0E+01	5.0E+06	N	BSL
	SVOC TICs (µg/kg)										
301020	(Z)-9-Octadecenamide	5.7E+01	6.2E+02	µg/kg	69SB3B	5/6	0 - 0	6.2E+02	--	Y	NSV
69009901	1,1'-Biphenyl, bis(1-methylethyl)-	6.5E+01	6.5E+01	µg/kg	69SB1B	1/6	0 - 0	6.5E+01	--	Y	NSV
84695	1,2-Benzenedicarboxylicacid, bis(2-methy	3.4E+01	6.3E+01	µg/kg	69SB2C	6/6	0 - 0	6.3E+01	--	Y	NSV
96764	2,4-bis(1,1-Dimethylethy-l)-phenol	2.4E+01	2.4E+01	µg/kg	69SB3B	1/6	0 - 0	2.4E+01	--	Y	NSV
101371	2,4,6-Triallyloxy-1,3,5-triazine	4.5E+01	7.8E+01	µg/kg	69SB3B	4/6	0 - 0	7.8E+01	--	Y	NSV
1000143924	7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,	2.1E+01	2.1E+01	µg/kg	69SB3B	1/6	0 - 0	2.1E+01	--	Y	NSV
112845	Erucylamide	1.9E+02	4.1E+02	µg/kg	69SB1B	3/6	0 - 0	4.1E+02	--	Y	NSV
2136712	Ethanol, 2-(hexadecyloxy)-	4.2E+01	4.2E+01	µg/kg	69SB2C	1/6	0 - 0	4.2E+01	--	Y	NSV
27193288	Phenol, (1,1,3,3-tetramethylbutyl)-	3.8E+02	3.8E+02	µg/kg	69SB1B	1/6	0 - 0	3.8E+02	--	Y	NSV
7683649	Squalene	4.6E+01	6.1E+01	µg/kg	69SB3C	2/6	0 - 0	6.1E+01	--	Y	NSV

Table 9-11
HHRS SSL Comparison for SWMU 69
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Soil to Groundwater SSL (DAF 20)	COPC Flag (Y/N)	Rationale for Selection or Deletion
	Cyanide (mg/kg)										
57125	Cyanide	5.0E-02	7.0E-02	mg/kg	69SB1C	3/6	0.0356 - 0.0356	7.0E-02	1.5E+02	N	BSL

Notes:

CAS = Chemical Abstracts Service
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyls
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
TIC = Tentatively Identified Compound
[1] = Chromium VI RBC value was used
[2] = Lead criteria are Action Levels; see USEPA Region III guidance
[3] = Mercuric chloride soil RBC value used
[4] = RBC value for alpha BHC was used for these compounds
[5] = Noncarcinogenic Residential RBC value for Aroclor 1254 was used for screening

DUP AVG = results for duplicate samples averaged
SSL DAF20 = Soil Screening Levels at a Dilution Attenuation Factor of 20
Per (SSL) values from the October 31, 2006, RBC Table

ASSL = Above Soil Screening Level
BSL = Below Soil Screening Levels
NSV = No Screening Value Available
* = Surface Soil Detections used for SSL Screening due to testing of one surface soil sample for PCB/Pesticides/Herbicides

Table 9-12
COPC/Background Comparison for SWMU 69
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Surface Soil COPC/Background Comparison

CAS #	Chemical	Minimum Concentration Surface Soil	Maximum Concentration Surface Soil	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Point Estimate[A]	Background Comparison
	TAL Metals (mg/kg)									
7429905	Aluminum	17,200	24,600	mg/kg	69SB2A	3/3	1.83 - 5.1	24,600	40,041	N
7440360	Antimony	0.35	16.5	mg/kg	69SB3A-DUP AVG	3/3	0.0518 - 0.0518	16.5	--	NBE
7440382	Arsenic	0.64	3.8	mg/kg	69SB1A	3/3	0.0232 - 0.0232	3.8	15.8	N
7440473	Chromium	30	50	mg/kg	69SB2A	3/3	0.912 - 0.912	50	65.3	N
7440484	Cobalt	11	16	mg/kg	69SB2A	3/3	0.208 - 0.208	16	72	N
7439896	Iron	20,950	34,600	mg/kg	69SB1A	3/3	17.9 - 71.6	34,600	50,962	N
7439965	Manganese	894	1,470	mg/kg	69SB1A	3/3	0.264 - 1.32	1,470	2,543	N
7440622	Vanadium	42	63	mg/kg	69SB1A	3/3	0.207 - 0.207	63	108	N

Total Soil COPC/Background Comparison

CAS #	Chemical	Minimum Concentration Total Soil	Maximum Concentration Total Soil	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Point Estimate[A]	Background Comparison
	TAL Metals (mg/kg)									
7429905	Aluminum	17,200	34,800	mg/kg	69SB2B	9/9	1.83 - 9.15	34,800	40,041	N
7440360	Antimony	0.35	16.5	mg/kg	69SB3A-DUP AVG	9/9	0.0518 - 0.0518	16.5	--	NBE
7440382	Arsenic	0.64	12	mg/kg	69SB1C	9/9	0.0232 - 0.0232	12	15.8	N
7440473	Chromium	30	56	mg/kg	69SB3C	9/9	0.912 - 0.912	56	65.3	N
7440484	Cobalt	9.90	23	mg/kg	69SB3B	9/9	0.208 - 0.208	23	72	N
7439896	Iron	20,950	46,900	mg/kg	69SB3C	9/9	17.9 - 71.6	46,900	50,962	N
7439965	Manganese	247	1,470	mg/kg	69SB1A	9/9	0.264 - 1.32	1,470	2,543	N
7440622	Vanadium	42	71	mg/kg	69SB2B	9/9	0.207 - 0.207	71	108	N

Notes:
CAS = Chemical Abstracts Service
TAL = Target Analyte List
mg/kg = Milligram Per Kilogram
[A] = Facility-Wide Background Point Estimate as
Reported in the Facility-Wide Background Study Report (IT 2001a)
DUP AVG = results for duplicate samples averaged
NBE = No Background Estimate Available

Table 9-13
Detected Chemicals Occurrence for SWMU 69
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CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening
	TAL Metals (mg/kg)							
7429905	Aluminum	14,000	24,600	mg/kg	69SB2A	3/3	1.83 - 5.1	24,600
7440360	Antimony	0.35	19	mg/kg	69SB3A	3/3	0.0518 - 0.0518	19.0
7440382	Arsenic	0.64	3.8	mg/kg	69SB1A	3/3	0.0232 - 0.0232	4
7440393	Barium	65	76	mg/kg	69SB1A	3/3	0.106 - 0.106	76
7440417	Beryllium	0.26	0.62	mg/kg	69SB2A	3/3	0.0333 - 0.0391	0.62
7440439	Cadmium	0.53	2.1	mg/kg	69SB3A	3/3	0.182 - 0.182	2.10
7440702	Calcium	346	840	mg/kg	69SB2A	3/3	16.6 - 16.6	840
7440473	Chromium	22	50	mg/kg	69SB2A	3/3	0.912 - 0.912	50
7440484	Cobalt	11	16	mg/kg	69SB2A	3/3	0.208 - 0.208	16
7440508	Copper	8.7	17	mg/kg	69SB2A	3/3	0.368 - 0.368	17
7439896	Iron	17,100	34,600	mg/kg	69SB1A	3/3	17.9 - 71.6	34,600
7439921	Lead	19	25	mg/kg	69SB3A	2/3	0.0218 - 0.0218	25
7439954	Magnesium	793	2,270	mg/kg	69SB2A	3/3	3.21 - 3.21	2,270
7439965	Manganese	894	1,470	mg/kg	69SB1A	3/3	0.264 - 1.32	1,470
7439976	Mercury	0.04	0.13	mg/kg	69SB1A	3/3	0.0077 - 0.0077	0.13
7440020	Nickel	9	10	mg/kg	69SB1A	2/3	0.0356 - 0.0356	10
2023695	Potassium	810	1,580	mg/kg	69SB2A	3/3	5 - 5	1,580
7782492	Selenium	0.36	0.4	mg/kg	69SB3A	2/3	0.0502 - 0.0502	0.40
7440224	Silver	0.043	0.085	mg/kg	69SB2A	3/3	0.0044 - 0.0044	0.09
7440235	Sodium	27	114	mg/kg	69SB2A	3/3	8.92 - 8.92	114
7440280	Thallium	0.26	0.33	mg/kg	69SB2A	3/3	0.027 - 0.027	0.33
7440622	Vanadium	35	63	mg/kg	69SB1A	3/3	0.207 - 0.207	63
7440666	Zinc	38	51	mg/kg	69SB2A	3/3	0.517 - 0.517	51
	TCL Pesticides/PCBs (µg/kg)							
309002	Aldrin	1.1E+00	1.1E+00	µg/kg	69SB2A	1/3	0.365 - 0.365	1.1E+00
319868	delta-BHC	2.5E+00	2.5E+00	µg/kg	69SB2A	1/3	0.982 - 0.982	2.5E+00
11097691	Aroclor 1254	2.2E+02	2.2E+02	µg/kg	69SB2A	1/3	3.6 - 3.6	2.2E+02
	TCL VOCs (µg/kg)							
78933	2-Butanone	3.0E+01	4.1E+01	µg/kg	69SB3A	3/3	5.95 - 6.4	4.1E+01
67641	Acetone	1.0E+02	1.6E+02	µg/kg	69SB3A	3/3	5.95 - 6.4	1.6E+02
	TCL SVOCs[1] (µg/kg)							
59507	4-Chloro-3-Methylphenol	1.0E+01	2.3E+01	µg/kg	69SB3A	3/3	6.25 - 6.77	2.3E+01
117817	Bis(2-ethylhexyl)phthalate	1.9E+01	2.2E+01	µg/kg	69SB2A	3/3	2.48 - 2.69	2.2E+01
85687	Butylbenzylphthalate	6.0E+00	6.0E+00	µg/kg	69SB3A	1/3	5.38 - 5.82	6.0E+00
105602	Caprolactam	1.4E+01	1.4E+01	µg/kg	69SB3A	1/3	7.66 - 8.29	1.4E+01
84662	Diethylphthalate	6.0E+00	8.0E+00	µg/kg	69SB1A	3/3	2.28 - 2.47	8.0E+00
84742	Di-n-butylphthalate	5.3E+01	3.0E+02	µg/kg	69SB1A	3/3	4.58 - 4.97	3.0E+02
	PAHs[2] (µg/kg)							
56553	Benzo(a)anthracene	2.9E+00	2.9E+00	µg/kg	69SB2A	1/3	0.96 - 1.04	2.9E+00
218019	Chrysene	2.9E+00	2.9E+00	µg/kg	69SB2A	1/3	1.44 - 1.56	2.9E+00
206440	Fluoranthene	3.8E+00	1.8E+01	µg/kg	69SB2A	2/3	2.04 - 2.21	1.8E+01
85018	Phenanthrene	1.6E+00	7.2E+00	µg/kg	69SB2A	2/3	0.72 - 0.78	7.2E+00
129000	Pyrene	2.9E+00	1.3E+01	µg/kg	69SB2A	2/3	1.08 - 1.17	1.3E+01
	Cyanide (mg/kg)							
57125	Cyanide	1.1E-01	1.4E-01	mg/kg	69SB2A	2/3	0.0356 - 0.0356	1.4E-01

Notes:

CAS = Chemical Abstracts Sevice
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
[1] = SVOCs analyzed by USEPA SW-846 8270 Method 8270C
[2] = PAHs analyzed by USEPA SW-846 Method8310

Table 9-14
Non-detected Chemicals for SWMU 69
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CAS #	Parameter Name	Units	Number of Samples	Minimum MDL	Maximum MDL	TSV	Maximum Detection Limit Exceeds TSV
Inorganics							
7439921	Lead	mg/kg	1	0.0218	0.0218	0.01	**Y**
7440020	Nickel	mg/kg	1	0.0356	0.0356	30	N
7782492	Selenium	mg/kg	1	0.0502	0.0502	1.8	**Y**
57125	Cyanide	mg/kg	1	0.0356	0.0356	0.005	**Y**
Pesticides/Herbicides							
72548	4,4'-DDD	µg/kg	1	0.286	0.286	--	NS
72559	4,4'-DDE	µg/kg	1	0.21	0.21	100	N
50293	4,4'-DDT	µg/kg	1	0.216	0.216	100	N
319846	alpha-BHC	µg/kg	1	0.364	0.364	100	N
5103719	alpha-Chlordane	µg/kg	1	0.521	0.521	100	N
319857	beta-BHC	µg/kg	1	1.36	1.36	100	N
60571	Dieldrin	µg/kg	1	0.371	0.371	100	N
959988	Endosulfan I	µg/kg	1	1.09	1.09	--	NS
33213659	Endosulfan II	µg/kg	1	0.257	0.257	--	NS
1031078	Endosulfan Sulfate	µg/kg	1	0.604	0.604	--	NS
72208	Endrin	µg/kg	1	0.358	0.358	100	N
7421934	Endrin aldehyde	µg/kg	1	1.33	1.33	--	NS
53494705	Endrin ketone	µg/kg	1	0.33	0.33	--	NS
58899	gamma-BHC (Lindane)	µg/kg	1	0.233	0.233	100	N
5103742	gamma-Chlordane	µg/kg	1	0.844	0.844	100	N
76448	Heptachlor	µg/kg	1	0.846	0.846	--	NS
1024573	Heptachlor epoxide	µg/kg	1	0.546	0.546	100	N
72435	Methoxychlor	µg/kg	1	0.336	0.336	100	N
8001352	Toxaphene	µg/kg	1	28	28	--	NS
93765	2,4,5-T	µg/kg	1	2.4	2.4	--	NS
93721	2,4,5-TP (Silvex)	µg/kg	1	4.8	4.8	--	NS
94757	2,4-D	µg/kg	1	19.2	19.2	--	NS
94826	2,4-DB	µg/kg	1	74.4	74.4	--	NS
75990	Dalapon	µg/kg	1	68.4	68.4	--	NS
1918009	Dicamba	µg/kg	1	2.4	2.4	--	NS
120365	Dichlorprop	µg/kg	1	20.4	20.4	--	NS
88857	Dinoseb	µg/kg	1	25.2	25.2	--	NS
94746	MCPA	µg/kg	1	1680	1680	--	NS
93652	MCPP	µg/kg	1	6070	6070	--	NS
PCBs							
12674112	Aroclor 1016	µg/kg	1	19.2	19.2	--	NS
11104282	Aroclor 1221	µg/kg	1	2.4	2.4	--	NS
11141165	Aroclor 1232	µg/kg	1	6	6	--	NS
53469219	Aroclor 1242	µg/kg	1	3.6	3.6	--	NS
12672296	Aroclor 1248	µg/kg	1	6	6	--	NS
11096825	Aroclor 1260	µg/kg	1	8.4	8.4	371	N
VOCs							
71556	1,1,1-Trichloroethane	µg/kg	3	0.507	0.545	300	N
79345	1,1,2,2-Tetrachloroethane	µg/kg	3	0.777	0.836	300	N
76131	1,1,2-Trichloro-1,2,2-trifluoroethane	µg/kg	3	0.903	0.972	--	NS
79005	1,1,2-Trichloroethane	µg/kg	3	0.706	0.759	300	N
75343	1,1-Dichloroethane	µg/kg	3	0.862	0.927	300	N
75354	1,1-Dichloroethene	µg/kg	3	0.872	0.938	--	NS
87616	1,2,3-Trichlorobenzene	µg/kg	3	0.647	0.696	--	NS
120821	1,2,4-Trichlorobenzene	µg/kg	3	0.488	0.525	100	N
96128	1,2-Dibromo-3-chloropropane	µg/kg	3	2.48	2.66	--	NS
106934	1,2-Dibromoethane	µg/kg	3	0.815	0.877	--	NS
95501	1,2-Dichlorobenzene	µg/kg	3	0.576	0.62	100	N
107062	1,2-Dichloroethane	µg/kg	3	0.513	0.552	870,000	N
78875	1,2-Dichloropropane	µg/kg	3	0.697	0.75	700,000	N
541731	1,3-Dichlorobenzene	µg/kg	3	0.319	0.343	--	NS
106467	1,4-Dichlorobenzene	µg/kg	3	0.845	0.909	100	N

Table 9-14
Non-detected Chemicals for SWMU 69
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CAS #	Parameter Name	Units	Number of Samples	Minimum MDL	Maximum MDL	TSV	Maximum Detection Limit Exceeds TSV
591786	2-Hexanone	µg/kg	3	2.69	2.89	--	NS
108101	4-Methyl-2-pentanone	µg/kg	3	1.74	1.87	--	NS
71432	Benzene	µg/kg	3	0.627	0.675	100	N
74975	Bromochloromethane	µg/kg	3	0.906	0.974	--	NS
75274	Bromodichloromethane	µg/kg	3	0.596	0.641	450,000	N
75252	Bromoform	µg/kg	3	0.688	0.74	--	NS
74839	Bromomethane	µg/kg	3	1.79	1.92	--	NS
75150	Carbon disulfide	µg/kg	3	1.73	1.86	--	NS
56235	Carbon tetrachloride	µg/kg	3	0.555	0.596	300	N
108907	Chlorobenzene	µg/kg	3	0.787	0.846	100	N
75003	Chloroethane	µg/kg	3	1.61	1.73	--	NS
67663	Chloroform	µg/kg	3	0.531	0.571	300	N
74873	Chloromethane	µg/kg	3	0.992	1.07	--	NS
156592	cis-1,2-Dichloroethene	µg/kg	3	0.845	0.909	300	N
10061015	cis-1,3-Dichloropropene	µg/kg	3	0.584	0.628	--	NS
110827	Cyclohexane	µg/kg	3	0.376	0.404	--	NS
124481	Dibromochloromethane	µg/kg	3	0.615	0.662	--	NS
75718	Dichlorodifluoromethane	µg/kg	3	0.795	0.855	--	NS
100414	Ethylbenzene	µg/kg	3	0.503	0.541	100	N
98828	Isopropylbenzene	µg/kg	3	0.65	0.699	--	NS
79209	Methyl acetate	µg/kg	3	4.13	4.44	--	NS
1634044	methyl tert-Butyl ether	µg/kg	3	0.763	0.82	--	NS
108872	Methylcyclohexane	µg/kg	3	1.01	1.08	--	NS
75092	Methylene chloride	µg/kg	3	3.34	3.6	300	N
100425	Styrene	µg/kg	3	0.526	0.566	100	N
127184	Tetrachloroethene	µg/kg	3	0.729	0.785	300	N
108883	Toluene	µg/kg	3	0.552	0.594	100	N
156605	trans-1,2-Dichloroethene	µg/kg	3	0.837	0.9	300	N
10061026	trans-1,3-Dichloropropene	µg/kg	3	0.62	0.667	--	NS
79016	Trichloroethene	µg/kg	3	0.806	0.867	300	N
75694	Trichlorofluoromethane	µg/kg	3	0.884	0.951	--	NS
75014	Vinyl Chloride	µg/kg	3	0.44	0.474	300	N
1330207	Xylenes	µg/kg	3	0.501	0.539	100	N
SVOCs							
92524	1,1'-Biphenyl	µg/kg	3	2.95	3.2	--	NS
95943	1,2,4,5-Tetrachlorobenzene	µg/kg	3	34.4	37.3	--	NS
108601	2,2'-oxybis(1-Chloropropane)	µg/kg	3	1.58	1.72	--	NS
95954	2,4,5-Trichlorophenol	µg/kg	3	4.01	4.34	100	N
88062	2,4,6-Trichlorophenol	µg/kg	3	3.14	3.41	100	N
120832	2,4-Dichlorophenol	µg/kg	3	4.22	4.58	100	N
105679	2,4-Dimethylphenol	µg/kg	3	9.53	10.3	100	N
51285	2,4-Dinitrophenol	µg/kg	3	3.84	4.16	20,000	N
121142	2,4-Dinitrotoluene	µg/kg	3	3.78	4.1	--	NS
606202	2,6-Dinitrotoluene	µg/kg	3	33.2	36	--	NS
91587	2-Chloronaphthalene	µg/kg	3	2.76	2.99	--	NS
95578	2-Chlorophenol	µg/kg	3	2.41	2.61	100	N
91576	2-Methylnaphthalene	µg/kg	3	3.29	3.56	--	NS
95487	2-Methylphenol	µg/kg	3	5.81	6.29	100	N
88744	2-Nitroaniline	µg/kg	3	5.52	5.98	--	NS
88755	2-Nitrophenol	µg/kg	3	2.04	2.21	--	NS
91941	3,3'-Dichlorobenzidine	µg/kg	3	66.5	72	--	NS
99092	3-Nitroaniline	µg/kg	3	22	23.8	--	NS
534521	4,6-Dinitro-2-methylphenol	µg/kg	3	5.41	5.86	--	NS
101553	4-Bromophenyl-phenylether	µg/kg	3	4.06	4.39	--	NS
106478	4-Chloroaniline	µg/kg	3	1.51	1.64	--	NS
7005723	4-Chlorophenyl-phenylether	µg/kg	3	3.92	4.25	--	NS
106445	4-Methylphenol	µg/kg	3	7.64	8.28	100	N
100016	4-Nitroaniline	µg/kg	3	8.7	9.43	--	NS

Table 9-14
Non-detected Chemicals for SWMU 69
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CAS #	Parameter Name	Units	Number of Samples	Minimum MDL	Maximum MDL	TSV	Maximum Detection Limit Exceeds TSV
100027	4-Nitrophenol	µg/kg	3	3.4	3.68	100	N
83329	Acenaphthene	µg/kg	3	2.06	2.24	100	N
208968	Acenaphthylene	µg/kg	3	1.8	1.95	100	N
98862	Acetophenone	µg/kg	3	2.28	2.47	--	NS
120127	Anthracene	µg/kg	3	5.54	6.01	100	N
1912249	Atrazine	µg/kg	3	8.26	8.94	--	NS
100527	Benzaldehyde	µg/kg	3	4.86	5.27	--	NS
56553	Benzo(a)anthracene	µg/kg	3	16	17.3	100	N
50328	Benzo(a)pyrene	µg/kg	3	6.85	7.42	100	N
205992	Benzo(b)fluoranthene	µg/kg	3	11.7	12.7	100	N
191242	Benzo(g,h,i)perylene	µg/kg	3	10.5	11.3	100	N
207089	Benzo(k)fluoranthene	µg/kg	3	16.1	17.4	100	N
111911	Bis(2-chloroethoxy)methane	µg/kg	3	3.77	4.08	--	NS
111444	Bis(2-chloroethyl)ether	µg/kg	3	2.08	2.25	--	NS
85687	Butylbenzylphthalate	µg/kg	2	5.38	5.82	--	NS
105602	Caprolactam	µg/kg	2	7.66	8.29	--	NS
86748	Carbazole	µg/kg	3	7.32	7.93	--	NS
218019	Chrysene	µg/kg	1	13.3	13.3	100	N
218019	Chrysene	µg/kg	3	12.2	13.3	100	N
53703	Dibenz(a,h)anthracene	µg/kg	3	7.08	7.67	100	N
132649	Dibenzofuran	µg/kg	3	3.79	4.11	--	NS
131113	Dimethylphthalate	µg/kg	3	3.97	4.3	200,000	N
117840	Di-n-octylphthalate	µg/kg	3	3.72	4.03	--	NS
206440	Fluoranthene	µg/kg	1	3.06	3.06	100	N
86737	Fluorene	µg/kg	3	2.02	2.18	100	N
118741	Hexachlorobenzene	µg/kg	3	3.01	3.26	1,000,000	N
87683	Hexachlorobutadiene	µg/kg	3	4.64	5.03	--	NS
77474	Hexachlorocyclopentadiene	µg/kg	3	2.38	2.57	10,000	N
67721	Hexachloroethane	µg/kg	3	2.8	3.03	--	NS
193395	Indeno(1,2,3-cd)pyrene	µg/kg	3	4.7	5.1	100	N
78591	Isophorone	µg/kg	3	2.08	2.25	--	NS
91203	Naphthalene	µg/kg	3	3.3	3.58	100	N
98953	Nitrobenzene	µg/kg	3	3.84	4.16	40,000	N
621647	N-Nitrosodi-n-propylamine	µg/kg	3	3.95	4.28	--	NS
86306	N-Nitrosodiphenylamine	µg/kg	3	5.7	6.18	20,000	N
87865	Pentachlorophenol	µg/kg	3	5.27	5.71	100	N
85018	Phenanthrene	µg/kg	1	2.99	2.99	100	N
108952	Phenol	µg/kg	3	4.75	5.15	100	N
129000	Pyrene	µg/kg	1	1.92	1.92	100	N
PAHs							
83329	Acenaphthene	µg/kg	3	11.3	12.2	100	N
208968	Acenaphthylene	µg/kg	3	13.9	15.1	100	N
120127	Anthracene	µg/kg	3	0.84	0.91	100	N
56553	Benzo(a)anthracene	µg/kg	2	0.96	1.04	100	N
50328	Benzo(a)pyrene	µg/kg	3	1.2	1.3	100	N
205992	Benzo(b)fluoranthene	µg/kg	3	1.56	1.69	100	N
191242	Benzo(g,h,i)perylene	µg/kg	3	15	16.3	100	N
207089	Benzo(k)fluoranthene	µg/kg	3	1.2	1.3	100	N
218019	Chrysene	µg/kg	2	1.44	1.56	100	N
53703	Dibenz(a,h)anthracene	µg/kg	3	1.68	1.82	100	N
206440	Fluoranthene	µg/kg	1	2.21	2.21	100	N
86737	Fluorene	µg/kg	3	1.56	1.69	100	N
193395	Indeno(1,2,3-cd)pyrene	µg/kg	3	0.84	0.91	100	N
91203	Naphthalene	µg/kg	3	9.48	10.3	100	N
85018	Phenanthrene	µg/kg	1	0.78	0.78	100	N
129000	Pyrene	µg/kg	1	1.17	1.17	100	N

Table 9-14
Non-detected Chemicals for SWMU 69
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Parameter Name	Units	Number of Samples	Minimum MDL	Maximum MDL	TSV	Maximum Detection Limit Exceeds TSV
Explosives							
99354	1,3,5-Trinitrobenzene	mg/kg	3	0.14	0.14	--	NS
99650	1,3-Dinitrobenzene	mg/kg	3	0.159	0.159	--	NS
118967	2,4,6-Trinitrotoluene	mg/kg	3	0.167	0.167	--	NS
121142	2,4-Dinitrotoluene	mg/kg	3	0.142	0.142	--	NS
606202	2,6-Dinitrotoluene	mg/kg	3	0.25	0.25	--	NS
35572782	2-Amino-4,6-dinitrotoluene	mg/kg	3	0.151	0.151	--	NS
88722	2-Nitrotoluene	mg/kg	3	0.266	0.266	--	NS
99081	3-Nitrotoluene	mg/kg	3	0.184	0.184	--	NS
1946510	4-Amino-2,6-dinitrotoluene	mg/kg	3	0.162	0.162	--	NS
99990	4-Nitrotoluene	mg/kg	3	0.251	0.251	--	NS
2691410	HMX (Octahydro-1,3,5,7-tetranitro-1,3,5,	mg/kg	3	0.229	0.229	--	NS
98953	Nitrobenzene	mg/kg	3	0.102	0.102	40,000	N
121824	RDX (Hexahydro-1,3,5-trinitro-1,3,5-tria	mg/kg	3	0.131	0.131	--	NS
Nitroglycerin/PETN							
628966	Nitroglycerin	mg/kg	3	0.213	0.223	--	NS
78115	PETN	mg/kg	3	0.294	0.306	--	NS

Notes:
CAS = Chemical Abstracts Service
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
NS = No screening value
TSV = Toxicity Screening Value
MDL = Method Detection Limit

Table 9-15
Preliminary Soil Invertebrate Risk Characterization for SWMU 69
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Chemicals	CAS #	MDC for Surface Soil	Direct Contact TRV	TRV Source[A]	HQ
TAL Metals (mg/kg)					
Aluminum	7429-90-5	24,600	1	BTAG 1995	**24,600**
Antimony	7440-36-0	19.0	78	ECO SSL 2005	<1
Arsenic	7440-38-2	4	328	BTAG 1995	<1
Barium	7440-39-3	76	330	ECO SSL 2005	<1
Beryllium	7440-41-7	0.62	40	ECO SSL 2005	<1
Cadmium	7440-43-9	2.10	140	ECO SSL 2005	<1
Chromium	7440-47-3	50	0.0075	BTAG 1995	**6,667**
Cobalt	7440-48-4	16	200	BTAG 1995	<1
Copper	7440-50-8	17	50	ORNL 1997a	<1
Iron	7439-89-6	34,600	12	BTAG 1995	**2,883**
Lead	7439-92-1	25	1,700	ECO SSL 2005	<1
Manganese	7439-96-5	1,470	330	BTAG 1995	**4**
Mercury	7439-97-6	0.13	0.058	BTAG 1995	**2**
Nickel	7440-02-0	10	100	ORNL 1997a	<1
Selenium	7782-49-2	0.40	1.8	BTAG 1995	<1
Silver	7440-22-4	0.09	20	CCME 2004	<1
Thallium	7440-28-0	0.33	1	CCME 2004	<1
Vanadium	7440-62-2	63	58	BTAG 1995	**1.1**
Zinc	7440-66-6	51	100	ORNL 1997a	<1
TCL Pesticides/PCBs (µg/kg)					
Aldrin	309-00-2	1.1	100	BTAG 1995	<1
delta-BHC	319-86-8	2.5	100,000	BTAG 1995	<1
TCL Pesticides/PCBs (µg/kg)					
Aroclor 1254	11097-69-1	220	500	CCME 2004	<1
TCL VOCs (µg/kg)					
2-Butanone	78-93-3	41	NV	--	NC
Acetone	67-64-1	160	NV	--	NC
TCL SVOCs (µg/kg)					
4-Chloro-3-Methylphenol	59-50-7	23	NV	--	NC
Bis(2-ethylhexyl)phthalate	117-81-7	22	NV	--	NC
Butylbenzylphthalate	85-68-7	6	NV	--	NC
Caprolactam	105-60-2	14	NV	--	NC
Diethylphthalate	84-66-2	8	NV	--	NC
Di-n-butylphthalate	84-74-2	300	NV	--	NC
PAHs (µg/kg)					
Benzo(a)anthracene	56-55-3	2.9	100	BTAG 1995	<1
Chrysene	218-01-9	2.9	100	BTAG 1995	<1
Fluoranthene	206-44-0	18	100	BTAG 1995	<1
Phenanthrene	85-01-8	7.2	100	BTAG 1995	<1
Pyrene	129-00-0	13	100	BTAG 1995	<1
Cyanide (mg/kg)					
Cyanide	57-12-5	0.14	0.005	BTAG 1995	**28**

Notes:

CAS = Chemical Abstracts Service
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
MDC = Maximum Detected Concentration
TRV = Toxicity Reference Value

NV = No value
HQ = Hazard Quotient
NC = Not Calculated no TRV available
BTAG = Biological Technical Assistance Group Screening Level, Draft 1995
[A] =
Region III BTAG (USEPA 1995)
Oak Ridge National Laboratory (Efroymson et al. 1997a)
USEPA Ecological SSL (ECO-SSL 2005)
Canadian Environmental Quality Guidelines (CCME 2004)

Table 9-16
Inorganic COPEC/Background Comparison for SWMU 69
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Measured Analytes	CAS-Number	MDC for Surface Soil	Background Point Estimate [A]	Maximum Concentration Exceeds Background Point Estimate
TAL METALS (mg/kg)				
ALUMINUM	7429-90-5	24,600	40,041	N
ANTIMONY	7440-36-0	19.00	--	NBE
CHROMIUM	7440-47-3	50	65	N
IRON	7439-89-6	34,600	50,962	N
LEAD	7439-92-1	25	27	N
MANGANESE	7439-96-5	1,470	2,543	N
MERCURY	7439-97-6	0.13	0.13	N
VANADIUM	7440-62-2	63	108	N
ZINC	7440-66-6	51	202	N

Notes:
CAS = Chemical Abstracts Service
mg/kg = Milligram Per Kilogram
MDC = Maximum Detected Concentration
[A] = Facility-Wide Background Point Estimate as
Reported in the Facility-Wide Background Study Report (IT 2001a)
NBE = No Background Point Estimate Available

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Table 9-17
Preliminary/Refined Wildlife Risk Characterization
Screening Level Ecological Risk Assessment
SSP Report - SWMU 69
Radford Army Ammunition Plant, Radford, Virginia

Preliminary Assessment

Parameter	Maximum Soil Concentration (mg/kg)	Wildlife TRV-Based Soil Concentrations																			
		American Robin				Red-tailed Hawk				Meadow Vole				Red Fox				Short-tailed Shrew			
		NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ
Metals																					
ARSENIC	4	1.39E+01	<1	3.46E+01	<1	3.89E+02	<1	9.71E+02	<1	8.99E+00	<1	8.99E+01	<1	1.34E+00	3.0	1.34E+01	<1	3.02E-01	13.3	3.02E+00	1.3
CADMIUM	2.1	6.75E-01	3.1	9.31E+00	<1	3.91E+02	<1	5.40E+03	<1	1.50E+01	<1	1.50E+02	<1	1.48E+01	<1	1.48E+02	<1	1.16E+00	1.8	1.16E+01	<1
CHROMIUM	50	5.27E+00	9.5	2.64E+01	1.9	2.70E+01	1.9	1.35E+02	<1	8.65E+05	<1	8.65E+06	<1	2.38E+04	<1	2.38E+05	<1	1.78E+04	<1	1.78E+05	<1
COPPER	17	1.38E+02	<1	1.82E+02	<1	7.11E+02	<1	9.33E+02	<1	8.34E+02	<1	1.10E+03	<1	7.43E+01	<1	9.78E+01	<1	9.57E+01	<1	1.26E+02	<1
LEAD	25	5.18E+00	4.8	5.18E+01	<1	5.69E+02	<1	5.69E+03	<1	1.05E+03	<1	1.05E+04	<1	4.97E+02	<1	4.97E+03	<1	5.45E+01	<1	5.45E+02	<1
MERCURY	0.13	6.08E-01	<1	1.22E+00	<1	2.62E-01	<1	5.23E-01	<1	4.27E-01	<1	1.74E+00	<1	3.93E-03	33.1	1.60E-02	8.1	8.31E-02	1.6	3.39E-01	<1
NICKEL	10	3.86E+02	<1	5.33E+02	<1	1.95E+03	<1	2.70E+03	<1	5.54E+03	<1	1.11E+04	<1	3.23E+02	<1	6.46E+02	<1	2.86E+02	<1	5.71E+02	<1
SELENIUM	0.40	3.13E-01	1.3	6.27E-01	<1	4.03E+00	<1	8.06E+00	<1	2.73E+00	<1	4.50E+00	<1	6.09E-01	<1	1.00E+00	<1	5.27E-01	<1	8.70E-01	<1
SILVER	0.09	2.31E+01	<1	1.73E+02	<1	8.34E+02	<1	6.26E+03	<1	1.72E+03	<1	1.72E+04	<1	2.89E+02	<1	2.89E+03	<1	5.85E+01	<1	5.85E+02	<1
ZINC	51	1.40E+01	3.6	1.26E+02	<1	2.19E+01	2.3	1.98E+02	<1	3.38E+03	<1	6.75E+03	<1	8.28E+01	<1	1.66E+02	<1	4.22E+02	<1	8.44E+02	<1
Pesticides																					
ALDRIN	0.0011	NC		NC		NC		NC		6.36E+01	<1	3.18E+02	<1	5.04E-01	<1	2.52E+00	<1	2.08E-01	<1	1.04E+00	<1
DELTA-BHC	0.0025	2.85E-01	<1	1.15E+00	<1	2.23E+04	<1	8.94E+04	<1	6.97E-01	<1	6.97E+00	<1	4.13E-01	<1	4.13E+00	<1	1.90E-02	<1	1.90E-01	<1
PCBs																					
Aroclor 1254	0.22	8.69E-03	25.3	8.69E-02	2.5	1.53E+00	<1	1.53E+01	<1	1.17E+01	<1	1.17E+02	<1	5.33E-02	4.1	5.33E-01	<1	3.42E-03	64.3	3.42E-02	6.4
SVOCs/PAHs																					
BENZO(A)ANTHRACENE	0.0029	NC		NC		NC		NC		4.78E+01	<1	4.78E+02	<1	2.55E+00	<1	2.55E+01	<1	1.43E+00	<1	1.43E+01	<1
CHRYSENE	0.0029	NC		NC		NC		NC		2.37E+03	<1	2.37E+04	<1	1.24E+02	<1	1.24E+03	<1	5.65E+01	<1	5.65E+02	<1
FLUORANTHENE	0.018	NC		NC		NC		NC		4.11E+03	<1	2.05E+04	<1	7.02E+02	<1	3.51E+03	<1	1.24E+02	<1	6.22E+02	<1
PHENANTHRENE	0.0072	8.17E+00	<1	4.08E+01	<1	7.63E+02	<1	3.81E+03	<1	7.32E+02	<1	3.66E+03	<1	2.98E+02	<1	1.49E+03	<1	3.22E+01	<1	1.61E+02	<1
PYRENE	0.013	NC		NC		NC		NC		1.07E+03	<1	5.35E+03	<1	1.85E+02	<1	9.25E+02	<1	3.17E+01	<1	1.58E+02	<1

Refined Assessment

Parameter	Maximum Soil Concentration (mg/kg)	Wildlife TRV-Based Soil Concentrations																			
		American Robin				Red-tailed Hawk				Meadow Vole				Red Fox				Short-tailed Shrew			
		NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ
Metals																					
ARSENIC	4.0	2.17E+03	<1	5.43E+03	<1	2.91E+07	<1	7.27E+07	<1	1.22E+02	<1	1.22E+03	<1	2.96E+04	<1	2.96E+05	<1	3.71E+01	<1	3.71E+02	<1
CADMIUM	2.1	1.11E+02	<1	1.53E+03	<1	2.93E+07	<1	4.05E+08	<1	2.03E+02	<1	2.03E+03	<1	3.58E+05	<1	3.58E+06	<1	1.46E+02	<1	1.46E+03	<1
CHROMIUM	50.0	7.83E+02	<1	3.92E+03	<1	2.02E+06	<1	1.01E+07	<1	1.17E+07	<1	1.17E+08	<1	5.21E+08	<1	5.21E+09	<1	2.15E+06	<1	2.15E+07	<1
LEAD	25.0	7.81E+02	<1	7.81E+03	<1	4.27E+07	<1	4.27E+08	<1	1.42E+04	<1	1.42E+05	<1	1.12E+07	<1	1.12E+08	<1	6.58E+03	<1	6.58E+04	<1
MERCURY	0.1	9.80E+01	<1	1.96E+02	<1	1.96E+04	<1	3.92E+04	<1	5.80E+00	<1	2.37E+01	<1	8.62E+01	<1	3.52E+02	<1	1.02E+01	<1	4.18E+01	<1
SELENIUM	0.4	5.12E+01	<1	1.02E+02	<1	3.02E+05	<1	6.04E+05	<1	3.70E+01	<1	6.11E+01	<1	1.36E+04	<1	2.25E+04	<1	6.57E+01	<1	1.08E+02	<1
ZINC	51.0	2.28E+03	<1	2.06E+04	<1	1.64E+06	<1	1.48E+07	<1	4.58E+04	<1	9.16E+04	<1	1.82E+06	<1	3.64E+06	<1	5.25E+04	<1	1.05E+05	<1
PCBs																					
Aroclor 1254	0.22	1.44E+00	<1	1.44E+01	<1	1.15E+05	<1	1.15E+06	<1	1.58E+02	<1	1.58E+03	<1	1.17E+03	<1	1.17E+04	<1	4.35E-01	<1	4.35E+00	<1

Notes:
NC = Not Calculated no TRV available
TRV = Toxicity Reference Value
HQ = Hazard Quotient
LOAEL = Lowest observable adverse effects level
NOAEL = No observable adverse effects level
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
PCB = Polychlorinated Biphenyls
SVOC = Semi-Volatile Organic Compound
PAH = Poly-Aromatic Hydrocarbon

= Indicate HQs greater than 1.0

Refer to Appendix F.2 for detailed description of model parameters and results

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10.0 AREA OF CONCERN A – NITROCELLULOSE RAINWATER DITCH

10.1 SITE BACKGROUND – ENVIRONMENTAL SETTING

Physiography

AOC A is a 0.045-acre (1,964 ft^2) area consisting of a shallow concrete ditch approximately two-feet wide flanked by concrete berms located between a paved driveway and the base of a grassy bank. The site lies in a relatively flat area of the MMA at an elevation of approximately 1800 ft msl (Figure 10-1).

AOC A was identified during the April 1987 Visual Site Inspection (VSI) as a one-foot deep soil depression that received runoff from the Nitrocellulose A-Line (USEPA 1987). The area was devoid of vegetation, and discolored soil was observed (USEPA 1987). During the August 2002 SSP site visit, the depression was covered with concrete and discolored soil was not evident. Several buildings, paved roads, and overhead lines are located near the site.



AOC A– August 2002 – Looking North

Tanks and Structures

Numerous unrelated buildings, overhead lines, and tanks exist near the site.

Surface Water

Based on topography, stormwater runoff from the asphalt area and grassy slope surrounding AOC A would flow into the concrete-lined ditch. Runoff then appears to flow northward along the ditch and percolate into the soil at the terminus of the concrete swale. Manholes are present north and south of the site. Other surface water bodies, drainage ditches, manholes, catch basins, or other flow paths have not been associated with the site.

Soil and Geology

AOC A is underlain by the Unison-Urban land complex soil. This soil has moderate permeability and is medium-to-strongly acidic (IT 2001a). SSP borings completed to the depth of groundwater (up to 32 ft) and refusal (ASB3) indicate that the site is underlain by 32+ ft of unconsolidated soil (alluvial terrace deposits) over carbonate bedrock of the Elbrook Formation. The uppermost 9 to 15 ft of alluvial terrace deposits consist of alternating layers of sandy silt or sandy clay (ML or CL) and silty sand (SM). A 2- to 5-ft thick layer of silty gravel (GM) is present below these deposits, which is underlain by elastic silt (MH) and sandy clay (CH). Physical testing of two representative soil samples at the site indicate acidic CH and MH soil with organic content in the range of 2.5 to 3.6% and a vertical hydraulic conductivity of 6.7E-07 for the MH sample (Table 3-1).

Groundwater

An unconfined aquifer occurs within the lower portion of unconsolidated soil underlying the site; groundwater is also present within the underlying bedrock. Groundwater was encountered at depths of 23

ft bgs (ASB2) to 28 ft bgs (ASB1). Based on land-surface topography and previous investigations at SWMU O located east of the site, groundwater flow in the site area is toward the north.

10.2 SITE BACKGROUND - HISTORY

AOC A is located near the Nitrocellulose A-Line production area (USEPA 1987). A low depression, approximately one foot deep, "which appears to be an unlined rainwater ditch" was identified during the April 1987 Visual Site Inspection.

10.3 PREVIOUS INVESTIGATIONS

Previous investigations have not been conducted at the site.

10.4 WORK PLAN DATA GAP ANALYSIS

The data gap analysis presented Section 1.10.5 in WPA 016 indicated that previous investigations had not been conducted at the site (URS 2003b). The following data gaps were identified:

- TCL VOCs - surface and subsurface soil;
- TCL SVOCs/PAHs - surface and subsurface soil;
- TCL PCBs and pesticides - surface soil;
- Explosives - in surface and subsurface soil;
- TAL inorganics - surface and subsurface soil; and
- Site-specific physical soil testing data.

10.5 SSP FIELD ACTIVITIES

Soil borings ASB1, ASB2, and ASB3 were advanced adjacent to the concrete swale while boring ASB4 was located in the center of the swale and boring ASB5 was located at the terminus of the swale to evaluate for the presence or absence of chemicals in surface soil and subsurface soil (Figure 10-1). Borings ASB1, ASB2, and ASB4 were advanced to the depth of groundwater and boring ASB3 was advanced to refusal (on silty gravel) using a tractor mounted, direct-push Geoprobe® unit. Due to overhead piping, boring ASB5 was advanced using a hand auger. Discrete samples were collected from surface, intermediate, and terminal intervals for the three borings as summarized below.

AOC A SSP Samples and Boring Information

Boring ID	Total Depth of Boring (ft bgs)	Surface Sample ID	Sample Depth (ft)	Intermediate Sample ID	Sample Depth (ft)	Terminal Sample ID	Sample Depth (ft)
ASB1	32.0	ASB1A	0.0 - 1.0	ASB1B	10.0 - 12.0	ASB1C	26.0 - 28.0
ASB2	24.0	ASB2A	0.0 - 1.0	ASB2B	10.0 - 12.0	ASB2C	21.0 - 23.0
ASB3	14.7	ASB3A	0.0 - 1.0	ASB3B	6.0 – 8.0	ASB3C	13.0 – 14.7
ASB4	32	ASB4A	0.0 - 1.0	ASB4B	10.0 – 11.0	ASB4C	20.0
ASB5	17	ASB5A	0.0 - 1.0	ASB5B	7	NC	

Note: Due to field conditions, a terminal sample was not collected at boring ASB5 due to refusal.

Soil samples were analyzed for TCL VOCs, TCL SVOCs, PAHs, explosives (including nitroglycerin and PETN), and TAL inorganics. Soil samples ASB2A, ASB4A, ASB4B, ASB4C, ASB5A, and ASB5B were also analyzed for TCL pesticides, TCL PCBs, and TCL herbicides. SSP analytical results (detected chemicals) are summarized in Table 10-1.

Two soil samples were collected from ASB1 (22-24 ft bgs) and ASB2 (14-16 ft bgs) for physical testing of percent moisture, grain size, pH, TOC, specific gravity, Atterberg limits, and bulk density. Hydraulic conductivity testing was also conducted on sample ASB2. Analytical results for these samples are summarized in Table 3-1 and the complete results of the physical soil testing are presented in Appendix E.

Deviations to the SSP field program outlined in WPA 016 were not required to adjust to field conditions at the site.

10.6 HUMAN HEALTH RISK SCREENING

10.6.1 Identification of COPCs and Cumulative Risk Screen

Tables 10-2 and 10-3 present the results of COPC evaluations for surface soil and total soil, respectively. COPCs identified for surface soil and subsurface soil included:

- *TAL Metals:* aluminum (NSV), arsenic, chromium, cobalt (NSV), copper, iron, manganese, and vanadium;
- *PCBs:* Aroclor 1254;
- *TCL SVOCs:* 2,4-DNT, DNT Mix, di-n-octylphthalate (NSV), Dimethylphthalate (NSV);
- *SVOC TICs:* 7 compounds (NSVs) for surface soil and 15 compounds (NSVs) for total soil; and
- *Explosives:* 2,4-DNT and DNT Mix.

10.6.2 Cumulative Risk Screen

Table 10-4 presents the results of the cumulative risk screening for surface soil. Tables 10-5 and 10-6 present the results of the cumulative risk screening for total soil. A summary of these screening results is presented below.

Cumulative Human Health Risk Screening Results for AOC A

	Surface Soil			Total Soil		
Residential Excess Cancer Risk	Fail	9.E-05	Arsenic, DNT Mix, Aroclor 1254	Fail	5.E-05	Arsenic, DNT Mix, Aroclor 1254
Industrial Excess Cancer Risk	Fail	2.E-05	Arsenic, DNT Mix, Aroclor 1254	Fail	1.E-05	Arsenic, DNT Mix, Aroclor 1254
Residential Noncarcinogenic	Fail	8	As, Cr, Cu, Fe, Mn, V, Aroclor 1254, 2,4-DNT	Fail	6	As, Cr, Cu, Fe, Mn, V, Aroclor 1254, 2,4-DNT
Industrial Noncarcinogenic	Pass	0.6	--	Pass	0.4	--

The cumulative human health risk screens failed for residential surface soil (carcinogenic and noncarcinogenic) and residential total soil (carcinogenic and noncarcinogenic). The cumulative risk screen failed for industrial surface soil and total soil (carcinogenic), but passed for noncarcinogenic.

Noncarcinogenic residential cumulative risk screenings for surface soil and total soil resulted in HIs of 8 and 6, respectively, which exceeded the EPA target HI of 1. Due to multiple chemicals contributing to an HI greater than 1, the HIs have been segregated based on primary target organs for chronic exposure. The following tables present the results of the HI segregation using data obtained from Oak Ridge National Laboratory's RAIS, which includes data from various sources such as USEPA and the ATSDR:

HI Segregation for Target Organs – AOC A – Surface Soil

Target Organ	As	Cr	Cu	Fe	Mn	V	Aroclor 1254	2,4-DNT	Total HI
Skin	0.9	--	--	--	--	--	--	--	***0.9***
Eyes	--	--	--	--	--	--	2	--	***2***
CNS	0.9	--	--	--	2	--	--	0.2	***3***
CV	0.9	--	--	2	--	--	--	--	***3***
Blood	--	--	--	--	--	1	--	0.2	***1***
Liver	--	--	--	2	--	--	--	0.2	***2***
Kidney	--	--	--	2	--	1	--	--	***3***
GI	--	0.4	0.2	--	--	1	--	--	***2***
Reproductive	--	--	--	--	2	--	--	0.2	***2***

HI segregation resulted in values equal to or higher than the cumulative SSP HI threshold of 0.5 for a target organ including: the skin, eyes, CNS, CV, blood, liver, kidney, GI, and reproductive.

HI Segregation for Target Organs – AOC A – Total Soil

Target Organ	As	Cr	Cu	Fe	Mn	V	Aroclor 1254	2,4-DNT	Total HI
Skin	0.2	--	--	--	--	--	--	--	0.2
Eyes	--	--	--	--	--	--	2	--	***2***
CNS	0.2	--	--	--	0.9	--	--	0.2	***1***
CV	0.2	--	--	2	--	--	--	--	***2***
Blood	--	--	--	--	--	0.9	--	0.2	***1***
Liver	--	--	--	2	--	--	--	0.2	***2***
Kidney	--	--	--	2	--	0.9	--	--	***3***
GI	--	0.2	.0.1	--	--	0.9	--	--	***1***
Reproductive	--	--	--	--	0.9	--	--	0.2	***1***

HI segregation resulted in values equal to or higher than the cumulative SSP HI threshold of 0.5 for a target organ including: the eyes, CNS, CV, blood, liver, kidney, GI, and reproductive.

10.6.3 Lead and Iron Screening

The MDC for lead at the site was 76 mg/kg, which was below the action level of 400 mg/kg; therefore, further risk characterization for lead was not required.

Iron concentrations at the site for surface soil and total soil resulted in HQs greater than the iron SSP threshold HQ of 0.5 for the residential scenario, and therefore, the site required further characterization for iron through a margin of exposure evaluation. Appendix H presents the margin of exposure evaluation for surface soil and total soil. A summary of the results for AOC A is presented below.

Iron Margin of Exposure Evaluation – Future Child Resident

	Surface Soil			Total Soil		
		Estimated Site Intake	Exposure Screening Level		Estimated Site Intake	Exposure Screening Level
RDA Screen (mg/day)	Fail	10.2	10	Pass	8.4	10
Provisional Reference Dose (RfD) Screen (mg/kg-day)	Fail	0.68	0.66	Pass	0.45	0.66

The site failed the margin of exposure evaluation for iron in surface soil and passed the margin of exposure for total soil.

10.6.4 Comparison to Generic SSLs

The MDC comparisons to generic SSLs (DAF 20) for detected chemicals indicated that arsenic, chromium, manganese, dieldrin, and methylene chloride exceeded their respective SSLs (Table 10-7). Although the site has SSL exceedances for manganese, the levels are below its background point estimate, and therefore, are not a concern.

10.6.5 Comparison to Site-Specific SSLs

The MDC for dieldrin was below its site-specific SSL of 55 ug/kg, but methylene chloride was above its site-specific SSL of 45 µg/kg calculated using the average TOC value from the two physical samples collected at the site during the SSP (Appendix F).

10.6.6 COPC Comparison to Background

The comparison of MDCs for metals identified as COPCs in surface soil and total soil with their background point estimates resulted in background exceedances for arsenic, chromium, copper, and iron (Table 10-8).

10.6.7 Human Health Risk Screening Summary

COPCs with available screening value were limited to metals and 2,4-DNT The residential cumulative human health risk screens failed for surface soil (carcinogenic and noncarcinogenic) and total soil

(carcinogenic and noncarcinogenic). The industrial cumulative risk screens failed for surface soil (carcinogenic) and total soil (carcinogenic). The site failed carcinogenic risk screens for surface and total soil due primarily to arsenic and dinitrotoluene. The site failed the noncarcinogenic risk screens primarily due to metals above background point estimates and Aroclor 1254.

The site passed the lead screening for soil. Iron concentrations in surface soil and total soil required a margin of exposure evaluation. Surface soil failed the margin of exposure evaluation for iron while total soil passed.

Generic SSL exceedances were limited to arsenic, chromium, manganese, dieldrin, and methylene chloride. The concentration of dieldrin was below its site-specific SSL, but the concentration of methylene chloride was above its site-specific SSL. Methylene chloride was detected in 9 of the 9 subsurface samples with SSL exceedances in 3 samples. These three samples are B-flagged due to blank contamination for this chemical, and therefore, are considered an artifact of sampling and analysis rather than site related.

10.7 ECOLOGICAL RISK SCREENING

10.7.1 Problem Formulation

10.7.1.1 Ecological Site Characterization

An overview of the physiography, water resources, geology and soil for the site is presented in Section 10.1. AOC A is an approximate 0.045-acre area (964 ft^2) consisting of a shallow concrete ditch approximately two ft wide, which does not provide habitat value to wildlife potentially occurring in the area (photograph on page 10-1). The area is bordered to the west by a concrete pad and building and to the east of the area, there is maintained grass. A network of process pipes and utility lines traverses areas immediately adjacent to the site.

Concrete covering of the ditch precludes the growth of vegetation in AOC A. The adjacent grassland community to the east of the area is typical of maintained grassed areas found throughout RFAAP.

The lack of habitat and the highly industrialized nature of the site greatly limit its capacity to support wildlife. Given its limited size, proximity to concrete roads and buildings, and its frequent disturbance by facility operations, few individuals would be expected to utilize the area for a lengthy time.

Threatened, rare, or endangered species were not observed during the site reconnaissance. These species are not likely to be present within the boundaries of the site. Threatened, rare, and endangered species information for RFAAP is discussed in Section 3.3.3.

10.7.2 Ecological Conceptual Site Model

The ECSM for AOC A (and other terrestrial sites for the SSP) is presented on Figure 3-1. While the site is a small area that is disturbed by current site operations and is unlikely to support important populations of terrestrial receptors, individual receptors may traverse the area from time to time. Soil represents the potential exposure medium to ecological receptors. Based on the site characterization and data, the following complete exposure pathway exists: terrestrial receptor exposure to surface soil

Detected chemical occurrence and distribution table is presented in Table 10-9. In addition, Table 10-10 summarizes the nondetected chemicals for AOC A. Potential ecological receptors may be exposed to COPECs in soil through the following exposure routes:

- Direct contact/absorption from soil;
- Direct ingestion of soil;

- Incidental ingestion of soil; and
- Direct ingestion of biota with accumulated COPECs.

Receptors of concern selected for AOC A include:

- Plants;
- Soil invertebrate/microbial community;
- Omnivorous birds (American Robin; *Turdus migratorius*);
- Carnivorous birds (Red-Tailed Hawk; *Buteo jamaicensis*);
- Herbivorous mammals (Meadow Vole; *Microtus pennsylvanicus*);
- Carnivorous mammals (Short-Tailed Shrew; *Blarina brevicauda*); and
- Omnivorous mammals (Red Fox; *Vulpes vulpes*).

Relevant assessment and measurement endpoints for the identified terrestrial receptors are presented in Section 3.3.6.1.

10.7.3 Preliminary Exposure Estimate and Risk Characterization

The preliminary exposure estimate and ecological effects evaluation considers the most conservative risk scenario. Highly conservative assumptions are used to estimate COPEC exposure to terrestrial receptors for pathways to be quantitatively evaluated. Conservative TRVs are used to evaluate the ecological effects of exposure using the two approaches discussed below.

10.7.3.1 Preliminary Exposure Estimate and Ecological Effects Evaluation

Direct Contact Approach

The MDCs for detected chemicals in soil are used as the preliminary exposure estimate concentrations to develop a conservative risk scenario for the direct contact pathway to soil invertebrates. Table 10-11 presents the preliminary exposure estimates for the direct contact approach.

Dose Rate Modeling Approach

In the dose rate modeling approach, detected bioaccumulative chemical MDCs, along with assumptions of maximum ingestion rate, minimum body weight, 100% area use, and 100% bioavailability are used in the conservative risk scenario as the preliminary exposure estimate for soil COPECs and compared to the calculated TRVs.

10.7.3.2 Background Concentrations of Metals

Background point estimates for metals were incorporated in the ecological screening to assess site soil concentrations in the context of facility-wide background levels (2002a). Essential nutrients, including calcium, magnesium, potassium, and sodium were not considered COPECs in the risk screening in accordance with the SSP (USEPA 2001a) and the MWP (URS 2003b). The results of this comparison have been incorporated into the risk management decision and ecological risk summary.

10.7.3.3 Preliminary Risk Characterization

Terrestrial Plants

Qualitative characterization of vegetative communities common to grassed areas at RFAAP is provided in Section 3.3.7.4. Stressed or dead vegetation was not observed during the site reconnaissance, which

could be attributed to chemical stress. Reduced plant density is likely due to poor physical substrate quality and not a response to COPEC concentrations in surface soil.

Soil Invertebrates and Microbial Communities

Direct contact HQs calculated for soil invertebrates and microbial communities are presented in Table 10-11. Other potentially complete exposure pathways to soil invertebrate and microbial communities include direct ingestion of soil and biota. However, there is insufficient information to quantify these pathways, and while these pathways exist, they are likely secondary to the direct contact/absorption pathway and should not substantially alter the risk characterization.

Of the detected chemicals for which ecological screening values are available, the concentrations of aluminum, chromium, copper, iron, manganese, mercury, vanadium, zinc, Aroclor 1254, benzo(b)fluoranthene, and cyanide resulted in HQ values that were greater than 1 (Table 10-11). However, MDCs for aluminum, manganese, and vanadium were below background point estimates (Table 10-12).

Terrestrial Wildlife

Quantitative risk characterization for terrestrial wildlife is limited to direct ingestion of biota and incidental ingestion of soil. The ECSM identifies a potentially complete direct contact exposure pathway to omnivorous birds and herbivorous and carnivorous mammals; however, there is insufficient information to quantify this pathway. This pathway is likely secondary to the direct ingestion pathway; therefore, it should not substantially alter the risk characterization.

The risk to each potential wildlife receptor at the site is presented in Table 10-13 and summarized as follows:

Receptor	NOAEL Only Exceedances	NOAEL and LOAEL Exceedances
American Robin	arsenic, cadmium, selenium	chromium, copper, lead, zinc, Aroclor 1254
Red-tailed Hawk	chromium, Aroclor 1254	zinc
Meadow Vole	arsenic	none
Red Fox	none	arsenic, copper, mercury, zinc, Aroclor 1254
Short-tailed Shrew	cadmium, lead, mercury, selenium	arsenic, copper, zinc, Aroclor 1254

10.7.4 Refined Exposure Estimate, Ecological Effects Evaluation, and Risk Characterization

10.7.4.1 Refined Exposure Estimate and Ecological Effects Evaluation - Dose Modeling

The conservative assumptions used in the preliminary exposure estimate and ecological effects evaluation were replaced with more environmentally realistic assumptions resulting in a more realistic estimate of potential risk.

Refined exposure estimates and ecological effects were not developed for soil invertebrates and microbial communities because an appropriate 95% UCL could not be calculated using the surface soil data.

The refined exposure estimates and ecological effects are developed for wildlife receptors having complete exposure pathways to be quantitatively evaluated (i.e., omnivorous birds and carnivorous and herbivorous mammals). In the refined model, a realistic area use factor ($AF_{refined}$) was calculated as the ratio of the site area to the average home range of the receptor (Appendix I, Table I-16).

10.7.4.2 Refined Risk Characterization -Terrestrial Wildlife

The refined risk characterization for AOC A is presented in Table 10-13 and summarized as follows:

Receptor	NOAEL Only Exceedances	NOAEL and LOAEL Exceedances	COPECs Below Background Point Est.
American Robin	lead (1.5) zinc (2.2) Aroclor 1254 (6.0)	none	none
Red-tailed Hawk	none	none	n/a
Meadow Vole	none	none	n/a
Red Fox	none	none	n/a
Short-tailed Shrew	arsenic (1.9)	Aroclor 1254 (19.9/2.0)*	none

*Note: (19.9/2.0) = NOAEL-based HQ/LOAEL-based HQ

10.7.4.3 Exposure and Risk Uncertainty Analysis

Potential risk and exposure uncertainty is discussed in Section 3.3.9. While factors such as lack of TSV and wildlife profile assumptions may create limited uncertainty, the very small size and negligible habitat quality of the site in combination with these limited uncertainties has produced a conservative assessment of potential ecological risks associated with AOC A.

10.7.5 Ecological Risk Screening Summary

Based in the refined ecological risk screening, the information collected and presented indicates that a more thorough assessment is warranted via collection of additional soil samples to be analyzed for metals, PCBs, and pesticides.

10.8 CONCEPTUAL SITE MODEL

A refined CSM for AOC A is presented on Figure 10-2. The site is a concrete ditch located in the MMA at RFAAP. Subsurface geology consists of 32+ ft of unconsolidated deposits overlying carbonate bedrock of the Elbrook Formation. Groundwater is present at approximately 24 to 32 ft bgs within unconsolidated deposits and in underlying bedrock. Groundwater flow is likely toward the north following surface topography.

AOC A consists of a concrete lined ditch and adjacent grassy and paved areas where precipitation and runoff appear to flow northward along the ditch and percolate into surface soil in adjacent grass areas. Potentially affected media at the site include surface soil, subsurface soil, and groundwater. Surface water and sediment are not present within or near the site. COPCs identified in soil with screening values included metals and 2,4-DNT.

Although current and likely future land-use scenarios are limited to industrial operations, both residential and industrial scenarios are evaluated. AOC A is enclosed by the Installation perimeter fence, and, therefore, potential receptors are limited to site workers (more conservative than trespasser scenario), future construction workers, and terrestrial biota. Direct deposition via stormwater runoff from Nitrocellulose Line A in the site area is considered a potential release mechanism to surface soil. Site workers, construction workers, and terrestrial biota could contact surface soil. Leaching of chemicals is considered a potential release mechanism to subsurface soil that may be contacted by potential future construction workers. Leaching of chemicals into groundwater has not been evaluated at the site.

10.9 RECOMMENDATION FOR FUTURE ACTION

An RFI for soil and groundwater media is recommended for the site based on the lack of groundwater data for the site and the results of the human health and ecological risk screenings.

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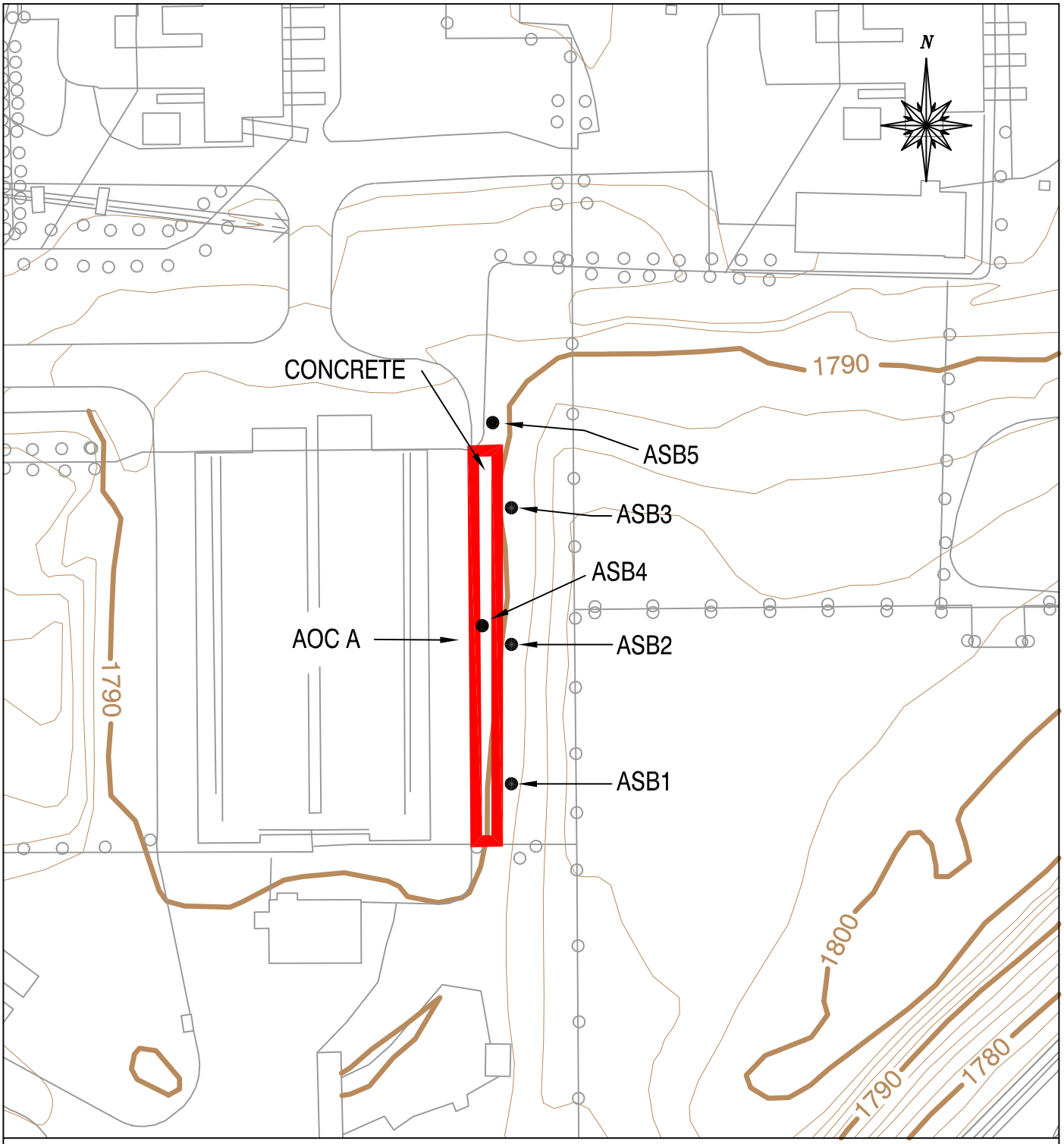


Legend

- Soil Sampling Location
- AOC A Approximate Boundary
- Aboveground Piping

RFAAP

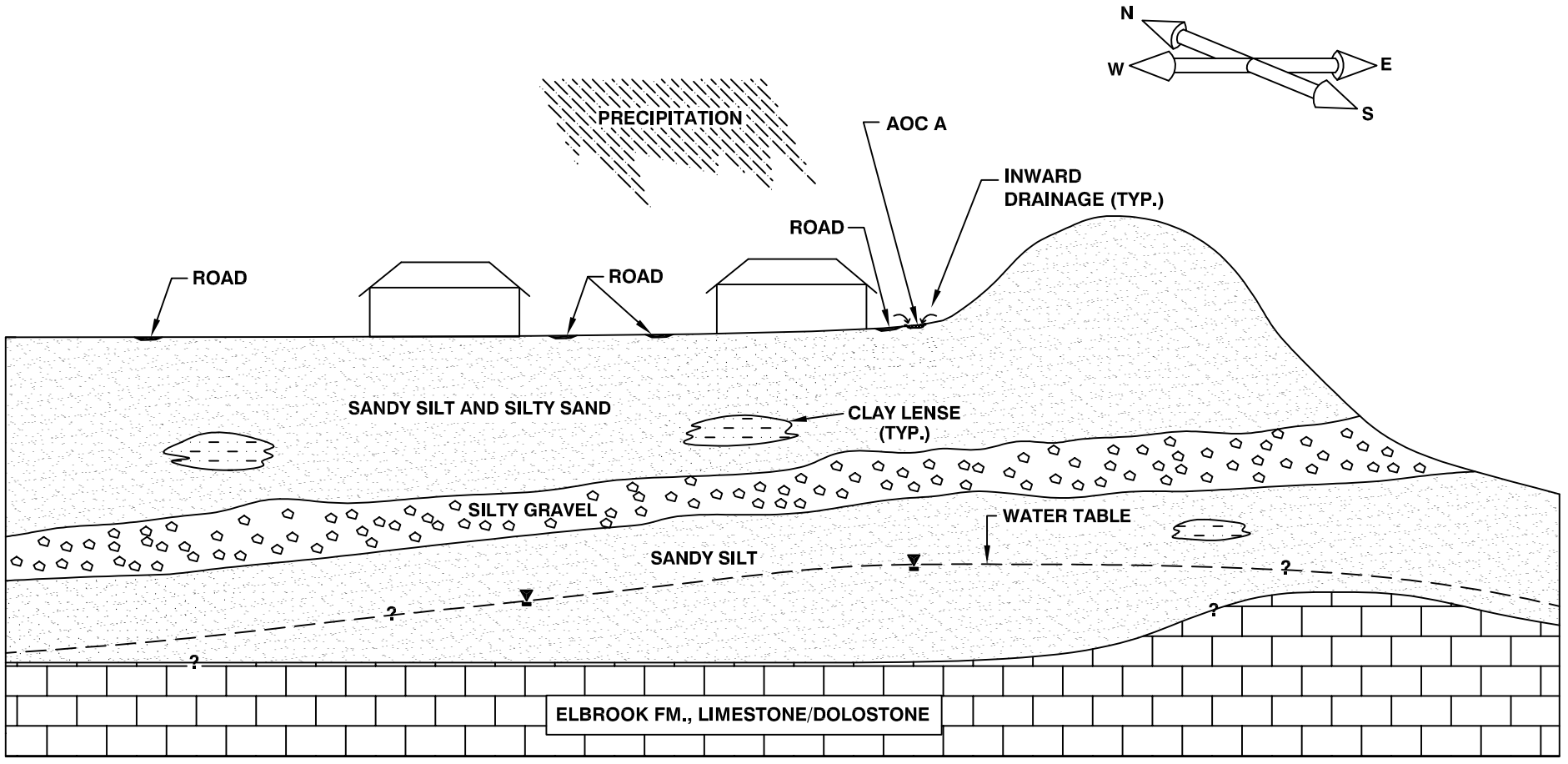
SSP REPORT

Date:	Prepared By:
December 2006	CD/DC
Scale:	**File Name:**
1"=50'	11656628

FIGURE 10-1

SSP SAMPLING LOCATION MAP

AOC A



CONCEPTUAL DRAWING - NO SCALE IMPLIED

NO BEDROCK TOPOGRAPHY IMPLIED

RFAAP

SSP REPORT

Date:	Prepared By:
June 2004	*KDC/TDH*
Scale:	**File Name:**
Not to scale	*15900619*

FIGURE 10-2

CONCEPTUAL SITE MODEL
AOC A

Table 10-1
Area of Concern A - Summary of Detected Chemicals in Analytical Samples
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	Draft BTAG Screening Level	ASB1A 10/11/2003 0-1		MDL	RL	ASB1B 10/11/2003 10-12		MDL	RL	ASB1C 10/11/2003 26-28		MDL	RL	ASB2A 10/11/2003 0-1		MDL	RL	ASB2B 10/11/2003 10-12		MDL	RL	ASB2B-DUP(SBD-10) 10/11/2003 10-12		MDL	RL
								Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
TAL Metals (mg/kg)																															
Aluminum	7429-90-5	--	40,041	--	--	--	1	32,000		9.15	250	30,800		9.15	250	36,300		9.15	250	28,500		9.15	250	32,300		9.15	250	34,800		9.15	250
Antimony	7440-36-0	N	--	3.13	40.88	13.2	0.48	0.086	J	0.0518	0.5	<0.5	U	0.0518	0.5	0.18	J	0.0518	0.5	0.071	J	0.0518	0.5	<0.5	U	0.0518	0.5	0.068	J	0.0518	0.5
Arsenic	7440-38-2	C	15.8	0.43	1.91	0.026	328	***3***		0.0232	0.4	***1.8***		0.0232	0.4	***8.1***		0.0232	0.4	***2.9***		0.0232	0.4	***3.4***		0.0232	0.4	***4.7***		0.0232	0.4
Barium	7440-39-3	N	209	1,564	20,440	6,015	440	86		0.106	5	99		0.106	5	115		0.106	5	61		0.106	5	77		0.106	5	98		0.106	5
Beryllium	7440-41-7	N	1.02	15.6	204.4	1,154	0.02	0.53	J	0.0333	1	0.9	J	0.167	1	1.8		0.167	1	0.55	J	0.0333	1	1.3		0.167	1	0.86	J	0.167	1
Cadmium	7440-43-9	N	0.69	3.9	51.1	27.4	2.5	0.94	J	0.182	1	<1	U	0.182	1	0.46	J	0.182	1	0.26	J	0.182	1	0.36	J	0.182	1	<1	U	0.182	1
Calcium	7440-70-2	--	--	--	--	--	--	2,569		16.6	250	408		16.6	250	126	J	16.6	250	6,100		16.6	250	867		16.6	250	380		16.6	250
Chromium[1]	7440-47-3	N	65.3	23.5	306.6	42.05	0.0075	38	,J,m	0.912	5	31	,J,m	0.912	5	40	,J,m	0.912	5	36	,J,m	0.912	5	39	,J,m	0.912	5	41	,J,m	0.912	5
Cobalt	7440-48-4	--	72.3	--	--	--	100	8.8	,J,s	0.208	1	24	,J,s	0.208	1	15	,J,s	0.208	1	9.3	,J,s	0.208	1	14	,J,s	0.208	1	22	,J,s	0.208	1
Copper	7440-50-8	N	53.5	312.9	4,088	10,518	15	155		1.84	5	20		0.368	2	43		0.368	2	57		0.368	2	19		0.368	2	23		0.368	2
Iron	7439-89-6	N	50,962	2,346	30,660	--	12	41,600		42.4	200	37,500		71.6	1,000	42,200		71.6	1,000	38,100		71.6	1,000	40,300		71.6	1,000	38,000		71.6	1,000
Lead[2]	7439-92-1	--	26.8	400	750	--	0.01	76		0.218	10	26		0.0218	1	19		0.0218	1	25		0.0218	1	8.8	,J,f	0.0218	1	13	,J,f	0.0218	1
Magnesium	7439-95-4	--	--	--	--	--	4,400	2,450		3.21	250	2,050		3.21	250	5,870		3.21	250	3,180		3.21	250	5,220	,J,f	3.21	250	2,800	,J,f	3.21	250
Manganese	7439-96-5	N	2,543	156.4	2,044	951.9	330	315		0.264	5	***1,750***		1.32	25	***1,170***		1.32	25	426		0.264	5	648		0.264	5	859		0.264	5
Mercury[3]	7439-97-6	--	0.13	2.35	30.66	--	0.058	0.067	J	0.0077	0.1	0.019	J	0.0077	0.1	0.075	J	0.0077	0.1	0.045	J	0.0077	0.1	0.014	J	0.0077	0.1	0.022	J	0.0077	0.1
Potassium	7440-09-7	--	--	--	--	--	--	1,540		5	100	1,840		5	100	3,780		5	100	1,220		5	100	2,750	,J,f	5	100	1,560	,J,f	5	100
Nickel	7440-02-0	N	62.8	156.4	2,044	--	2	13		0.0356	0.5	16		0.0356	0.5	28		0.0356	0.5	13		0.0356	0.5	36	,J,f	0.0356	0.5	21	,J,f	0.0356	0.5
Selenium	7782-49-2	N	--	39.1	511	18.98	1.8	0.56	J	0.0502	1	0.52	J	0.0502	1	0.99	J	0.0502	1	0.47	J	0.0502	1	0.6	J	0.0502	1	0.5	J	0.0502	1
Silver	7440-22-4	N	--	39.1	511	31.03	0.0000098	0.07	J	0.0044	3	0.061	J	0.0044	3	0.11	J	0.0044	3	0.072	J	0.0044	3	0.093	J	0.0044	3	0.094	J	0.0044	3
Sodium	7440-23-5	--	--	--	--	--	--	95	J	18.1	100	122		18.1	100	54	J	18.1	100	77	J	18.1	100	77	J	18.1	100	50	J	18.1	100
Thallium	7440-28-0	N	2.11	0.548	7.154	3.64	0.001	0.24	J,B,x	0.027	0.5	0.43	J	0.027	0.5	0.45	J	0.027	0.5	0.23	J,B,x	0.027	0.5	0.23	J,B,x	0.027	0.5	0.22	J,B,x	0.027	0.5
Vanadium	7440-62-2	N	108	7.8	102.2	730.1	0.5	68	,L,m	0.207	1	66	,L,m	0.207	1	56	,L,m	0.207	1	63	,L,m	0.207	1	55	,L,m	0.207	1	49	,L,m	0.207	1
Zinc	7440-66-6	N	202	2,346	30,660	13,622	10	78		0.517	4	56		0.517	4	109		2.59	20	58		0.517	4	45		0.517	4	37		0.517	4
Pesticides/PCBs (ug/kg)																															
Dieldrin	60-57-1	C	--	4.0E+01	1.8E+02	2.2E+00	100	NT				NT				NT				<25	U	0.371	25	NT				NT			
Aroclor 1254[4]	11097-69-1	C	--	1.6E+02	1.4E+03	1.1E+03	100	NT				NT				NT				9.9	J	3.6	41	NT				NT			
VOCs (ug/kg)																															
Acetone	67-64-1	N	--	7.0E+06	9.2E+07	2.2E+04	--	15	J,B,z	11.2	24	19	J,B,z	12.1	26	29	,B,z	12.1	26	16	J,B,z	11.2	25	23	J,B,z	12.1	26	24	J,B,z	13.1	28
Benzene	71-43-2	C	--	1.2E+04	5.2E+04	1.9E+00	100	<6.1	U	0.805	6.1	<6.4	U	0.872	6.4	<6.5	U	0.872	6.5	<6.2	U	0.805	6.2	<6.6	U	0.872	6.6	<6.9	U	0.939	6.9
Ethylbenzene	100-41-4	N	--	7.8E+05	1.0E+07	1.5E+04	100	<6.1	U	1.92	6.1	<6.4	U	2.08	6.4	<6.5	U	2.08	6.5	<6.2	U	1.92	6.2	<6.6	U	2.08	6.6	<6.9	U	2.24	6.9
Methyl acetate	79-20-9	N	--	7.8E+06	1.0E+08	2.5E+04	--	<24	U	4.5	24	<26	U	4.88	26	<26	U,UJ,c	4.88	26	<25	U	4.5	25	<26	U	4.88	26	<28	U	5.25	28
Methylene chloride	75-09-2	C	--	8.5E+04	3.8E+05	1.9E+01	300	4.9	J	1.44	24	5.9	J	1.56	26	6.6	J,B,z	1.56	26	4.5	J	1.44	25	7.7	J	1.56	26	7	J	1.68	28
Toluene	108-88-3	N	--	6.3E+05	8.2E+06	2.7E+04	100	<6.1	U	1.38	6.1	<6.4	U	1.5	6.4	<6.5	U	1.5	6.5	<6.2	U	1.38	6.2	<6.6	U	1.5	6.6	<6.9	U	1.61	6.9
Xylenes (Total)	1330-20-7	N	--	1.6E+06	2.0E+07	3.0E+03	100	<6.1	U	1.82	6.1	<6.4	U	1.98	6.4	<6.5	U	1.98	6.5	<6.2	U	1.82	6.2	<6.6	U	1.98	6.6	<6.9	U	2.13	6.9
SVOCs (ug/kg)																															
1,1'-Biphenyl	92-52-4	N	--	3.9E+05	5.1E+06	9.6E+04	--	<210	U	2.95	210	<220	U	3.2	220	<220	U	3.2	220	<210	U	2.95	210	<220	U	3.2	220	<220	U	3.2	220
2-Methylnaphthalene	91-57-6	N	--	3.1E+04	4.1E+05	4.4E+03	--	<210	U	3.29	210	<220	U	3.56	220	<220	U	3.56	220	<210	U	3.29	210	<220	U	3.56	220	<220	U	3.56	220
2,4-Dinitrotoluene	121-14-2	N	--	1.6E+04	2.0E+05	5.7E+02	--	***850***	J	18.9	1,000	<220	U	4.1	220	<220	U	4.1	220	***1,000***	U	3.78	210	<220	U	4.1	220	<220	U	4.1	220
2,6-Dinitrotoluene	606-20-2	N	--	7.8E+03	1.0E+05	2.5E+02	--	82	J	33.2	210	<220	U	36	220	<220	U	36	220	100	J	33.2	210	<220	U	36	220	<220	U	36	220
Dinitrotoluene Mix	--	C	--	9.4E+02	4.2E+03	--	--	932				ND				ND				1,100				ND				ND			
Acenaphthene	83-32-9	N	--	4.7E+05	6.1E+06	1.0E+05	100	<210	U	2.06	210	<220	U	2.24	220	<220	U	2.24	220	<210	U	2.06	210	<220	U	2.24	220	<220	U	2.24	220
Acenaphthylene[5]	208-96-8	N	--	2.3E+05	3.1E+06	--	100	<210	U	1.8	210	<220	U	1.95	220	<220	U	1.95	220	<210	U	1.8	210	<220	U	1.95	220	<220	U	1.95	220
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	100	<210	U	5.54	210	<220	U	6.01	220	<220	U	6.01	220	<210	U	5.54	210	<220	U	6.01	220	<220	U	6.01	220
Benzo(a)anthracene	56-55-3	C	--	2.2E+02	3.9E+03	4.8E+02	100	<210	U	16	210	<220	U	17.3	220	<220	U	17.3	220	<210	U	16	210	<220	U	17.3	220	<220	U	17.3	220
Benzo(a)pyrene	50-32-8	C	--	2.2E+01	3.9E+02	1.2E+02	100	9	J	6.85	210	<220	U	7.42	220	<220	U	7.42	220	<210	U	6.85	210	<220	U	7.42	220	<220	U	7.42	220
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	100	16	J,J,I	11.7	210	<220	U	12.7	220	<220	U	12.7	220	<210	U	11.7	210	<220	U	12.7	220	<220	U	12.7	220
Benzo(k)fluoranthene	207-08-9	C	--	2.2E+03	3.9E+04	1.5E+04	100	<210	U	16.1	210	<220	U	17.4	220	<220	U	17.4	220	<210	U	16.1	210	<220	U	17.4	220	<220	U	17.4	220
Bis(2-ethylhexyl)phthalate	117-81-7	C	--	4.6E+04	2.0E+05	2.9E+06	--	1,400		12.4	1,000	22	J	2.69	220	17	J	2.69	220	110	J	2.48	210	22	J	2.69	220	16	J	2.69	220
Butylbenzylphthalate	85-68-7	N	--	1.6E+06	2.0E+07	1.7E+07	--	<210	U	5.38	210	<220	U	5.82	220	<220	U	5.82	220	<210	U	5.38	210	<220	U	5.82	220	<220	U	5.82	220
Di-n-butylphthalate	84-74-2	N	--	7.8E+05	1.0E+07	5.0E+06	--	5,100		22.9	1,000	93	J	4.97	220	130	J	4.97	220	4,300		23.7	1,100	590		4.97	220	640		4.97	220
Di-n-octylphthalate	117-84-0	--	--	--	--	--	--	<210	U	3.72	210	<220	U	4.03	220	<220	U	4.03	220	<210	U	3.72	210	<220	U	4.03	220	<220	U	4.03	220
Diethylphthalate	84-66-2	N	--	6.3E+06	8.2E+07	4.5E+05	--	14	J	2.28	210	8	J	2.47	220	10	J	2.47	220	10	J	2.28	210	10	J	2.47	220	<220	U	2.47	220
Dimethylphthalate	131-11-3	--	--	--	--	--	--	210		3.97	210	<220	U	4.3	220	<220	U	4.3	220	<210	U	3.97	210	<220	U	4.3	220	<220	U	4.3	220
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	100	15	J	12.2	210	<220	U	13.3	220	<220	U	13.3	220	<210	U	12.2	210	<220	U	13.3	220	<220	U	13.3	220
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	100	30	J	2.82	210	<220	U	3.06	220	<220	U	3.06	220	3	J	2.82	210	<220	U	3.06	220	<220	U	3.06	220
Fluorene	86-73-7	N	--	3.1E+05	4.1E+06	1.4E+05	100	<210	U	2.02	210	<220	U	2.18	220	<220	U	2.18	220	<210	U	2.02	210	<220	U	2.18	220	<220	U	2.18	220
Indeno(1,2,3-cd)pyrene	193-39-5	C	--	2.2E+02	3.9E+03	4.2E+03	100	6	J	4.7	210	<220	U	5.1	220	<220	U	5.1	220	<210	U	4.7	210	<220	U	5.1	220	<220	U	5.1	220
N-Nitrosodiphenylamine	86-30-6	C	--	1.3E+05	5.8E+05	7.6E+02	--	***1,000***		28.5	1,000	<220	U	6.18	220	<220	U	6.18	220	120	J	5.7	210	<220	U	6.18	220	<220	U	6.18	220
Pentachlorophenol	87-86-5	C	--	5.3E+03	2.4E+04	--	100	<400	U	5.27	400	<420	U	5.71	420	<430	U	5.71	430	<410	U	5.27	410	<430	U	5.71	430	<430	U	5.71	430
Phenanthrene[5]	85-01-8	N	--	2.3E+05	3.1E+06	--	100	11	J	2.76	210	<220	U	2.99	220	<220	U	2.99	220	<210	U	2.76	210	<220	U	2.99	220	<220	U	2.99	220
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	100	26	J	1.78	210	<220	U	1.92	220	<220	U	1.92	220	3	J	1.78	210	<220	U	1.92	220	<220	U	1.92	220
SVOC TICs (ug/kg)																															
(Z)-9-Octadecenamide	301-02-0	--	--	--	--	--	--	NI				1,600	E,NJ,t	0	100	NI				190	E,NJ,t	0	100	230	E,NJ,t	0	100	94	E,NJ,t	0	100
1,2-Benzenedicarboxylic acid, butyl 2-et	85-69-8	--	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
1,2-Benzenedicarboxylic acid, butyl 2-me	17851-53-5	--	--	--	--	--	--	60	E,NJ,t	0	10	NI				NI				NI				NI				510	E,NJ,t	0	10
1,2-Benzenedicarboxylicacid, bis(2-methy	84-69-5	--	--	--	--	--	--	NI				110	E,B,x	0	100	200	E,NJ,t	0	100	490	E,NJ,t	0	100	510	E,NJ,t	0	100	NI			
1-Dodecanol	112-53-8	--	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
1-Heptadecanol	1454-85-9	--	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
1-Pentadecanol	629-76-5	--	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
2(5H)-Furanone, 5,5-dimethyl-	20019-64-1	--	--	--	--	--	--	NI				NI				49	E,NJ,t	0	100	NI				NI				NI			
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	--	--	--	--	--	--	NI				NI				NI				NI				87	E,B,x	0	100	69	E,B,x	0	100
2-Ethyl-1-Hexanol	104-76-7	--	--	--	--	--	--	NI				33	E,NJ,t	0	1,700	NI				NI				NI				NI			
Benzenamine, 4-nitro-N-phenyl-	836-30-6	--	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Benzeneamine, 2-nitro-N-phenyl-	119-75-5	--	--	--	--	--	--	140	E,NJ,t	0	10	NI				NI				NI				NI				NI			
Bis(2-ethylhexyl)maleate	142-16-5	--	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Erucylamide	112-84-5	--	--	--	--	--	--	1,500	E,B,x	0	10	NI				NI				1,100	E,B,x	0	10	NI				NI			
Phosphonic acid, dioctadecyl ester	19047-85-9	--	--	--	--	--	--	NI				24	E,NJ,t	0	10	NI				NI				NI				NI			

Table 10-1
Area of Concern A - Summary of Detected Chemicals in Analytical Samples
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	Draft BTAG Screening Level	ASB1A 10/11/2003 0-1		MDL	RL	ASB1B 10/11/2003 10-12		MDL	RL	ASB1C 10/11/2003 26-28		MDL	RL	ASB2A 10/11/2003 0-1		MDL	RL	ASB2B 10/11/2003 10-12		MDL	RL	ASB2B-DUP(SBD-10) 10/11/2003 10-12		MDL	RL
								Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
PAHs (ug/kg)																															
Benzo(a)anthracene	56-55-3	C	--	2.2E+02	3.9E+03	4.8E+02	100	<26	U	0.96	26	<27	U	1.04	27	<27	U	1.04	27	3.6	J	1	26	<28	U	1.04	28	<29	U	1.12	29
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	100	5	J	1.44	26	<27	U	1.56	27	<27	U	1.56	27	3.7	J	1.5	26	<28	U	1.56	28	<29	U	1.68	29
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	100	17	J,J,c	2.04	26	<27	U	2.21	27	<27	U	2.21	27	7.7	J	2.13	26	<28	U	2.21	28	<29	U	2.38	29
Indeno(1,2,3-cd)pyrene	193-39-5	C	--	2.2E+02	3.9E+03	4.2E+03	100	<26	U	0.84	26	<27	U	0.91	27	<27	U	0.91	27	6.2	J	0.875	26	<28	U	0.91	28	<29	U	0.98	29
Phenanthrene	85-01-8	N	--	2.3E+05	3.1E+06	--	100	3.1	J	0.72	26	<27	U	0.78	27	<27	U	0.78	27	4	J	0.75	26	<28	U	0.78	28	<29	U	0.84	29
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	100	11	J	1.08	26	<27	U	1.17	27	<27	U	1.17	27	21	J	1.13	26	<28	U	1.17	28	<29	U	1.26	29
Explosives (mg/kg)																															
2,4-Dinitrotoluene	121-14-2	N	--	1.6E+01	2.0E+02	5.7E-01	--	<0.5	U	0.142	0.5	<0.5	U	0.142	0.5	<0.5	U	0.142	0.5	<0.5	U	0.142	0.5	<0.5	U	0.142	0.5	<0.5	U	0.142	0.5
2,6-Dinitrotoluene	606-20-2	N	--	7.8E+00	1.0E+02	2.5E-01	--	<1	U	0.25	1	<1	U	0.25	1	<1	U	0.25	1	<1	U	0.25	1	<1	U	0.25	1	<1	U	0.25	1
Dinitrotoluene Mix	--	C	--	9.4E-01	4.2E+00	--	--	ND				ND				ND				ND				ND				ND			
Cyanide (mg/kg)																															
Cyanide	57-12-5	N	--	156.4	2,044	147.5	0.005	0.06	J	0.0356	0.5	<0.5	U	0.0356	0.5	0.47	J	0.0356	0.5	0.23	J	0.0356	0.5	0.18	J	0.0356	0.5	0.14	J	0.0356	0.5
Percent Solids (%)																															
Percent Solids	--	--	--	--	--	--	--	82		0.1	0.1	78		0.1	0.1	77		0.1	0.1	80		0.1	0.1	76		0.1	0.1	72		0.1	0.1

Table 10-1
Area of Concern A - Summary of Detected Chemicals in Analytical Samples
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	Draft BTAG Screening Level	ASB2C 10/11/2003 21-23		MDL	RL	ASB3A 10/11/2003 0-1		MDL	RL	ASB3B 10/11/2003 6-8		MDL	RL	ASB3C 10/11/2003 13-14.7		MDL	RL	ASB4-A 4/20/2006 0-1		MDL	RL	ASB4A-DUP(Dup-1) 4/20/2006 0-1		MDL	RL
								Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
TAL Metals (mg/kg)																															
Aluminum	7429-90-5	--	40,041	--	--	--	1	35,000		9.15	250	32,100		9.15	250	28,300		9.15	250	24,500		1.83	50	33,000	,J,k	79	2,500	28,000	,J,k	40	1,200
Antimony	7440-36-0	N	--	3.13	40.88	13.2	0.48	<0.5	U	0.0518	0.5	<0.5	U	0.0518	0.5	<0.5	U	0.0518	0.5	<0.5	U	0.0518	0.5	0.1	J,J,k	0.036	0.5	0.24	J,J,k	0.036	0.5
Arsenic	7440-38-2	C	15.8	0.43	1.91	0.026	328	***4.5***		0.0232	0.4	***1.9***		0.0232	0.4	***1.6***		0.0232	0.4	***2.2***		0.0232	0.4	***2***	,J,k	0.023	0.4	***1.7***	,J,k	0.023	0.4
Barium	7440-39-3	N	209	1,564	20,440	6,015	440	88		0.106	5	114		0.106	5	63		0.106	5	50		0.106	5	67	,J,k	0.1	5	57	,J,k	0.1	5
Beryllium	7440-41-7	N	1.02	15.6	204.4	1,154	0.02	0.59	J	0.167	1	0.62	J	0.0333	1	0.57	J	0.0333	1	0.64	J	0.0333	1	0.55	J,J,k	0.016	1	0.64	J,J,k	0.016	1
Cadmium	7440-43-9	N	0.69	3.9	51.1	27.4	2.5	<1	U	0.182	1	<1	U	0.182	1	0.75	J	0.182	1	<1	U	0.182	1	0.076	J,J,k	0.0073	1	0.17	J,J,k	0.0073	1
Calcium	7440-70-2	--	--	--	--	--	--	310		16.6	250	3,910		16.6	250	644		16.6	250	293		16.6	250	2,200	,J,k	10	250	2,100	,J,k	10	250
Chromium[1]	7440-47-3	N	65.3	23.5	306.6	42.05	0.0075	***52***	,J,m	0.912	5	33	,J,m	0.912	5	30	,J,m	0.912	5	41	,J,m	0.912	5	29	,J,k	0.57	5	***43***	,J,k	0.57	5
Cobalt	7440-48-4	--	72.3	--	--	--	100	20	,J,s	0.208	1	24	,J,s	0.208	1	12	,J,s	0.208	1	11	,J,s	0.208	1	6.2	,J,k	0.35	1	6.2	,J,k	0.35	1
Copper	7440-50-8	N	53.5	312.9	4,088	10,518	15	22		0.368	2	36		0.368	2	17		0.368	2	14		0.368	2	460	,J,k	0.22	10	560	,J,k	0.45	20
Iron	7439-89-6	N	50,962	2,346	30,660	--	12	40,200		71.6	1,000	38,300		71.6	1,000	36,500		71.6	1,000	33,600		71.6	1,000	40,000	,J,k	23	500	66,000	,J,k	46	1,000
Lead[2]	7439-92-1	--	26.8	400	750	--	0.01	12		0.0218	1	34		0.0218	1	11		0.0218	1	12		0.0218	1	30	,J,k	0.041	1	34	,J,k	0.041	1
Magnesium	7439-95-4	--	--	--	--	--	4,400	2,120		3.21	250	2,090		3.21	250	1,980		3.21	250	1,160		3.21	250	2,600	,J,k	3.4	250	2,400	,J,k	3.4	250
Manganese	7439-96-5	N	2,543	156.4	2,044	951.9	330	704		0.264	5	***2,400***		1.32	25	483		0.264	5	330		0.264	5	290	,J,k	0.14	10	350	,J,k	0.14	10
Mercury[3]	7439-97-6	--	0.13	2.35	30.66	--	0.058	0.02	J	0.0077	0.1	0.052	J	0.0077	0.1	0.03	J	0.0077	0.1	0.025	J	0.0077	0.1	0.041	J,J,k	0.0048	0.1	0.035	J,J,k	0.0048	0.1
Potassium	7440-09-7	--	--	--	--	--	--	1,260		5	100	1,410		5	100	1,670		5	100	1,010		5	100	1,600	,J,k	7.5	100	1,500	,J,k	7.5	100
Nickel	7440-02-0	N	62.8	156.4	2,044	--	2	20		0.0356	0.5	12		0.0356	0.5	13		0.0356	0.5	14		0.0356	0.5	16	,J,k	0.027	0.5	13	,J,k	0.027	0.5
Selenium	7782-49-2	N	--	39.1	511	18.98	1.8	0.45	J	0.0502	1	0.3	J	0.0502	1	0.4	J	0.0502	1	0.4	J	0.0502	1	<1	U,UJ,k	0.063	1	0.07	J,J,k	0.063	1
Silver	7440-22-4	N	--	39.1	511	31.03	0.0000098	0.075	J	0.0044	3	0.054	J	0.0044	3	0.048	J	0.0044	3	0.074	J	0.0044	3	0.1	J,J,k	0.017	3	0.065	J,J,k	0.017	3
Sodium	7440-23-5	--	--	--	--	--	--	50	J	18.1	100	207		18.1	100	237		18.1	100	131		18.1	100	120	,J,k	19	100	49	J,J,k	19	100
Thallium	7440-28-0	N	2.11	0.548	7.154	3.64	0.001	0.21	J,B,x	0.027	0.5	0.48	J	0.027	0.5	0.2	J,B,x	0.027	0.5	0.15	J,B,x	0.027	0.5	0.32	J,J,k	0.0085	0.5	0.24	J,J,k	0.0085	0.5
Vanadium	7440-62-2	N	108	7.8	102.2	730.1	0.5	54	,L,m	0.207	1	68	,L,m	0.207	1	66	,L,m	0.207	1	42	,L,m	0.207	1	91	,J,k	0.047	2	75	,J,k	0.047	2
Zinc	7440-66-6	N	202	2,346	30,660	13,622	10	40		0.517	4	56		0.517	4	46		0.517	4	44		0.517	4	76	,J,k	0.85	4	140	,J,k	4.3	20
Pesticides/PCBs (ug/kg)																															
Dieldrin	60-57-1	C	--	4.0E+01	1.8E+02	2.2E+00	100	NT				NT				NT				NT				***14***	J,J,g	0.6	26	***3.2***	J,J,g	0.61	26
Aroclor 1254[4]	11097-69-1	C	--	1.6E+02	1.4E+03	1.1E+03	100	NT				NT				NT				NT				200		7.7	42	30	J	7.8	43
VOCs (ug/kg)																															
Acetone	67-64-1	N	--	7.0E+06	9.2E+07	2.2E+04	--	23	J,B,z	13.1	27	12	J,B,z	11.2	25	19	J,B,z	11.2	25	18	J,B,z	11.2	24	380	J,B,z	73	960	380	J,B,z	74	970
Benzene	71-43-2	C	--	1.2E+04	5.2E+04	1.9E+00	100	<6.8	U	0.939	6.8	<6.2	U	0.805	6.2	<6.2	U	0.805	6.2	<6	U	0.805	6	***13***	J	4.2	64	<65	U	4.2	65
Ethylbenzene	100-41-4	N	--	7.8E+05	1.0E+07	1.5E+04	100	<6.8	U	2.24	6.8	<6.2	U	1.92	6.2	<6.2	U	1.92	6.2	<6	U	1.92	6	15	J	7	64	<65	U	7.1	65
Methyl acetate	79-20-9	N	--	7.8E+06	1.0E+08	2.5E+04	--	<27	U	5.25	27	<25	U	4.5	25	<25	U	4.5	25	<24	U	4.5	24	85	J	25	320	89	J	25	320
Methylene chloride	75-09-2	C	--	8.5E+04	3.8E+05	1.9E+01	300	11	J	1.68	27	5.3	J	1.44	25	6.6	J	1.44	25	3.7	J	1.44	24	***94***	JB,B,z	13	320	***97***	JB,B,z	14	320
Toluene	108-88-3	N	--	6.3E+05	8.2E+06	2.7E+04	100	<6.8	U	1.61	6.8	<6.2	U	1.38	6.2	<6.2	U	1.38	6.2	<6	U	1.38	6	81		16	64	<65	U	17	65
Xylenes (Total)	1330-20-7	N	--	1.6E+06	2.0E+07	3.0E+03	100	<6.8	U	2.13	6.8	<6.2	U	1.82	6.2	<6.2	U	1.82	6.2	<6	U	1.82	6	100	J	16	190	<190	U	16	190
SVOCs (ug/kg)																															
1,1'-Biphenyl	92-52-4	N	--	3.9E+05	5.1E+06	9.6E+04	--	<230	U	3.44	230	<210	U	2.95	210	<210	U	2.95	210	<200	U	2.95	200	<22	U	2.1	22	<22	U	2.1	22
2-Methylnaphthalene	91-57-6	N	--	3.1E+04	4.1E+05	4.4E+03	--	<230	U	3.84	230	<210	U	3.29	210	<210	U	3.29	210	<200	U	3.29	200	<22	U	1.9	22	<22	U	2	22
2,4-Dinitrotoluene	121-14-2	N	--	1.6E+04	2.0E+05	5.7E+02	--	<230	U	4.41	230	***28,000***	J	977	53,000	23	J	3.78	210	<200	U	3.78	200	<44	U	14	44	<44	U	14	44
2,6-Dinitrotoluene	606-20-2	N	--	7.8E+03	1.0E+05	2.5E+02	--	<230	U	38.8	230	***3,300***	E,J,q	33.2	210	<210	U	33.2	210	<200	U	33.2	200	<22	U	1.7	22	<22	U	1.7	22
Dinitrotoluene Mix	--	C	--	9.4E+02	4.2E+03	--	--	ND				31,300				23				ND				ND				ND			
Acenaphthene	83-32-9	N	--	4.7E+05	6.1E+06	1.0E+05	100	<230	U	2.41	230	<210	U	2.06	210	<210	U	2.06	210	<200	U	2.06	200	<22	U	1.7	22	<22	U	1.7	22
Acenaphthylene[5]	208-96-8	N	--	2.3E+05	3.1E+06	--	100	<230	U	2.1	230	<210	U	1.82	210	<210	U	1.8	210	<200	U	1.8	200	<22	U	1.7	22	<22	U	1.7	22
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	100	<230	U	6.47	230	<210	U	5.54	210	<210	U	5.54	210	<200	U	5.54	200	<22	U	2.1	22	<22	U	2.1	22
Benzo(a)anthracene	56-55-3	C	--	2.2E+02	3.9E+03	4.8E+02	100	<230	U	18.6	230	<210	U	16	210	<210	U	16	210	<200	U	16	200	<22	U	3.9	22	<22	U	3.9	22
Benzo(a)pyrene	50-32-8	C	--	2.2E+01	3.9E+02	1.2E+02	100	<230	U	7.99	230	10	J,J,i	6.85	210	<210	U	6.85	210	<200	U	6.85	200	<22	U	3.9	22	<22	U	4	22
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	100	<230	U	13.7	230	<210	U,UJ,i	11.7	210	<210	U	11.7	210	<200	U	11.7	200	<22	U	3.9	22	<22	U	3.9	22
Benzo(k)fluoranthene	207-08-9	C	--	2.2E+03	3.9E+04	1.5E+04	100	<230	U	18.8	230	<210	U,UJ,i	16.1	210	<210	U	16.1	210	<200	U	16.1	200	<22	U	2.8	22	<22	U	2.8	22
Bis(2-ethylhexyl)phthalate	117-81-7	C	--	4.6E+04	2.0E+05	2.9E+06	--	34	J	2.9	230	1,200	E,J,q	2.48	210	20	J	2.48	210	22	J	2.48	200	160	,J,f	25	87	310	,J,f	25	88
Butylbenzylphthalate	85-68-7	N	--	1.6E+06	2.0E+07	1.7E+07	--	9	J	6.27	230	240		5.38	210	<210	U	5.38	210	<200	U	5.38	200	<87	U	27	87	<88	U	28	88
Di-n-butylphthalate	84-74-2	N	--	7.8E+05	1.0E+07	5.0E+06	--	600		5.35	230	130,000		1180	53,000	320		4.58	210	320		4.58	200	150		3.4	22	100		3.4	22
Di-n-octylphthalate	117-84-0	--	--	--	--	--	--	<230	U	4.34	230	38	J	3.72	210	<210	U	3.72	210	<200	U	3.72	200	14	J	2.6	22	12	J	2.6	22
Diethylphthalate	84-66-2	N	--	6.3E+06	8.2E+07	4.5E+05	--	8	J	2.66	230	14	J	2.28	210	10	J	2.28	210	8	J	2.28	200	26		2	22	6.8	J	2	22
Dimethylphthalate	131-11-3	--	--	--	--	--	--	<230	U	4.63	230	<210	U	3.97	210	<210	U	3.97	210	<200	U	3.97	200	<22	U	1.9	22	<22	U	1.9	22
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	100	<230	U	14.3	230	<210	U	12.2	210	<210	U	12.2	210	<200	J	12.2	200	<22	U	3.6	22	<22	U	3.6	22
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	100	<230	U	3.29	230	8.8	J	2.82	210	<210	U	2.82	210	<200	J	2.82	200	<22	U	2.4	22	<22	U	2.4	22
Fluorene	86-73-7	N	--	3.1E+05	4.1E+06	1.4E+05	100	<230	U	2.35	230	<210	U	2.02	210	<210	U	2.02	210	<200	U	2.02	200	<22	U	2	22	<22	U	2	22
Indeno(1,2,3-cd)pyrene	193-39-5	C	--	2.2E+02	3.9E+03	4.2E+03	100	<230	U	5.49	230	<210	UJ,UJ,i	4.7	210	<210	U	4.7	210	<200	U	4.7	200	<87	U	25	87	<88	U	25	88
N-Nitrosodiphenylamine	86-30-6	C	--	1.3E+05	5.8E+05	7.6E+02	--	<230	U	6.65	230	***4,700***	J	1470	53,000	8	J	5.7	210	<200	U	5.7	200	***1,000***	,J,f	1.5	22	340	,J,f	1.6	22
Pentachlorophenol	87-86-5	C	--	5.3E+03	2.4E+04	--	100	<450	U	6.15	450	<410	U	5.27	410	<410	U	5.27	410	<390	U	5.27	390	<44	U	2.8	44	<44	U	2.8	44
Phenanthrene[5]	85-01-8	N	--	2.3E+05	3.1E+06	--	100	<230	U	3.22	230	3.8	J	2.76	210	<210	U	2.76	210	<200	J	2.76	200	<22	U	2.3	22	<22	U	2.3	22
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	100	<230	U	2.07	230	6.7	J	1.78	210	<210	U	1.78	210	<200	J	1.78	200	<22	U	2.6	22	<22	U	2.6	22
SVOC TICs (ug/kg)																															
(Z)-9-Octadecenamide	301-02-0	--	--	--	--	--	--	NI				NI				NI				NI				NT				NT			
1,2-Benzenedicarboxylic acid, butyl 2-et	85-69-8	--	--	--	--	--	--	NI				560	E,NJ,t	0	10	NI				NI				NT				NT			
1,2-Benzenedicarboxylic acid, butyl 2-me	17851-53-5	--	--	--	--	--	--	NI				NI				420	E,NJ,t	0	10	340	E,NJ,t	0	10	NT				NT			
1,2-Benzenedicarboxylicacid, bis(2-methy	84-69-5	--	--	--	--	--	--	500	E,NJ,t	0	100	170	E,NJ,t	0	100	NI				NI				NT				NT			
1-Dodecanol	112-53-8	--	--	--	--	--	--	NI				NI				47	E,NJ,t	0	10	NI				NT				NT			
1-Heptadecanol	1454-85-9	--	--	--	--	--	--	260	E,NJ,t	0	10	NI				NI				NI				NT				NT			
1-Pentadecanol	629-76-5	--	--	--	--	--	--	NI				NI				40	E,NJ,t	0	10	NI				NT				NT			
2(5H)-Furanone, 5,5-dimethyl-	20019-64-1	--	--	--	--	--	--	NI				NI				NI				NI				NT				NT			
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	--	--	--	--	--	--	NI				NI				94	E,B,x	0	100	65	E,B,x	0	100	NT				NT			
2-Ethyl-1-Hexanol	104-76-7	--	--	--	--	--	--	NI				NI				NI				30	E,NJ,t	0	1,700	NT				NT			
Benzenamine, 4-nitro-N-phenyl-	836-30-6	--	--	--	--	--	--	NI				310	E,NJ,t	0	10	NI				NI				NT				NT			
Benzeneamine, 2-nitro-N-phenyl-	119-75-5	--	--	--	--	--	--	NI				520	E,NJ,t	0	10	NI				NI				NT				NT			
Bis(2-ethylhexyl)maleate	142-16-5	--	--	--	--	--	--	76	E,NJ,t	0	100	NI				NI				NI				NT				NT			
Erucylamide	112-84-5	--	--	--	--	--	--	NI				NI				NI				950	E,B,x	0	10	NT				NT			
Phosphonic acid, dioctadecyl ester	19047-85-9	--	--	--	--	--	--	NI				NI				NI				NI				NT				NT			

Table 10-1
Area of Concern A - Summary of Detected Chemicals in Analytical Samples
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	Draft BTAG Screening Level	ASB2C 10/11/2003 21-23		MDL	RL	ASB3A 10/11/2003 0-1		MDL	RL	ASB3B 10/11/2003 6-8		MDL	RL	ASB3C 10/11/2003 13-14.7		MDL	RL	ASB4-A 4/20/2006 0-1		MDL	RL	ASB4A-DUP(Dup-1) 4/20/2006 0-1		MDL	RL
								Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
PAHs (ug/kg)																															
Benzo(a)anthracene	56-55-3	C	--	2.2E+02	3.9E+03	4.8E+02	100	<65	U	1.12	65	<26	U	1.04	26	<26	U,UL,s	1.04	26	<25	U	0.96	25	NT				NT			
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	100	<65	U	1.68	65	<26	U	1.56	26	<26	U,UL,s	1.56	26	1.8	J	1.44	25	NT				NT			
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	100	<65	U	2.38	65	<26	U	2.21	26	<26	U,UL,s	2.21	26	8.7	J	2.04	25	NT				NT			
Indeno(1,2,3-cd)pyrene	193-39-5	C	--	2.2E+02	3.9E+03	4.2E+03	100	<65	U	0.98	65	<26	U	0.91	26	<26	U,UL,s	0.91	26	<25	U	0.84	25	NT				NT			
Phenanthrene	85-01-8	N	--	2.3E+05	3.1E+06	--	100	<65	U	0.84	65	1.9	J	0.78	26	<26	U,UL,s	0.78	26	3	J	0.72	25	NT				NT			
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	100	<65	U	1.26	65	<26	U	1.17	26	<26	U,UL,s	1.17	26	9.9	J	1.08	25	NT				NT			
Explosives (mg/kg)																															
2,4-Dinitrotoluene	121-14-2	N	--	1.6E+01	2.0E+02	5.7E-01	--	0.2	J	0.142	0.5	***20***		0.71	0.5	<0.5	U	0.142	0.5	<0.5	U	0.142	0.5	<0.5	U	0.073	0.5	<0.5	U	0.073	0.5
2,6-Dinitrotoluene	606-20-2	N	--	7.8E+00	1.0E+02	2.5E-01	--	<1	U	0.25	1	<1	U	0.25	1	<1	U	0.25	1	<1	U	0.25	1	<1	U	0.099	1	<1	U	0.099	1
Dinitrotoluene Mix	--	C	--	9.4E-01	4.2E+00	--	--	0.2				20				ND				ND				ND				ND			
Cyanide (mg/kg)																															
Cyanide	57-12-5	N	--	156.4	2,044	147.5	0.005	<0.5	U	0.0356	0.5	0.15	J	0.0356	0.5	<0.5	U	0.0356	0.5	<0.5	U	0.0356	0.5	<0.26	U	0.046	0.26	<0.26	U	0.046	0.26
Percent Solids (%)																															
Percent Solids	--	--	--	--	--	--	--	73		0.1	0.1	80		0.1	0.1	80		0.1	0.1	84		0.1	0.1	78		0.1	0.1	77		0.1	0.1

Table 10-1
Area of Concern A - Summary of Detected Chemicals in Analytical Samples
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	Draft BTAG Screening Level	ASB4-B 4/20/2006 10-11		MDL	RL	ASB4-C 4/20/2006 20		MDL	RL	ASB5-A 4/20/2006 0-1		MDL	RL	ASB5-B 4/20/2006 7		MDL	RL
								Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
TAL Metals (mg/kg)																							
Aluminum	7429-90-5	--	40,041	--	--	--	1	26,000	,J,k	79	2500	27,000	,J,k	40	1,200	21,000	,J,k	1.6	50	36,000	,J,k	79	2,500
Antimony	7440-36-0	N	--	3.13	40.88	13.2	0.48	<0.5	U,UJ,k	0.036	0.5	0.14	J,J,k	0.036	0.5	0.63	,J,k	0.036	0.5	<0.5	U,UJ,k	0.036	0.5
Arsenic	7440-38-2	C	15.8	0.43	1.91	0.026	328	***1.6***	,J,k	0.023	0.4	***4.2***	,J,k	0.023	0.4	***20***	,J,k	0.023	0.4	***1.8***	,J,k	0.023	0.4
Barium	7440-39-3	N	209	1,564	20,440	6,015	440	50	,J,k	0.1	5	86	,J,k	0.1	5	150	,J,k	0.1	5	94	,J,k	0.1	5
Beryllium	7440-41-7	N	1.02	15.6	204.4	1,154	0.02	0.59	J,J,k	0.016	1	1.1	,J,k	0.016	1	0.59	J,J,k	0.016	1	0.84	J,J,k	0.016	1
Cadmium	7440-43-9	N	0.69	3.9	51.1	27.4	2.5	0.036	J,J,k	0.0073	1	0.15	J,J,k	0.0073	1	1.3	,J,k	0.0073	1	0.072	J,J,k	0.0073	1
Calcium	7440-70-2	--	--	--	--	--	--	710	,J,k	10	250	320	,J,k	10	250	18,000	,J,k	10	250	220	J,J,k	10	250
Chromium[1]	7440-47-3	N	65.3	23.5	306.6	42.05	0.0075	28	,J,k	0.57	5	21	,J,k	0.57	5	***100***	,J,k	1.1	10	30	,J,k	0.57	5
Cobalt	7440-48-4	--	72.3	--	--	--	100	6.3	,J,k	0.35	1	33	,J,k	0.35	1	6.9	,J,k	0.35	1	22	,J,k	0.35	1
Copper	7440-50-8	N	53.5	312.9	4,088	10,518	15	15	,J,k	0.022	1	30	,J,k	0.022	1	150	,J,k	0.22	10	21	,J,k	0.022	1
Iron	7439-89-6	N	50,962	2,346	30,660	--	12	33,000	,J,k	23	500	55,000	,J,k	46	1,000	33,000	,J,k	23	500	47,000	,J,k	23	500
Lead[2]	7439-92-1	--	26.8	400	750	--	0.01	13	,J,k	0.041	1	25	,J,k	0.041	1	330	,J,k	0.41	10	24	,J,k	0.041	1
Magnesium	7439-95-4	--	--	--	--	--	4,400	1,300	,J,k	3.4	250	3,900	,J,k	3.4	250	10,000	,J,k	3.4	250	2,700	,J,k	3.4	250
Manganese	7439-96-5	N	2,543	156.4	2,044	951.9	330	260	,J,k	0.14	10	***1,700***	,J,k	3.5	250	310	,J,k	0.14	10	950	,J,k	0.14	10
Mercury[3]	7439-97-6	--	0.13	2.35	30.66	--	0.058	0.033	J,J,k	0.0048	0.1	0.025	J,J,k	0.0048	0.1	0.14	,J,k	0.0048	0.1	0.062	J,J,k	0.0048	0.1
Potassium	7440-09-7	--	--	--	--	--	--	1,200	,J,k	7.5	100	2,600	,J,k	7.5	100	1,100	,J,k	7.5	100	2,600	,J,k	7.5	100
Nickel	7440-02-0	N	62.8	156.4	2,044	--	2	12	,J,k	0.027	0.5	32	,J,k	0.027	0.5	13	,J,k	0.027	0.5	19	,J,k	0.027	0.5
Selenium	7782-49-2	N	--	39.1	511	18.98	1.8	0.07	J,J,k	0.063	1	0.1	J,J,k	0.063	1	0.32	J,J,k	0.063	1	0.16	J,J,k	0.063	1
Silver	7440-22-4	N	--	39.1	511	31.03	0.0000098	0.045	J,J,k	0.017	3	0.19	J,J,k	0.017	3	0.18	J,J,k	0.017	3	0.064	J,J,k	0.017	3
Sodium	7440-23-5	--	--	--	--	--	--	330	,J,k	19	100	<100	U,UJ,k	19	100	41	J,J,k	19	100	<100	U,J,k	19	100
Thallium	7440-28-0	N	2.11	0.548	7.154	3.64	0.001	0.19	J,J,k	0.0085	0.5	0.37	J,J,k	0.0085	0.5	0.21	J,J,k	0.0085	0.5	0.39	J,J,k	0.0085	0.5
Vanadium	7440-62-2	N	108	7.8	102.2	730.1	0.5	71	,J,k	0.047	2	77	,J,k	0.047	2	56	,J,k	0.047	2	96	,J,k	0.047	2
Zinc	7440-66-6	N	202	2,346	30,660	13,622	10	47	,J,k	0.85	4	37	,J,k	0.85	4	1,400	,J,k	43	200	69	,J,k	0.85	4
Pesticides/PCBs (ug/kg)																							
Dieldrin	60-57-1	C	--	4.0E+01	1.8E+02	2.2E+00	100	***4.6***	J,J,g	0.6	26	<30	U	0.7	30	<510	U	12	510	<27	U	0.65	27
Aroclor 1254[4]	11097-69-1	C	--	1.6E+02	1.4E+03	1.1E+03	100	41	J	7.7	42	<49	U	9	49	***2,400***		76	420	160		8.2	45
VOCs (ug/kg)																							
Acetone	67-64-1	N	--	7.0E+06	9.2E+07	2.2E+04	--	390	J,B,z	73	960	460	J,B,z	85	1,100	420	J,B,z	72	950	370	J,B,z	78	1,000
Benzene	71-43-2	C	--	1.2E+04	5.2E+04	1.9E+00	100	<64	U	4.2	64	<75	U	4.9	75	<63	U	4.1	63	<68	U	4.5	68
Ethylbenzene	100-41-4	N	--	7.8E+05	1.0E+07	1.5E+04	100	<64	U	7	64	<75	U	8.2	75	<63	U	6.9	63	<68	U	7.5	68
Methyl acetate	79-20-9	N	--	7.8E+06	1.0E+08	2.5E+04	--	190	J	25	320	81	J	29	370	140	J	25	320	76	J	27	340
Methylene chloride	75-09-2	C	--	8.5E+04	3.8E+05	1.9E+01	300	***99***	JB,B,z	13	320	***110***	JB,B,z	16	370	***94***	JB,B,z	13	320	***100***	JB,B,z	14	340
Toluene	108-88-3	N	--	6.3E+05	8.2E+06	2.7E+04	100	<64	U	16	64	<75	U	19	75	<63	U	16	63	<68	U	18	68
Xylenes (Total)	1330-20-7	N	--	1.6E+06	2.0E+07	3.0E+03	100	<190	U	16	190	<220	U	19	220	<190	U	16	190	<210	U	17	210
SVOCs (ug/kg)																							
1,1'-Biphenyl	92-52-4	N	--	3.9E+05	5.1E+06	9.6E+04	--	<22	U	2.1	22	<25	U	2.4	25	2.2	J	2.1	22	<23	U	2.2	23
2-Methylnaphthalene	91-57-6	N	--	3.1E+04	4.1E+05	4.4E+03	--	<22	U	1.9	22	<25	U	2.3	25	4.9	J	1.9	22	<23	U	2.1	23
2,4-Dinitrotoluene	121-14-2	N	--	1.6E+04	2.0E+05	5.7E+02	--	<44	U	14	44	<51	U	16	51	***11,000***		1,400	4,300	<47	U	15	47
2,6-Dinitrotoluene	606-20-2	N	--	7.8E+03	1.0E+05	2.5E+02	--	<22	U	1.7	22	<25	U	2	25	***940***		17	220	<23	U	1.8	23
Dinitrotoluene Mix	--	C	--	9.4E+02	4.2E+03	--	--	ND				ND				11,940				ND			
Acenaphthene	83-32-9	N	--	4.7E+05	6.1E+06	1.0E+05	100	<22	U	1.7	22	<25	U	2	25	6.6	J	1.7	22	<23	U	1.8	23
Acenaphthylene[5]	208-96-8	N	--	2.3E+05	3.1E+06	--	100	<22	U	1.7	22	<25	U	2	25	21	J	1.7	22	<23	U	1.8	23
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	100	<22	U	2.1	22	<25	U	2.4	25	21	J	2.1	22	<23	U	2.2	23
Benzo(a)anthracene	56-55-3	C	--	2.2E+02	3.9E+03	4.8E+02	100	<22	U	3.9	22	<25	U	4.5	25	72		3.8	22	<23	U	4.2	23
Benzo(a)pyrene	50-32-8	C	--	2.2E+01	3.9E+02	1.2E+02	100	<22	U	3.9	22	<25	U	4.6	25	22		3.9	22	<23	U	4.2	23
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	100	<22	U	3.9	22	<25	U	4.5	25	120		3.8	22	<23	U	4.1	23
Benzo(k)fluoranthene	207-08-9	C	--	2.2E+03	3.9E+04	1.5E+04	100	<22	U	2.8	22	<25	U	3.2	25	36		2.7	22	<23	U	3	23
Bis(2-ethylhexyl)phthalate	117-81-7	C	--	4.6E+04	2.0E+05	2.9E+06	--	420		25	87	38	J	29	100	5,700		250	860	130		27	93
Butylbenzylphthalate	85-68-7	N	--	1.6E+06	2.0E+07	1.7E+07	--	<87	U	27	87	<100	U	32	100	160		27	86	<93	U	29	93
Di-n-butylphthalate	84-74-2	N	--	7.8E+05	1.0E+07	5.0E+06	--	470		3.4	22	9.8	J	3.9	25	62,000		330	2,200	89		3.6	23
Di-n-octylphthalate	117-84-0	--	--	--	--	--	--	13	J	2.6	22	<25	U	3	25	55		2.5	22	<23	U	2.8	23
Diethylphthalate	84-66-2	N	--	6.3E+06	8.2E+07	4.5E+05	--	8.4	J	2	22	7.7	J	2.3	25	24		1.9	22	3.9	J	2.1	23
Dimethylphthalate	131-11-3	--	--	--	--	--	--	<22	U	1.9	22	<25	U	2.2	25	210		1.9	22	<23	U	2	23
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	100	<22	U	3.6	22	<25	U	4.2	25	87		3.5	22	<23	U	3.8	23
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	100	<22	U	2.4	22	<25	U	2.8	25	430		2.4	22	<23	U	2.5	23
Fluorene	86-73-7	N	--	3.1E+05	4.1E+06	1.4E+05	100	<22	U	2	22	<25	U	2.3	25	14	J	1.9	22	<23	U	2.1	23
Indeno(1,2,3-cd)pyrene	193-39-5	C	--	2.2E+02	3.9E+03	4.2E+03	100	<87	U	25	87	<100	U	29	100	<86	U	24	86	<93	U	26	93
N-Nitrosodiphenylamine	86-30-6	C	--	1.3E+05	5.8E+05	7.6E+02	--	150		1.5	22	<25	U	1.8	25	***2,900***		15	220	5.2	J	1.6	23
Pentachlorophenol	87-86-5	C	--	5.3E+03	2.4E+04	--	100	<44	U	2.8	44	<51	U	3.3	51	100		2.8	43	<47	U	3	47
Phenanthrene[5]	85-01-8	N	--	2.3E+05	3.1E+06	--	100	<22	U	2.3	22	<25	U	2.6	25	160		2.2	22	<23	U	2.4	23
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	100	<22	U	2.6	22	<25	U	3	25	240		2.6	22	<23	U	2.8	23
SVOC TICs (ug/kg)																							
(Z)-9-Octadecenamide	301-02-0	--	--	--	--	--	--	NT				NT				NT				NT			
1,2-Benzenedicarboxylic acid, butyl 2-et	85-69-8	--	--	--	--	--	--	NT				NT				NT				NT			
1,2-Benzenedicarboxylic acid, butyl 2-me	17851-53-5	--	--	--	--	--	--	NT				NT				NT				NT			
1,2-Benzenedicarboxylicacid, bis(2-methy	84-69-5	--	--	--	--	--	--	NT				NT				NT				NT			
1-Dodecanol	112-53-8	--	--	--	--	--	--	NT				NT				NT				NT			
1-Heptadecanol	1454-85-9	--	--	--	--	--	--	NT				NT				NT				NT			
1-Pentadecanol	629-76-5	--	--	--	--	--	--	NT				NT				NT				NT			
2(5H)-Furanone, 5,5-dimethyl-	20019-64-1	--	--	--	--	--	--	NT				NT				NT				NT			
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	--	--	--	--	--	--	NT				NT				NT				NT			
2-Ethyl-1-Hexanol	104-76-7	--	--	--	--	--	--	NT				NT				NT				NT			
Benzenamine, 4-nitro-N-phenyl-	836-30-6	--	--	--	--	--	--	NT				NT				NT				NT			
Benzeneamine, 2-nitro-N-phenyl-	119-75-5	--	--	--	--	--	--	NT				NT				NT				NT			
Bis(2-ethylhexyl)maleate	142-16-5	--	--	--	--	--	--	NT				NT				NT				NT			
Erucylamide	112-84-5	--	--	--	--	--	--	NT				NT				NT				NT			
Phosphonic acid, dioctadecyl ester	19047-85-9	--	--	--	--	--	--	NT				NT				NT				NT			

Table 10-1
Area of Concern A - Summary of Detected Chemicals in Analytical Samples
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	Draft BTAG Screening Level	ASB4-B 4/20/2006 10-11		MDL	RL	ASB4-C 4/20/2006 20		MDL	RL	ASB5-A 4/20/2006 0-1		MDL	RL	ASB5-B 4/20/2006 7		MDL	RL
								Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
PAHs (ug/kg)																							
Benzo(a)anthracene	56-55-3	C	--	2.2E+02	3.9E+03	4.8E+02	100	NT				NT				NT				NT			
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	100	NT				NT				NT				NT			
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	100	NT				NT				NT				NT			
Indeno(1,2,3-cd)pyrene	193-39-5	C	--	2.2E+02	3.9E+03	4.2E+03	100	NT				NT				NT				NT			
Phenanthrene	85-01-8	N	--	2.3E+05	3.1E+06	--	100	NT				NT				NT				NT			
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	100	NT				NT				NT				NT			
Explosives (mg/kg)																							
2,4-Dinitrotoluene	121-14-2	N	--	1.6E+01	2.0E+02	5.7E-01	--	<0.5	U	0.073	0.5	<0.5	U	0.073	0.5	***1.3***		0.073	0.5	<0.5	U	0.073	0.5
2,6-Dinitrotoluene	606-20-2	N	--	7.8E+00	1.0E+02	2.5E-01	--	<1	U	0.099	1	<1	U	0.099	1	***0.25***	J,J,g	0.099	1	<1	U	0.099	1
Dinitrotoluene Mix	--	C	--	9.4E-01	4.2E+00	--	--	ND				ND				1.55				ND			
Cyanide (mg/kg)																							
Cyanide	57-12-5	N	--	156.4	2,044	147.5	0.005	<0.26	U	0.046	0.26	0.72		0.053	0.3	0.21	J	0.045	0.25	0.6		0.049	0.27
Percent Solids (%)																							
Percent Solids	--	--	--	--	--	--	--	78		0.1	0.1	67		0.1	0.1	79		0.1	0.1	73		0.1	0.1

Notes:

CAS = Chemical Abstracts Service
ft bgs = Feet Below Ground Surface
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyl
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
PAH = Polynuclear Aromatic Compound
TIC = Tentatively Identified Compound
(1) = Chromium VI RBC value was used
(2) = Lead criteria are Action Levels; see USEPA Region III guidance
(3) = Mercuric chloride soil RBC value used
(4) = Noncarcinogenic Residential RBC value for Aroclor 1254 was used for screening
(5) = RBC value for pyrene was used for these compounds
[A] = Facility-Wide Background Point Estimate as Reported in the Facility-Wide Background Study Report (IT 2001a)

MDL = Method Detection Limit
RL = Reporting Limit
NT = Not Tested
NI = Not Identified
LQ = Laboratory Qualifier
VQ = Validation Qualifier
r = Reason Code
NA = Not Applicable

RBC = USEPA Region III Risk-Based Concentration (RBC) values from the October 31, 2006, RBC Table and October 10, 2006, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
C = Carcinogenic per EPA RBC Table (October 2006)
N = Noncarcinogenic per EPA RBC Table (October 2006)
SSL DAF20 = Soil Screening Level at a Dilution Attenuation Factor of 20
BTAG = Biological Technical Assistance Group Screening Level, Draft 1995

= Concentration Exceeds Adjusted Soil Residential RBC

= Concentration Exceeds Adjusted Soil Industrial RBC

underline = Concentration Exceeds Site Background Values

bold italic = Concentration Exceeds SSL DAF20

= Concentration Exceeds BTAG Screening Level

Laboratory Qualifiers

U	The compound was analyzed for but not detected. The reporting limit will be adjusted to reflect any dilution, and for soil, the percent moisture.
J	Estimated value.
B	Analyte found in associated blank as well as in the sample.
E	Concentration exceeded the upper level of the calibration range of the instrument for that specific analysis. For TICs, compound not present in calibration standard, calculated using total peak areas ion chromatographs and response factor of 1.

Validation Qualifiers

B	Not detected substantially above the level reported in laboratory or field blanks.
N	Tentative Identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.
J	Analyte present. Reported value may not be accurate or precise.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
UL	Not detected, quantitation limit is probably higher.

Reason Codes

GC/MS Organics

c	Calibration failure; poor (RRF) or unstable (%D) response
f	Field duplicate imprecision
i	Tuning Failure or poor mass spectrometer performance
l	MS/MSD recovery failure
q	Concentration exceeded the linear range
s	Surrogate failure
t	Tentatively identified Compound
x	Field and/or equipment blank contamination
z	Method blank and/or storage blank contamination

Inorganics and Conventionals

f	Field duplicate imprecision
g	Dual column confirmation imprecis
m	MS/MSD recovery failure
s	No confirmation column
x	Trip blank contamination

GC and HPLC Organics

c	Calibration failure; poor or unstable (%D) response
f	Field duplicate imprecision
i	MS/MSD recovery failure
k	Laboratory duplicate imprecision
l	LCS recovery failure
q	Concentration exceeded the linear range
s	No confirmation column
x	Trip blank contamination
z	Method blank and/or storage blank contamination

Table 10-2
HHRS COPC Selection (Surface Soil) for AOC A
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	C/N	Adjusted RBC Residential	Adjusted RBC Industrial	COPC Flag (Y/N)	Rationale for Selection or Deletion
	TAL Metals (mg/kg)												
7429905	Aluminum	21,000	32,100	mg/kg	ASB3A	5/5	1.6 - 79	32,100	--	--	--	Y	NSV
7440360	Antimony	0.071	0.63	mg/kg	ASB5-A	4/5	0.036 - 0.0518	0.63	N	3.13	41	N	BSL
7440382	Arsenic	1.85	20	mg/kg	ASB5-A	5/5	0.023 - 0.0232	20	C	0.43	1.91	Y	***ARES/IND***
7440393	Barium	61	150	mg/kg	ASB5-A	5/5	0.1 - 0.106	150	N	1564.29	20,440	N	BSL
7440417	Beryllium	0.53	0.62	mg/kg	ASB3A	5/5	0.016 - 0.0333	0.62	N	15.64	204	N	BSL
7440439	Cadmium	0.123	1.3	mg/kg	ASB5-A	4/5	0.0073 - 0.182	1.3	N	3.91	51	N	BSL
7440702	Calcium	2,150	18,000	mg/kg	ASB5-A	5/5	10 - 16.6	18,000	--	--	--	N	Nutrient
7440473	Chromium [1]	33	100	mg/kg	ASB5-A	5/5	0.57 - 1.1	100	N	23.5	306.6	Y	**ARES**
7440484	Cobalt	6.2	24	mg/kg	ASB3A	5/5	0.208 - 0.35	24	--	--	--	Y	NSV
7440508	Copper	36	510	mg/kg	ASB4A-DUP AVG	5/5	0.22 - 1.84	510	N	312.9	4,088	Y	**ARES**
7439896	Iron	33,000	53,000	mg/kg	ASB4A-DUP AVG	5/5	23 - 71.6	53,000	N	2346	30,660	Y	***ARES/IND***
7439921	Lead [2]	25	330	mg/kg	ASB5-A	5/5	0.0218 - 0.41	330	--	400	750	N	BSL
7439954	Magnesium	2,090	10,000	mg/kg	ASB5-A	5/5	3.21 - 3.4	10,000	--	--	--	N	Nutrient
7439965	Manganese	310	2,400	mg/kg	ASB3A	5/5	0.14 - 1.32	2,400	N	156.4	2,044	Y	***ARES/IND***
7439976	Mercury [3]	0.038	0.14	mg/kg	ASB5-A	5/5	0.0048 - 0.0077	0.14	--	0.782	10	N	BSL
7440097	Potassium	1,100	1,550	mg/kg	ASB4A-DUP AVG	5/5	5 - 7.5	1,550	--	--	--	N	Nutrient
7440020	Nickel	12	14.5	mg/kg	ASB4A-DUP AVG	5/5	0.027 - 0.0356	14.5	N	156.4	2,044	N	BSL
7782492	Selenium	0.05075	0.56	mg/kg	ASB1A	5/5	0.0502 - 0.063	0.56	N	39.1	511	N	BSL
7440224	Silver	0.054	0.18	mg/kg	ASB5-A	5/5	0.0044 - 0.017	0.18	N	39.1	511	N	BSL
7440235	Sodium	41	207	mg/kg	ASB3A	5/5	18.1 - 19	207	--	--	--	N	Nutrient
7440280	Thallium	0.21	0.48	mg/kg	ASB3A	5/5	0.0085 - 0.027	0.48	N	0.55	7	N	BSL
7440622	Vanadium	56	83	mg/kg	ASB4A-DUP AVG	5/5	0.047 - 0.207	83	N	7.82	102	Y	**ARES**
7440666	Zinc	56	1,400	mg/kg	ASB5-A	5/5	0.517 - 43	1,400	N	2,346	30,660	N	BSL
	Pesticides/PCBs (ug/kg)												
60571	Dieldrin	8.6E+00	8.6E+00	µg/kg	ASB4A-DUP AVG	1/3	0.371 - 12	8.6E+00	C	4.0E+01	1.8E+02	N	BSL
11097691	Aroclor 1254 [4]	9.9E+00	2.4E+03	µg/kg	ASB5-A	3/3	3.6 - 76	2.4E+03	C	1.6E+02	1.4E+03	Y	***ARES/IND***
	VOCs (ug/kg)												
67641	Acetone	1.2E+01	4.2E+02	µg/kg	ASB5-A	5/5	11.2 - 74	4.2E+02	N	7.0E+06	9.2E+07	N	BSL
71432	Benzene	7.6E+00	7.6E+00	µg/kg	ASB4A-DUP AVG	1/5	0.805 - 4.2	7.6E+00	C	1.2E+04	5.2E+04	N	BSL
100414	Ethylbenzene	9.3E+00	9.3E+00	µg/kg	ASB4A-DUP AVG	1/5	1.92 - 7.1	9.3E+00	N	7.8E+05	1.0E+07	N	BSL
79209	Methyl acetate	8.7E+01	1.4E+02	µg/kg	ASB5-A	2/5	4.5 - 25	1.4E+02	N	7.8E+06	1.0E+08	N	BSL
75092	Methylene chloride	4.5E+00	9.6E+01	µg/kg	ASB4A-DUP AVG	5/5	1.44 - 14	9.6E+01	C	8.5E+04	3.8E+05	N	BSL
108883	Toluene	4.5E+01	4.5E+01	µg/kg	ASB4A-DUP AVG	1/5	1.38 - 17	4.5E+01	N	6.3E+05	8.2E+06	N	BSL
1330207	Xylenes (Total)	5.4E+01	5.4E+01	µg/kg	ASB4A-DUP AVG	1/5	1.82 - 16	5.4E+01	N	1.6E+06	2.0E+07	N	BSL
	SVOCs (ug/kg)												
92524	1,1'-Biphenyl	2.2E+00	2.2E+00	µg/kg	ASB5-A	1/5	2.1 - 2.95	2.2E+00	N	3.9E+05	5.1E+06	N	BSL
91576	2-Methylnaphthalene	4.9E+00	4.9E+00	µg/kg	ASB5-A	1/5	1.9 - 3.29	4.9E+00	N	3.1E+04	4.1E+05	N	BSL
121142	2,4-Dinitrotoluene	8.5E+02	2.8E+04	µg/kg	ASB3A	4/5	3.78 - 1400	2.8E+04	N	1.6E+04	2.0E+05	Y	**ARES**
606202	2,6-Dinitrotoluene	8.2E+01	3.3E+03	µg/kg	ASB3A	4/5	1.7 - 33.2	3.3E+03	N	7.8E+03	1.0E+05	N	BSL
--	Dinitrotoluene Mix	9.3E+02	3.1E+04	µg/kg	ASB3A	4/5	0 - 0	3.1E+04	C	9.4E+02	4.2E+03	Y	***ARES/IND***
83329	Acenaphthene	6.6E+00	6.6E+00	µg/kg	ASB5-A	1/5	1.7 - 2.06	6.6E+00	N	4.7E+05	6.1E+06	N	BSL
208968	Acenaphthylene [5]	2.1E+01	2.1E+01	µg/kg	ASB5-A	1/5	1.7 - 1.82	2.1E+01	N	2.3E+05	3.1E+06	N	BSL
120127	Anthracene	2.1E+01	2.1E+01	µg/kg	ASB5-A	1/5	2.1 - 5.54	2.1E+01	N	2.3E+06	3.1E+07	N	BSL
56553	Benzo(a)anthracene	7.2E+01	7.2E+01	µg/kg	ASB5-A	1/5	3.8 - 16	7.2E+01	C	2.2E+02	3.9E+03	N	BSL
50328	Benzo(a)pyrene	9.0E+00	2.2E+01	µg/kg	ASB5-A	3/5	3.9 - 6.85	2.2E+01	C	2.2E+01	3.9E+02	N	BSL
205992	Benzo(b)fluoranthene	1.6E+01	1.2E+02	µg/kg	ASB5-A	2/5	3.8 - 11.7	1.2E+02	C	2.2E+02	3.9E+03	N	BSL
207089	Benzo(k)fluoranthene	3.6E+01	3.6E+01	µg/kg	ASB5-A	1/5	2.7 - 16.1	3.6E+01	C	2.2E+03	3.9E+04	N	BSL
117840	Di-n-octylphthalate	1.3E+01	5.5E+01	µg/kg	ASB5-A	3/5	2.5 - 3.72	5.5E+01	--	--	--	Y	NSV
84662	Diethylphthalate	1.0E+01	2.4E+01	µg/kg	ASB5-A	5/5	1.9 - 2.28	2.4E+01	N	6.3E+06	8.2E+07	N	BSL
131113	Dimethylphthalate	2.1E+02	2.1E+02	µg/kg	ASB1A	2/5	1.9 - 3.97	2.1E+02	--	--	--	Y	NSV
193395	Indeno(1,2,3-cd)pyrene	6.0E+00	6.0E+00	µg/kg	ASB1A	1/5	4.7 - 25	6.0E+00	C	2.2E+02	3.9E+03	N	BSL
86306	N-Nitrosodiphenylamine	1.2E+02	4.7E+03	µg/kg	ASB3A	5/5	1.5 - 1470	4.7E+03	C	1.3E+05	5.8E+05	N	BSL
85018	Phenanthrene [5]	3.8E+00	1.6E+02	µg/kg	ASB5-A	3/5	2.2 - 2.76	1.6E+02	N	2.3E+05	3.1E+06	N	BSL

Table 10-2
HHRS COPC Selection (Surface Soil) for AOC A
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	C/N	Adjusted RBC Residential	Adjusted RBC Industrial	COPC Flag (Y/N)	Rationale for Selection or Deletion
	SVOC TICs (ug/kg)												
301020	(Z)-9-Octadecenamide	1.9E+02	1.9E+02	µg/kg	ASB2A	1/3	0 - 0	1.9E+02	--	--	--	Y	NSV
85698	1,2-Benzenedicarboxylic acid, butyl 2-et	5.6E+02	5.6E+02	µg/kg	ASB3A	1/3	0 - 0	5.6E+02	--	--	--	Y	NSV
17851535	1,2-Benzenedicarboxylic acid, butyl 2-me	6.0E+01	6.0E+01	µg/kg	ASB1A	1/3	0 - 0	6.0E+01	--	--	--	Y	NSV
84695	1,2-Benzenedicarboxylicacid, bis(2-methy	1.7E+02	4.9E+02	µg/kg	ASB2A	2/3	0 - 0	4.9E+02	--	--	--	Y	NSV
836306	Benzenamine, 4-nitro-N-phenyl-	3.1E+02	3.1E+02	µg/kg	ASB3A	1/3	0 - 0	3.1E+02	--	--	--	Y	NSV
119755	Benzeneamine, 2-nitro-N-phenyl-	1.4E+02	5.2E+02	µg/kg	ASB3A	2/3	0 - 0	5.2E+02	--	--	--	Y	NSV
112845	Erucylamide	1.1E+03	1.5E+03	µg/kg	ASB1A	2/3	0 - 0	1.5E+03	--	--	--	Y	NSV
	PAHs (ug/kg)												
56553	Benzo(a)anthracene	3.6E+00	3.6E+00	µg/kg	ASB2A	1/3	0.96 - 1.04	3.6E+00	C	2.2E+02	3.9E+03	N	BSL
218019	Chrysene	3.7E+00	5.0E+00	µg/kg	ASB1A	2/3	1.44 - 1.56	5.0E+00	C	2.2E+04	3.9E+05	N	BSL
206440	Fluoranthene	7.7E+00	1.7E+01	µg/kg	ASB1A	2/3	2.04 - 2.21	1.7E+01	N	3.1E+05	4.1E+06	N	BSL
193395	Indeno(1,2,3-cd)pyrene	6.2E+00	6.2E+00	µg/kg	ASB2A	1/3	0.84 - 0.91	6.2E+00	C	2.2E+02	3.9E+03	N	BSL
85018	Phenanthrene [5]	1.9E+00	4.0E+00	µg/kg	ASB2A	3/3	0.72 - 0.78	4.0E+00	N	2.3E+05	3.1E+06	N	BSL
129000	Pyrene	1.1E+01	2.1E+01	µg/kg	ASB2A	2/3	1.08 - 1.17	2.1E+01	N	2.3E+05	3.1E+06	N	BSL
	Explosives (mg/kg)												
121142	2,4-Dinitrotoluene	1.3E+00	2.0E+01	mg/kg	ASB3A	2/5	0.073 - 0.71	2.0E+01	N	1.6E+01	2.0E+02	Y	**ARES**
606202	2,6-Dinitrotoluene	2.5E-01	2.5E-01	mg/kg	ASB5-A	1/5	0.099 - 0.25	2.5E-01	N	7.8E+00	1.0E+02	N	BSL
--	Dinitrotoluene Mix	1.6E+00	2.0E+01	mg/kg	ASB3A	2/5	0 - 0	2.0E+01	C	9.4E-01	4.2E+00	Y	***ARES/IND***
	Cyanide (mg/kg)												
57125	Cyanide	6.0E-02	2.3E-01	mg/kg	ASB2A	4/5	0.0356 - 0.046	2.3E-01	N	1.6E+02	2.0E+03	N	BSL

Notes:

CAS = Chemical Abstracts Service
COPC = Chemical of Potential Concern
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyls
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
PAH = Polynuclear Aromatic Compound
TIC = Tentatively Identified Compound
[1] = Chromium VI RBC value was used
[2] = Lead criteria are Action Levels; see USEPA Region III guidance
[3] = Mercuric chloride soil RBC value used
[4] = Noncarcinogenic Residential RBC value for Aroclor 1254 was used for screening
[5] = RBC value for pyrene was used for these compounds

DUP AVG = results for duplicate samples averaged
RBC = USEPA Region III Risk-Based Concentration
(RBC) values from the October 31, 2006,
RBC Table and October 10, 2006, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
C = Carcinogenic per EPA RBC Table (October 2006)
N = Noncarcinogenic per EPA RBC Table (October 2006)

ARES = Above Residential RBC
ARES/IND = Above Residential RBC/Industrial RBC
BSL = Below Residential/Industrial RBC Screening Levels
NSV = No Screening Value Available

Table 10-3
HHRS COPC Selection (Total Soil) for AOC A
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	C/N	Adjusted RBC Residential	Adjusted RBC Industrial	COPC Flag (Y/N)	Rationale for Selection or Deletion
	TAL Metals (mg/kg)												
7429905	Aluminum	21,000	36,300	mg/kg	ASB1C	14/14	1.6 - 79	36,300	--	--	--	Y	NSV
7440360	Antimony	0.04695	0.63	mg/kg	ASB5-A	7/14	0.036 - 0.0518	0.63	N	3.13	41	N	BSL
7440382	Arsenic	1.6	20	mg/kg	ASB5-A	14/14	0.023 - 0.0232	20	C	0.43	1.9	Y	***ARES/IND***
7440393	Barium	50	150	mg/kg	ASB5-A	14/14	0.1 - 0.106	150	N	1,564	20,440	N	BSL
7440417	Beryllium	0.53	1.8	mg/kg	ASB1C	14/14	0.016 - 0.167	1.8	N	15.6	204	N	BSL
7440439	Cadmium	0.036	1.3	mg/kg	ASB5-A	10/14	0.0073 - 0.182	1.3	N	3.9	51	N	BSL
7440702	Calcium	126	18,000	mg/kg	ASB5-A	14/14	10 - 16.6	18,000	--	--	--	N	Nutrient
7440473	Chromium [1]	21	100	mg/kg	ASB5-A	14/14	0.57 - 1.1	100	N	23.5	306.6	Y	**ARES**
7440484	Cobalt	6.2	33	mg/kg	ASB4-C	14/14	0.208 - 0.35	33	--	--	--	Y	NSV
7440508	Copper	14	510	mg/kg	ASB4A-DUP AVG	14/14	0.022 - 1.84	510	N	312.9	4,088	Y	**ARES**
7439896	Iron	33,000	55,000	mg/kg	ASB4-C	14/14	23 - 71.6	55,000	N	2,346	30,660	Y	***ARES/IND***
7439921	Lead [2]	10.9	330	mg/kg	ASB5-A	14/14	0.0218 - 0.41	330	--	400	750	N	BSL
7439954	Magnesium	1,160	10,000	mg/kg	ASB5-A	14/14	3.21 - 3.4	10,000	--	--	--	N	Nutrient
7439965	Manganese	260	2,400	mg/kg	ASB3A	14/14	0.14 - 3.5	2,400	N	156.4	2,044	Y	***ARES/IND***
7439976	Mercury [3]	0.018	0.14	mg/kg	ASB5-A	14/14	0.0048 - 0.0077	0.14	--	0.782	10	N	BSL
7440097	Potassium	1,010	3,780	mg/kg	ASB1C	14/14	5 - 7.5	3,780	--	--	--	N	Nutrient
7440020	Nickel	12	32	mg/kg	ASB4-C	14/14	0.027 - 0.0356	32	N	156	2,044	N	BSL
7782492	Selenium	0.05075	0.99	mg/kg	ASB1C	14/14	0.0502 - 0.063	0.99	N	39.1	511	N	BSL
7440224	Silver	0.045	0.19	mg/kg	ASB4-C	14/14	0.0044 - 0.017	0.19	N	39.1	511	N	BSL
7440235	Sodium	41	330	mg/kg	ASB4-B	12/14	18.1 - 19	330	--	--	--	N	Nutrient
7440280	Thallium	0.15	0.48	mg/kg	ASB3A	14/14	0.0085 - 0.027	0.48	N	0.55	7.2	N	BSL
7440622	Vanadium	42	96	mg/kg	ASB5-B	14/14	0.047 - 0.207	96	N	7.82	102.2	Y	**ARES**
7440666	Zinc	37	1,400	mg/kg	ASB5-A	14/14	0.517 - 43	1,400	N	2,346	30,660	N	BSL
	Pesticides/PCBs (ug/kg)												
60571	Dieldrin	4.6E+00	8.6E+00	µg/kg	ASB4A-DUP AVG	2/6	0.371 - 12	8.6E+00	C	4.0E+01	1.8E+02	N	BSL
11097691	Aroclor 1254 [4]	9.9E+00	2.4E+03	µg/kg	ASB5-A	5/6	3.6 - 76	2.4E+03	C	1.6E+02	1.4E+03	Y	***ARES/IND***
	VOCs (ug/kg)												
67641	Acetone	1.2E+01	4.6E+02	µg/kg	ASB4-C	14/14	11.2 - 85	4.6E+02	N	7.0E+06	9.2E+07	N	BSL
71432	Benzene	7.6E+00	7.6E+00	µg/kg	ASB4A-DUP AVG	1/14	0.805 - 4.9	7.6E+00	C	1.2E+04	5.2E+04	N	BSL
100414	Ethylbenzene	9.3E+00	9.3E+00	µg/kg	ASB4A-DUP AVG	1/14	1.92 - 8.2	9.3E+00	N	7.8E+05	1.0E+07	N	BSL
79209	Methyl acetate	7.6E+01	1.9E+02	µg/kg	ASB4-B	5/14	4.5 - 29	1.9E+02	N	7.8E+06	1.0E+08	N	BSL
75092	Methylene chloride	3.7E+00	1.1E+02	µg/kg	ASB4-C	14/14	1.44 - 16	1.1E+02	C	8.5E+04	3.8E+05	N	BSL
108883	Toluene	4.5E+01	4.5E+01	µg/kg	ASB4A-DUP AVG	1/14	1.38 - 19	4.5E+01	N	6.3E+05	8.2E+06	N	BSL
1330207	Xylenes (Total)	5.4E+01	5.4E+01	µg/kg	ASB4A-DUP AVG	1/14	1.82 - 19	5.4E+01	N	1.6E+06	2.0E+07	N	BSL
	SVOCs (ug/kg)												
92524	1,1'-Biphenyl	2.2E+00	2.2E+00	µg/kg	ASB5-A	1/14	2.1 - 3.44	2.2E+00	N	3.9E+05	5.1E+06	N	BSL
91576	2-Methylnaphthalene	4.9E+00	4.9E+00	µg/kg	ASB5-A	1/14	1.9 - 3.84	4.9E+00	N	3.1E+04	4.1E+05	N	BSL
121142	2,4-Dinitrotoluene	2.3E+01	2.8E+04	µg/kg	ASB3A	5/14	3.78 - 1400	2.8E+04	N	1.6E+04	2.0E+05	Y	**ARES**
606202	2,6-Dinitrotoluene	8.2E+01	3.3E+03	µg/kg	ASB3A	4/14	1.7 - 38.8	3.3E+03	N	7.8E+03	1.0E+05	N	BSL
--	Dinitrotoluene Mix	2.3E+01	3.1E+04	µg/kg	ASB3A	5/14	0 - 0	3.1E+04	C	9.4E+02	4.2E+03	Y	***ARES/IND***
83329	Acenaphthene	6.6E+00	6.6E+00	µg/kg	ASB5-A	1/14	1.7 - 2.41	6.6E+00	N	4.7E+05	6.1E+06	N	BSL
208968	Acenaphthylene [5]	2.1E+01	2.1E+01	µg/kg	ASB5-A	1/14	1.7 - 2.1	2.1E+01	N	2.3E+05	3.1E+06	N	BSL
120127	Anthracene	2.1E+01	2.1E+01	µg/kg	ASB5-A	1/14	2.1 - 6.47	2.1E+01	N	2.3E+06	3.1E+07	N	BSL
56553	Benzo(a)anthracene	7.2E+01	7.2E+01	µg/kg	ASB5-A	1/14	3.8 - 18.6	7.2E+01	C	2.2E+02	3.9E+03	N	BSL
50328	Benzo(a)pyrene	9.0E+00	2.2E+01	µg/kg	ASB5-A	3/14	3.9 - 7.99	2.2E+01	C	2.2E+01	3.9E+02	N	BSL
205992	Benzo(b)fluoranthene	1.6E+01	1.2E+02	µg/kg	ASB5-A	2/14	3.8 - 13.7	1.2E+02	C	2.2E+02	3.9E+03	N	BSL
207089	Benzo(k)fluoranthene	3.6E+01	3.6E+01	µg/kg	ASB5-A	1/14	2.7 - 18.8	3.6E+01	C	2.2E+03	3.9E+04	N	BSL
117817	Bis(2-ethylhexyl)phthalate	1.7E+01	5.7E+03	µg/kg	ASB5-A	14/14	2.48 - 250	5.7E+03	C	4.6E+04	2.0E+05	N	BSL
85687	Butylbenzylphthalate	9.0E+00	2.4E+02	µg/kg	ASB3A	3/14	5.38 - 32	2.4E+02	N	1.6E+06	2.0E+07	N	BSL
84742	Di-n-butylphthalate	9.8E+00	1.3E+05	µg/kg	ASB3A	14/14	3.4 - 1180	1.3E+05	N	7.8E+05	1.0E+07	N	BSL
117840	Di-n-octylphthalate	1.3E+01	5.5E+01	µg/kg	ASB5-A	4/14	2.5 - 4.34	5.5E+01	--	--	--	Y	NSV
84662	Diethylphthalate	3.9E+00	2.4E+01	µg/kg	ASB5-A	14/14	1.9 - 2.66	2.4E+01	N	6.3E+06	8.2E+07	N	BSL
131113	Dimethylphthalate	2.1E+02	2.1E+02	µg/kg	ASB1A	2/14	1.9 - 4.63	2.1E+02	--	--	--	Y	NSV
218019	Chrysene	1.5E+01	8.7E+01	µg/kg	ASB5-A	2/14	3.5 - 14.3	8.7E+01	C	2.2E+04	3.9E+05	N	BSL
206440	Fluoranthene	3.0E+00	4.3E+02	µg/kg	ASB5-A	4/14	2.4 - 3.29	4.3E+02	N	3.1E+05	4.1E+06	N	BSL
86737	Fluorene	1.4E+01	1.4E+01	µg/kg	ASB5-A	1/14	1.9 - 2.35	1.4E+01	N	3.1E+05	4.1E+06	N	BSL
193395	Indeno(1,2,3-cd)pyrene	6.0E+00	6.0E+00	µg/kg	ASB1A	1/14	4.7 - 29	6.0E+00	C	2.2E+02	3.9E+03	N	BSL
86306	N-Nitrosodiphenylamine	5.2E+00	4.7E+03	µg/kg	ASB3A	8/14	1.5 - 1470	4.7E+03	C	1.3E+05	5.8E+05	N	BSL
87865	Pentachlorophenol	1.0E+02	1.0E+02	µg/kg	ASB5-A	1/14	2.8 - 6.15	1.0E+02	C	5.3E+03	2.4E+04	N	BSL
85018	Phenanthrene [5]	3.8E+00	1.6E+02	µg/kg	ASB5-A	3/14	2.2 - 3.22	1.6E+02	N	2.3E+05	3.1E+06	N	BSL
129000	Pyrene	3.0E+00	2.4E+02	µg/kg	ASB5-A	4/14	1.78 - 3	2.4E+02	N	2.3E+05	3.1E+06	N	BSL

Table 10-3
HHRS COPC Selection (Total Soil) for AOC A
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	C/N	Adjusted RBC Residential	Adjusted RBC Industrial	COPC Flag (Y/N)	Rationale for Selection or Deletion
	SVOC TICs (ug/kg)												
301020	(Z)-9-Octadecenamide	1.6E+02	1.6E+03	µg/kg	ASB1B	3/9	0 - 0	1.6E+03	--	--	--	Y	NSV
85698	1,2-Benzenedicarboxylic acid, butyl 2-et	5.6E+02	5.6E+02	µg/kg	ASB3A	1/9	0 - 0	5.6E+02	--	--	--	Y	NSV
17851535	1,2-Benzenedicarboxylic acid, butyl 2-me	6.0E+01	4.2E+02	µg/kg	ASB3B	4/9	0 - 0	4.2E+02	--	--	--	Y	NSV
84695	1,2-Benzenedicarboxylicacid, bis(2-methy	1.1E+02	5.0E+02	µg/kg	ASB2C	6/9	0 - 0	5.0E+02	--	--	--	Y	NSV
112538	1-Dodecanol	4.7E+01	4.7E+01	µg/kg	ASB3B	1/9	0 - 0	4.7E+01	--	--	--	Y	NSV
1454859	1-Heptadecanol	2.6E+02	2.6E+02	µg/kg	ASB2C	1/9	0 - 0	2.6E+02	--	--	--	Y	NSV
629765	1-Pentadecanol	4.0E+01	4.0E+01	µg/kg	ASB3B	1/9	0 - 0	4.0E+01	--	--	--	Y	NSV
20019641	2(5H)-Furanone, 5,5-dimethyl-	4.9E+01	4.9E+01	µg/kg	ASB1C	1/9	0 - 0	4.9E+01	--	--	--	Y	NSV
101371	2,4,6-Triallyloxy-1,3,5-triazine	6.5E+01	9.4E+01	µg/kg	ASB3B	3/9	0 - 0	9.4E+01	--	--	--	Y	NSV
104767	2-Ethyl-1-Hexanol	3.0E+01	3.3E+01	µg/kg	ASB1B	2/9	0 - 0	3.3E+01	--	--	--	Y	NSV
836306	Benzenamine, 4-nitro-N-phenyl-	3.1E+02	3.1E+02	µg/kg	ASB3A	1/9	0 - 0	3.1E+02	--	--	--	Y	NSV
119755	Benzeneamine, 2-nitro-N-phenyl-	1.4E+02	5.2E+02	µg/kg	ASB3A	2/9	0 - 0	5.2E+02	--	--	--	Y	NSV
142165	Bis(2-ethylhexyl)maleate	7.6E+01	7.6E+01	µg/kg	ASB2C	1/9	0 - 0	7.6E+01	--	--	--	Y	NSV
112845	Erucylamide	9.5E+02	1.5E+03	µg/kg	ASB1A	3/9	0 - 0	1.5E+03	--	--	--	Y	NSV
19047859	Phosphonic acid, dioctadecyl ester	2.4E+01	2.4E+01	µg/kg	ASB1B	1/9	0 - 0	2.4E+01	--	--	--	Y	NSV
	PAHs (ug/kg)												
56553	Benzo(a)anthracene	3.6E+00	3.6E+00	µg/kg	ASB2A	1/9	0.96 - 1.12	3.6E+00	C	2.2E+02	3.9E+03	N	BSL
218019	Chrysene	1.8E+00	5.0E+00	µg/kg	ASB1A	3/9	1.44 - 1.68	5.0E+00	C	2.2E+04	3.9E+05	N	BSL
206440	Fluoranthene	7.7E+00	1.7E+01	µg/kg	ASB1A	3/9	2.04 - 2.38	1.7E+01	N	3.1E+05	4.1E+06	N	BSL
193395	Indeno(1,2,3-cd)pyrene	6.2E+00	6.2E+00	µg/kg	ASB2A	1/9	0.84 - 0.98	6.2E+00	C	2.2E+02	3.9E+03	N	BSL
85018	Phenanthrene [5]	1.9E+00	4.0E+00	µg/kg	ASB2A	4/9	0.72 - 0.84	4.0E+00	N	2.3E+05	3.1E+06	N	BSL
129000	Pyrene	9.9E+00	2.1E+01	µg/kg	ASB2A	3/9	1.08 - 1.26	2.1E+01	N	2.3E+05	3.1E+06	N	BSL
	Explosives (mg/kg)												
121142	2,4-Dinitrotoluene	2.0E-01	2.0E+01	mg/kg	ASB3A	3/14	0.073 - 0.71	2.0E+01	N	1.6E+01	2.0E+02	Y	**ARES**
606202	2,6-Dinitrotoluene	2.5E-01	2.5E-01	mg/kg	ASB5-A	1/14	0.099 - 0.25	2.5E-01	N	7.8E+00	1.0E+02	N	BSL
--	Dinitrotoluene Mix	2.0E-01	2.0E+01	mg/kg	ASB3A	3/14	0 - 0	2.0E+01	C	9.4E-01	4.2E+00	Y	***ARES/IND***
	Cyanide (mg/kg)												
57125	Cyanide	6.0E-02	7.2E-01	mg/kg	ASB4-C	8/14	0.0356 - 0.053	7.2E-01	N	1.6E+02	2.0E+03	N	BSL

Notes:

CAS = Chemical Abstracts Service
COPC = Chemical of Potential Concern
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyls
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
PAH = Polynuclear Aromatic Compound
TIC = Tentatively Identified Compound
[1] = Chromium VI RBC value was used
[2] = Lead criteria are Action Levels; see USEPA Region III guidance
[3] = Mercuric chloride soil RBC value used
[4] = Noncarcinogenic Residential RBC value for Aroclor 1254 was used for screening
[5] = RBC value for pyrene was used for these compounds

DUP AVG = results for duplicate samples averaged
RBC = USEPA Region III Risk-Based Concentration
(RBC) values from the October 31, 2006,
RBC Table and October 10, 2006, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
C = Carcinogenic per EPA RBC Table (October 2006)
N = Noncarcinogenic per EPA RBC Table (October 2006)

ARES = Above Residential RBC
ARES/IND = Above Residential RBC/Industrial RBC
BSL = Below Residential/Industrial RBC Screening Levels
NSV = No Screening Value Available

Table 10-4
Cumulative HHRS for AOC A (Surface Soil)
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Units	MDC	C/N	RBC Residential	RBC Industrial	Non Carcinogenic HI (RBC_{Res})	Excess Cancer Risk (RBC_{Res})	Non Carcinogenic HI (RBC_{Ind})	Excess Cancer Risk (RBC_{Ind})
	TAL Metals									
7429905	Aluminum	mg/kg	3.21E+04	--	--	--	--	--	--	--
7440382	Arsenic	mg/kg	2.00E+01	C	4.26E-01	1.91E+00	--	5.E-05	--	1.E-05
7440382	Arsenic	mg/kg	2.00E+01	N	2.35E+01	3.07E+02	9.E-01	--	7.E-02	--
7440473	Chromium [1]	mg/kg	1.00E+02	N	2.35E+02	3.07E+03	4.E-01	--	3.E-02	--
7440484	Cobalt	mg/kg	2.40E+01	--	--	--	--	--	--	--
7440508	Copper	mg/kg	5.10E+02	N	3.13E+03	4.09E+04	2.E-01	--	1.E-02	--
7439896	Iron	mg/kg	5.30E+04	N	2.35E+04	3.07E+05	2.E+00	--	2.E-01	--
7439965	Manganese	mg/kg	2.40E+03	N	1.56E+03	2.04E+04	2.E+00	--	1.E-01	--
7440622	Vanadium	mg/kg	8.30E+01	N	7.82E+01	1.02E+03	1.E+00	--	8.E-02	--
	PCBs									
11097691	Aroclor 1254 [4]	µg/kg	2.40E+03	C	3.20E+02	1.43E+03	--	8.E-06	--	2.E-06
11097691	Aroclor 1254 [4]	µg/kg	2.40E+03	N	1.56E+03	2.00E+04	2.E+00	--	1.E-01	--
	TCL SVOCs									
121142	2,4-Dinitrotoluene	µg/kg	2.80E+04	N	1.56E+05	2.04E+06	2.E-01	--	1.E-02	--
--	Dinitrotoluene Mix	µg/kg	3.13E+04	C	9.40E+02	4.20E+03	--	3.E-05	--	7.E-06
	SVOC TICs (µg/kg)									
301020	(Z)-9-Octadecenamide	µg/kg	1.90E+02	--	--	--	--	--	--	--
84695	1,2-Benzenedicarboxylicacid, bis(2-methy	µg/kg	4.90E+02	--	--	--	--	--	--	--
85698	1,2-Benzenedicarboxylic acid, butyl 2-et	µg/kg	5.60E+02	--	--	--	--	--	--	--
17851535	1,2-Benzenedicarboxylic acid, butyl 2-me	µg/kg	6.00E+01	--	--	--	--	--	--	--
119755	Benzeneamine, 2-nitro-N-phenyl-	µg/kg	5.20E+02	--	--	--	--	--	--	--
836306	Benzenamine, 4-nitro-N-phenyl-	µg/kg	3.10E+02	--	--	--	--	--	--	--
112845	Erucylamide	µg/kg	1.50E+03	--	--	--	--	--	--	--
						Cumulative Risk	8.E+00	9.E-05	6.E-01	2.E-05

Notes:

CAS = Chemical Abstracts Service
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyls
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
TIC = Tentatively Identified Compound
[1] = Chromium VI RBC value was used

MDC = Maximum Detected Concentration
HI = Hazard Index
RBC = USEPA Region III Risk-Based Concentration
(RBC) values from the October 31, 2006,
RBC Table and October 10, 2006, Alternate RBC Table
C = Carcinogenic per EPA RBC Table (October 2006)
N = Noncarcinogenic per EPA RBC Table (October 2006)

Table 10-5
Exposure Point Concentration Summary for AOC A
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Medium:	Total Soil
Exposure Medium:	Total Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic (1)	Rationale (2)
Total Soil	Aluminum	mg/kg	3.01E+04	3.22E+04	3.6E+04	3.22E+04	mg/kg	95% UCL (Student's t)	85% < FOD, Normal
	Arsenic	mg/kg	4.25E+00	4.60E+00	2.0E+01	4.60E+00	mg/kg	95% UCL (Bootstrap)	85% < FOD, Unknown
	Chromium	mg/kg	3.92E+01	4.09E+01	5.2E+01	4.09E+01	mg/kg	95% UCL (Bootstrap)	85% < FOD, Unknown
	Cobalt	mg/kg	1.55E+01	1.94E+01	3.3E+01	1.94E+01	mg/kg	95% UCL (Student's t)	85% < FOD, Normal
	Copper	mg/kg	7.94E+01	1.89E+02	5.1E+02	1.89E+02	mg/kg	95% UCL (Bootstrap)	85% < FOD, Unknown
	Iron	mg/kg	4.06E+04	4.38E+04	5.5E+04	4.38E+04	mg/kg	95% UCL (Student's t)	85% < FOD, Normal
	Manganese	mg/kg	6.48E+02	1.41E+03	2.4E+03	1.41E+03	mg/kg	95% UCL (Land's)	85% < FOD, Lognormal
	Vanadium	mg/kg	6.56E+01	7.21E+01	9.6E+01	7.21E+01	mg/kg	95% UCL (Student's t)	85% < FOD, Normal
	Aroclor 1254	µg/kg	--	--	2.4E+03	2.40E+03	mg/kg	--	--
	2,4-dinitrotoluene	µg/kg	--	--	2.8E+04	2.80E+04	mg/kg	--	--
	Dinitrotoluene Mix	µg/kg	--	--	3.1E+04	3.13E+04	mg/kg	--	--

Notes:
UCL = Upper Confidence Limit
mg/kg = Milligram Per Kilogram

(1) See Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites (OSWER Directive 9285.6-10, December 2002) for details on the following methods for calculating the 95% UCL:
95% UCL (Bounding) = The frequency of detection is less than 50%; therefore, the 95% UCL is calculated by the bounding method.
95% UCL (Student's t, adj) = The frequency of detection is between 50% and 85%, and the underlying distribution (detects only) is normal; therefore, Aitchison's Method is used to adjust the detects-only mean and standard deviaiton, and the 95% UCL is calculated using the Student's t method.
95% UCL (Land, adj) = The frequency of detection is between 50% and 85%, and the underlying distribution (detects only) is lognormal; therefore, Aitchison's Method is used to adjust the detects-only mean and standard deviation, and the 95% UCL is calculated using Land's method.
95% UCL (Student's t) = The frequency of detection is greater than 85%, and the distribution is normal.; therefore, the 95% UCL is calculated using the Student's t method.
95% UCL (Bootstrap) = The frequency of detection is between 50% and 85% and the underlying distribution (detects only) is neither normal nor lognormal, OR the frequency of detection is greater than 85% and the distribution (with non-detects represented by half of the detection limit) is neither normal nor lognormal; therefore, the 95% UCL is calculated using Hall's bootstrap method.
Maximum: The 95% UCL exceeds the maximum detected concentration; therefore, the maximum detected concentration is used to represent the 95% UCL.

(2) FOD = Frequency of detection
FOD < 50%: Frequency of detection is less than 50%
50% < FOD < 85%, Normal: Frequency of detection is between 50% and 85%, and the underlying distribution (detects only) is normal.
50% < FOD < 85%, Lognormal: Frequency of detection is between 50% and 85%, and the underlying distribution (detects only) is lognormal.
50% < FOD < 85%, Unknown: Frequency of detection is between 50% and 85%, and the underlying distribution (detects only) is neither normal nor lognormal.
85% < FOD, Normal: Frequency of detection is greater than 85%, and the distribution is normal.
85% < FOD, Lognormal: Frequency of detection is greater than 85%, and the distribution is lognormal.
85% < FOD, Unknown: Frequency of detection is greater than 85%, and the distribution is neither normal nor lognormal.

Table 10-6
Cumulative HHRS for AOC A (Total Soil)
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Units	Maximum EPC	C/N	RBC Residential	RBC Industrial	Non Carcinogenic HI (RBC_{Res})	Excess Cancer Risk (RBC_{Res})	Non Carcinogenic HI (RBC_{Ind})	Excess Cancer Risk (RBC_{Ind})
	TAL Metals									
7429905	Aluminum	mg/kg	3.22E+04	--	--	--	--	--	--	--
7440382	Arsenic	mg/kg	4.60E+00	C	4.26E-01	1.91E+00	--	1.E-05	--	2.E-06
7440382	Arsenic	mg/kg	4.60E+00	N	2.35E+01	3.07E+02	2.E-01	--	1.E-02	--
7440473	Chromium [1]	mg/kg	4.20E+01	N	2.35E+02	3.07E+03	2.E-01	--	1.E-02	--
7440484	Cobalt	mg/kg	1.94E+01	--	--	--	--	--	--	--
7440508	Copper	mg/kg	1.89E+02	N	3.13E+03	4.09E+04	6.E-02	--	5.E-03	--
7439896	Iron	mg/kg	4.38E+04	N	2.35E+04	3.07E+05	2.E+00	--	1.E-01	--
7439965	Manganese	mg/kg	1.41E+03	N	1.56E+03	2.04E+04	9.E-01	--	7.E-02	--
7440622	Vanadium	mg/kg	7.21E+01	N	7.82E+01	1.02E+03	9.E-01	--	7.E-02	--
	PCBs									
11097691	Aroclor 1254 [4]	µg/kg	2.40E+03	C	3.20E+02	1.43E+03	--	8.E-06	--	2.E-06
11097691	Aroclor 1254 [4]	µg/kg	2.40E+03	N	1.56E+03	2.00E+04	2.E+00		1.E-01	
	TCL SVOCs									
121142	2,4-Dinitrotoluene	µg/kg	2.80E+04	N	1.56E+05	2.04E+06	2.E-01	--	1.E-02	--
--	Dinitrotoluene Mix	µg/kg	3.10E+04	C	9.40E+02	4.20E+03	--	3.E-05	--	7.E-06
	SVOC TICs								--	
301020	(Z)-9-Octadecenamide	µg/kg	1.60E+03	--	--	--	--	--	--	--
112538	1-Dodecanol	µg/kg	4.70E+01	--	--	--	--	--	--	--
1454859	1-Heptadecanol	µg/kg	2.60E+02	--	--	--	--	--	--	--
629765	1-Pentadecanol	µg/kg	4.00E+01	--	--	--	--	--	--	--
84695	1,2-Benzenedicarboxylicacid, bis(2-methy	µg/kg	5.00E+02	--	--	--	--	--	--	--
85698	1,2-Benzenedicarboxylic acid, butyl 2-et	µg/kg	5.60E+02	--	--	--	--	--	--	--
17851535	1,2-Benzenedicarboxylic acid, butyl 2-me	µg/kg	4.20E+02	--	--	--	--	--	--	--
20019641	2(5H)-Furanone, 5,5-dimethyl-	µg/kg	4.90E+01	--	--	--	--	--	--	--
104767	2-Ethyl-1-Hexanol	µg/kg	3.30E+01	--	--	--	--	--	--	--
101371	2,4,6-Triallyloxy-1,3,5-triazine	µg/kg	9.40E+01	--	--	--	--	--	--	--
119755	Benzeneamine, 2-nitro-N-phenyl-	µg/kg	5.20E+02	--	--	--	--	--	--	--
836306	Benzenamine, 4-nitro-N-phenyl-	µg/kg	3.10E+02	--	--	--	--	--	--	--
142165	Bis(2-ethylhexyl)maleate	µg/kg	7.60E+01	--	--	--	--	--	--	--
112845	Erucylamide	µg/kg	1.50E+03	--	--	--	--	--	--	--
19047859	Phosphonic acid, dioctadecyl ester	µg/kg	2.40E+01	--	--	--	--	--	--	--
						Cumulative Risk	6.E+00	5.E-05	4.E-01	1.E-05

Notes:
CAS = Chemical Abstracts Service
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyls
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
TIC = Tentatively Identified Compound
[1] = Chromium VI RBC value was used
[4] = Noncarcinogenic Residential RBC value for Aroclor 1254 was used for screening

HI = Hazard Index
EPC = Exposure Point Concentration
RBC = USEPA Region III Risk-Based Concentration
(RBC) values from the October 31, 2006,
RBC Table and October 10, 2006, Alternate RBC Table
C = Carcinogenic per EPA RBC Table (October 2006)
N = Noncarcinogenic per EPA RBC Table (October 2006)

Table 10-7
HHRS SSL Comparison for AOC A
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Soil to Groundwater SSL (DAF 20)	COPC Flag (Y/N)	Rationale for Selection or Deletion
	TAL Metals (mg/kg)										
7429905	Aluminum	24,500	36,300	mg/kg	ASB1C	9/9	1.83 - 79	36,300	--	Y	NSV
7440360	Antimony	0.04695	0.18	mg/kg	ASB1C	3/9	0.036 - 0.0518	0.18	13.2	N	BSL
7440382	Arsenic	1.6	8.1	mg/kg	ASB1C	9/9	0.023 - 0.0232	8.1	0.026	Y	**ASSL**
7440393	Barium	50	115	mg/kg	ASB1C	9/9	0.1 - 0.106	115	6,015	N	BSL
7440417	Beryllium	0.57	1.8	mg/kg	ASB1C	9/9	0.016 - 0.167	1.8	1,154	N	BSL
7440439	Cadmium	0.036	0.75	mg/kg	ASB3B	6/9	0.0073 - 0.182	0.75	27.4	N	BSL
7440702	Calcium	126	710	mg/kg	ASB4-B	9/9	10 - 16.6	710	--	Y	NSV
7440473	Chromium [1]	21	52	mg/kg	ASB2C	9/9	0.57 - 0.912	52	42	Y	**ASSL**
7440484	Cobalt	6.3	33	mg/kg	ASB4-C	9/9	0.208 - 0.35	33	--	Y	NSV
7440508	Copper	14	43	mg/kg	ASB1C	9/9	0.022 - 0.368	43	10,518	N	BSL
7439896	Iron	33,000	55,000	mg/kg	ASB4-C	9/9	23 - 71.6	55,000	--	Y	NSV
7439921	Lead [2]	10.9	26	mg/kg	ASB1B	9/9	0.0218 - 0.041	26	--	Y	NSV
7439954	Magnesium	1160	5,870	mg/kg	ASB1C	9/9	3.21 - 3.4	5,870	--	Y	NSV
7439965	Manganese	260	1,750	mg/kg	ASB1B	9/9	0.14 - 3.5	1,750	952	Y	**ASSL**
7439976	Mercury [3]	0.018	0.075	mg/kg	ASB1C	9/9	0.0048 - 0.0077	0.075	--	Y	NSV
7440097	Potassium	1,010	3,780	mg/kg	ASB1C	9/9	5 - 7.5	3,780	--	Y	NSV
7440020	Nickel	12	32	mg/kg	ASB4-C	9/9	0.027 - 0.0356	32	--	Y	NSV
7782492	Selenium	0.07	0.99	mg/kg	ASB1C	9/9	0.0502 - 0.063	0.99	19	N	BSL
7440224	Silver	0.045	0.19	mg/kg	ASB4-C	9/9	0.0044 - 0.017	0.19	31	N	BSL
7440235	Sodium	50	330	mg/kg	ASB4-B	7/9	18.1 - 19	330	--	Y	NSV
7440280	Thallium	0.15	0.45	mg/kg	ASB1C	9/9	0.0085 - 0.027	0.45	3.6	N	BSL
7440622	Vanadium	42	96	mg/kg	ASB5-B	9/9	0.047 - 0.207	96	730	N	BSL
7440666	Zinc	37	109	mg/kg	ASB1C	9/9	0.517 - 2.59	109	13,622	N	BSL
	Pesticides/PCBs (ug/kg)										
60571	Dieldrin	4.6	4.6	µg/kg	ASB4-B	1/3	0.6 - 0.7	4.6	2.2E+00	Y	**ASSL**
11097691	Aroclor 1254 [4]	41	160	µg/kg	ASB5-B	2/3	7.7 - 9	160	1.1E+03	N	BSL
	VOCs (ug/kg)										
67641	Acetone	18	460	µg/kg	ASB4-C	9/9	11.2 - 85	460	2.2E+04	N	BSL
79209	Methyl acetate	76	190	µg/kg	ASB4-B	3/9	4.5 - 29	190	2.5E+04	N	BSL
75092	Methylene chloride	3.7	110	µg/kg	ASB4-C	9/9	1.44 - 16	110	1.9E+01	Y	**ASSL**
121142	2,4-Dinitrotoluene	23	23	µg/kg	ASB3B	1/9	3.78 - 16	23	5.7E+02	N	BSL
--	Dinitrotoluene Mix	23	23	µg/kg	ASB3B	1/9	0 - 0	23	--	Y	NSV
117817	Bis(2-ethylhexyl)phthalate	17	420	µg/kg	ASB4-B	9/9	2.48 - 29	420	2.9E+06	N	BSL
85687	Butylbenzylphthalate	9	9	µg/kg	ASB2C	1/9	5.38 - 32	9	1.7E+07	N	BSL
84742	Di-n-butylphthalate	9.8	615	µg/kg	ASB2B-DUP AVG	9/9	3.4 - 5.35	615	5.0E+06	N	BSL
117840	Di-n-octylphthalate	13	13	µg/kg	ASB4A-DUP AVG	1/9	2.6 - 4.34	13	--	Y	NSV
84662	Diethylphthalate	3.9	10	µg/kg	ASB1C	9/9	2 - 2.66	10	4.5E+05	N	BSL
86306	N-Nitrosodiphenylamine	5.2	150	µg/kg	ASB4-B	3/9	1.5 - 6.65	150	7.6E+02	N	BSL
	SVOC TICs (ug/kg)										
301020	(Z)-9-Octadecenamide	162	1,600	µg/kg	ASB1B	2/9	0 - 0	1,600	--	Y	NSV
17851535	1,2-Benzenedicarboxylic acid, butyl 2-me	255	420	µg/kg	ASB3B	3/9	0 - 0	420	--	Y	NSV
84695	1,2-Benzenedicarboxylicacid, bis(2-methy	110	500	µg/kg	ASB2C	4/9	0 - 0	500	--	Y	NSV
112538	1-Dodecanol	47	47	µg/kg	ASB3B	1/9	0 - 0	47	--	Y	NSV
1454859	1-Heptadecanol	260	260	µg/kg	ASB2C	1/9	0 - 0	260	--	Y	NSV
629765	1-Pentadecanol	40	40	µg/kg	ASB3B	1/9	0 - 0	40	--	Y	NSV
20019641	2(5H)-Furanone, 5,5-dimethyl-	49	49	µg/kg	ASB1C	1/9	0 - 0	49	--	Y	NSV
101371	2,4,6-Triallyloxy-1,3,5-triazine	65	94	µg/kg	ASB3B	3/9	0 - 0	94	--	Y	NSV
104767	2-Ethyl-1-Hexanol	30	33	µg/kg	ASB1B	2/9	0 - 0	33	--	Y	NSV
142165	Bis(2-ethylhexyl)maleate	76	76	µg/kg	ASB2C	1/9	0 - 0	76	--	Y	NSV
112845	Erucylamide	950	950	µg/kg	ASB3C	1/9	0 - 0	950	--	Y	NSV
19047859	Phosphonic acid, dioctadecyl ester	24	24	µg/kg	ASB1B	1/9	0 - 0	24	--	Y	NSV

Table 10-7
HHRS SSL Comparison for AOC A
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Soil to Groundwater SSL (DAF 20)	COPC Flag (Y/N)	Rationale for Selection or Deletion
	PAHs (ug/kg)										
218019	Chrysene	1.8	1.8	µg/kg	ASB3C	1/6	1.44 - 1.68	1.8	4.8E+04	N	BSL
206440	Fluoranthene	8.7	8.7	µg/kg	ASB3C	1/6	2.04 - 2.38	8.7	6.3E+06	N	BSL
85018	Phenanthrene [5]	3	3	µg/kg	ASB3C	1/6	0.72 - 0.84	3	--	Y	NSV
129000	Pyrene	9.9	9.9	µg/kg	ASB3C	1/6	1.08 - 1.26	9.9	6.8E+05	N	BSL
	Explosives (mg/kg)										
121142	2,4-Dinitrotoluene	0.2	0.2	mg/kg	ASB2C	1/9	0.073 - 0.142	0.2	5.7E-01	N	BSL
--	Dinitrotoluene Mix	0.2	0.2	mg/kg	ASB2C	1/9	0 - 0	0.2	--	Y	NSV
	Cyanide (mg/kg)										
57125	Cyanide	0.16	0.72	mg/kg	ASB4-C	4/9	0.0356 - 0.053	0.72	1.5E+02	N	BSL

Notes:

CAS = Chemical Abstracts Service
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyls
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
PAH = Polynuclear Aromatic Compound
TIC = Tentatively Identified Compound
[1] = Chromium VI SSL DAF20 value was used
[2] = Lead criteria are Action Levels; see USEPA Region III guidance
[3] = Mercuric chloride soil RBC value used
[4] = Noncarcinogenic Residential RBC value for Aroclor 1254 was used for screening
[5] = RBC value for pyrene was used for these compounds

DUP AVG = results for duplicate samples averaged
SSL DAF20 = Soil Screening Levels at a Dilution Attenuation Factor of 20 Per (SSL) values from the October 31, 2006, RBC Table

ASSL = Above Soil Screening Level
BSL = Below Soil Screening Levels
NSV = No Screening Value Available
* = Surface Soil Detections used for SSL Screening due to testing of one surface soil sample for PCB/Pesticides/Herbicides

Table 10-8
COPC/Background Comparison for AOC A
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Surface Soil COPC/Background Comparison

CAS #	Chemical	Minimum Concentration Surface Soil	Maximum Concentration Surface Soil	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Point Estimate[A]	Background Comparison
	TAL Metals (mg/kg)									
7429905	Aluminum	21,000	32,100	mg/kg	ASB3A	5/5	1.6 - 79	32,100	40,041	N
7440382	Arsenic	1.85	20	mg/kg	ASB5-A	5/5	0.023 - 0.0232	20	16	**Y**
7440473	Chromium	33	100	mg/kg	ASB5-A	5/5	0.57 - 1.1	100	65	**Y**
7440484	Cobalt	6.2	24	mg/kg	ASB3A	5/5	0.208 - 0.35	24	72	N
7440508	Copper	36	510	mg/kg	ASB4A-DUP AVG	5/5	0.22 - 1.84	510	54	**Y**
7439896	Iron	33,000	53,000	mg/kg	ASB4A-DUP AVG	5/5	23 - 71.6	53,000	50,962	**Y**
7439965	Manganese	310	2,400	mg/kg	ASB3A	5/5	0.14 - 1.32	2,400	2,543	N
7440622	Vanadium	56	83	mg/kg	ASB4A-DUP AVG	5/5	0.047 - 0.207	83	108	N

Total Soil COPC/Background Comparison

CAS #	Chemical	Minimum Concentration Total Soil	Maximum Concentration Total Soil	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Point Estimate[A]	Background Comparison
	TAL Metals (mg/kg)									
7429905	Aluminum	21,000	36,300	mg/kg	ASB1C	14/14	1.6 - 79	36,300	40,041	N
7440382	Arsenic	1.6	20	mg/kg	ASB5-A	14/14	0.023 - 0.0232	20	16	**Y**
7440473	Chromium	21	100	mg/kg	ASB5-A	14/14	0.57 - 1.1	100	65	**Y**
7440484	Cobalt	6.2	33	mg/kg	ASB4-C	14/14	0.208 - 0.35	33.00	72.30	N
7440508	Copper	14	510	mg/kg	ASB4A-DUP AVG	14/14	0.022 - 1.84	510	54	**Y**
7439896	Iron	33,000	55,000	mg/kg	ASB4-C	14/14	23 - 71.6	55,000	50,962	**Y**
7439965	Manganese	260	2,400	mg/kg	ASB3A	14/14	0.14 - 3.5	2,400	2,543	N
7440622	Vanadium	42	96	mg/kg	ASB5-B	14/14	0.047 - 0.207	96	108	N

Notes:
CAS = Chemical Abstracts Service
TAL = Target Analyte List
mg/kg = Milligram Per Kilogram
[A] = Facility-Wide Background Point Estimate as
Reported in the Facility-Wide Background Study Report (IT 2001a)

Table 10-9
Detected Chemicals Occurrence for AOC A
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Chemical	CAS #	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening
TAL Metals (mg/kg)								
Aluminum	7429-90-5	21,000	32,100	mg/kg	ASB3A	5/5	1.6 - 79	32,100
Antimony	7440-36-0	0.071	0.63	mg/kg	ASB5-A	4/5	0.036 - 0.0518	0.63
Arsenic	7440-38-2	1.85	20	mg/kg	ASB5-A	5/5	0.023 - 0.0232	20
Barium	7440-39-3	61	150	mg/kg	ASB5-A	5/5	0.1 - 0.106	150
Beryllium	7440-41-7	0.53	0.62	mg/kg	ASB3A	5/5	0.016 - 0.0333	0.62
Cadmium	7440-43-9	0.12	1.3	mg/kg	ASB5-A	4/5	0.0073 - 0.182	1.3
Calcium	7440-70-2	2,150	18,000	mg/kg	ASB5-A	5/5	10 - 16.6	18,000
Chromium	7440-47-3	33	100	mg/kg	ASB5-A	5/5	0.57 - 1.1	100
Cobalt	7440-48-4	6.20	24	mg/kg	ASB3A	5/5	0.208 - 0.35	24
Copper	7440-50-8	36	510	mg/kg	ASB4A-DUP AVG	5/5	0.22 - 1.84	510
Iron	7439-89-6	33,000	53,000	mg/kg	ASB4A-DUP AVG	5/5	23 - 71.6	53,000
Lead	7439-92-1	25	330	mg/kg	ASB5-A	5/5	0.0218 - 0.41	330
Magnesium	7439-95-4	2,090	10,000	mg/kg	ASB5-A	5/5	3.21 - 3.4	10,000
Manganese	7439-96-5	310	2,400	mg/kg	ASB3A	5/5	0.14 - 1.32	2,400
Mercury	7439-97-6	0.04	0.14	mg/kg	ASB5-A	5/5	0.0048 - 0.0077	0.14
Potassium	7440-09-7	1,100	1,550	mg/kg	ASB4A-DUP AVG	5/5	5 - 7.5	1,550
Nickel	7440-02-0	12	14.5	mg/kg	ASB4A-DUP AVG	5/5	0.027 - 0.0356	14.5
Selenium	7782-49-2	0.05	0.56	mg/kg	ASB1A	5/5	0.0502 - 0.063	0.56
Silver	7440-22-4	0.05	0.18	mg/kg	ASB5-A	5/5	0.0044 - 0.017	0.18
Sodium	7440-23-5	41	207	mg/kg	ASB3A	5/5	18.1 - 19	207
Thallium	7440-28-0	0.21	0.48	mg/kg	ASB3A	5/5	0.0085 - 0.027	0.48
Vanadium	7440-62-2	56	83	mg/kg	ASB4A-DUP AVG	5/5	0.047 - 0.207	83
Zinc	7440-66-6	56	1,400	mg/kg	ASB5-A	5/5	0.517 - 43	1,400
Pesticides/PCBs (ug/kg)								
Dieldrin	60-57-1	8.6	8.6	µg/kg	ASB4A-DUP AVG	1/3	0.371 - 12	8.6
Aroclor 1254	11097-69-1	9.9	2,400	µg/kg	ASB5-A	3/3	3.6 - 76	2,400
VOCs (ug/kg)								
Acetone	67-64-1	12	420	µg/kg	ASB5-A	5/5	11.2 - 74	420
Benzene	71-43-2	7.55	7.55	µg/kg	ASB4A-DUP AVG	1/5	0.805 - 4.2	7.55
Ethylbenzene	100-41-4	9.28	9.28	µg/kg	ASB4A-DUP AVG	1/5	1.92 - 7.1	9.28
Methyl acetate	79-20-9	87	140	µg/kg	ASB5-A	2/5	4.5 - 25	140
Methylene chloride	75-09-2	4.5	95.5	µg/kg	ASB4A-DUP AVG	5/5	1.44 - 14	95.5
Toluene	108-88-3	44.75	44.75	µg/kg	ASB4A-DUP AVG	1/5	1.38 - 17	44.75
Xylenes (Total)	1330-20-7	54	54	µg/kg	ASB4A-DUP AVG	1/5	1.82 - 16	54

Table 10-9
Detected Chemicals Occurrence for AOC A
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Chemical	CAS #	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening
SVOCs (ug/kg)								
1,1'-Biphenyl	92-52-4	2.2	2.2	µg/kg	ASB5-A	1/5	2.1 - 2.95	2.2
2-Methylnaphthalene	91-57-6	4.9	4.9	µg/kg	ASB5-A	1/5	1.9 - 3.29	4.9
2,4-Dinitrotoluene	121-14-2	850	28,000	µg/kg	ASB3A	4/5	3.78 - 1400	28,000
2,6-Dinitrotoluene	606-20-2	82	3,300	µg/kg	ASB3A	4/5	1.7 - 33.2	3,300
Acenaphthene	83-32-9	6.6	6.6	µg/kg	ASB5-A	1/5	1.7 - 2.06	6.6
Acenaphthylene	208-96-8	21	21	µg/kg	ASB5-A	1/5	1.7 - 1.82	21
Anthracene	120-12-7	21	21	µg/kg	ASB5-A	1/5	2.1 - 5.54	21
Benzo(a)pyrene	50-32-8	9	22	µg/kg	ASB5-A	3/5	3.9 - 6.85	22
Benzo(b)fluoranthene	205-99-2	16	120	µg/kg	ASB5-A	2/5	3.8 - 11.7	120
Benzo(k)fluoranthene	207-08-9	36	36	µg/kg	ASB5-A	1/5	2.7 - 16.1	36
Bis(2-ethylhexyl)phthalate	117-81-7	110	5,700	µg/kg	ASB5-A	5/5	2.48 - 250	5,700
Butylbenzylphthalate	85-68-7	160	240	µg/kg	ASB3A	2/5	5.38 - 28	240
Di-n-butylphthalate	84-74-2	125	130,000	µg/kg	ASB3A	5/5	3.4 - 1180	130,000
Di-n-octylphthalate	117-84-0	13	55	µg/kg	ASB5-A	3/5	2.5 - 3.72	55
Diethylphthalate	84-66-2	10	24	µg/kg	ASB5-A	5/5	1.9 - 2.28	24
Dimethylphthalate	131-11-3	210	210	µg/kg	ASB1A	2/5	1.9 - 3.97	210
Fluorene	86-73-7	14	14	µg/kg	ASB5-A	1/5	1.9 - 2.02	14
N-Nitrosodiphenylamine	86-30-6	120	4,700	µg/kg	ASB3A	5/5	1.5 - 1470	4,700
Pentachlorophenol	87-86-5	100	100	µg/kg	ASB5-A	1/5	2.8 - 5.27	100
PAHs (ug/kg)								
Benzo(a)anthracene	56-55-3	3.6	3.6	µg/kg	ASB2A	1/3	0.96 - 1.04	3.6
Chrysene	218-01-9	3.7	5	µg/kg	ASB1A	2/3	1.44 - 1.56	5
Fluoranthene	206-44-0	7.7	17	µg/kg	ASB1A	2/3	2.04 - 2.21	17
Indeno(1,2,3-cd)pyrene	193-39-5	6.2	6.2	µg/kg	ASB2A	1/3	0.84 - 0.91	6.2
Phenanthrene	85-01-8	1.9	4	µg/kg	ASB2A	3/3	0.72 - 0.78	4
Pyrene	129-00-0	11	21	µg/kg	ASB2A	2/3	1.08 - 1.17	21
Explosives (mg/kg)								
2,4-Dinitrotoluene	121-14-2	1.3	20	mg/kg	ASB3A	2/5	0.073 - 0.71	20
2,6-Dinitrotoluene	606-20-2	0.25	0.25	mg/kg	ASB5-A	1/5	0.099 - 0.25	0.25
Cyanide (mg/kg)								
Cyanide	57-12-5	0.06	0.23	mg/kg	ASB2A	4/5	0.0356 - 0.046	0.23

Notes:

CAS = Chemical Abstracts Service
COPEC = Chemical of Potential Ecological Concern
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyl
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon
TIC = Tentatively Identified Compound
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram

Table 10-10
Non-detected Chemicals for AOC A
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Parameter Name	Units	Number of Samples	Minimum MDL	Maximum MDL	TSV	Maximum Detection Limit Exceeds TSV
Inorganics							
7440439	Cadmium	mg/kg	1	0.182	0.182	4	N
7440360	Antimony	mg/kg	1	0.0518	0.0518	5	**Y**
Pesticides/Herbicides							
72548	4,4'-DDD	µg/kg	1	0.286	0.286	--	NS
72559	4,4'-DDE	µg/kg	1	0.21	0.21	100	**Y**
50293	4,4'-DDT	µg/kg	1	0.216	0.216	100	N
309002	Aldrin	µg/kg	1	0.365	0.365	100	N
319846	alpha-BHC	µg/kg	1	0.364	0.364	100	N
5103719	alpha-Chlordane	µg/kg	1	0.521	0.521	100	N
319857	beta-BHC	µg/kg	1	1.36	1.36	100	N
319868	delta-BHC	µg/kg	1	0.982	0.982	100	N
60571	Dieldrin	µg/kg	1	0.371	0.371	100	N
959988	Endosulfan I	µg/kg	1	1.09	1.09	--	NS
33213659	Endosulfan II	µg/kg	1	0.257	0.257	--	NS
1031078	Endosulfan Sulfate	µg/kg	1	0.604	0.604	--	NS
72208	Endrin	µg/kg	1	0.358	0.358	100	N
7421934	Endrin aldehyde	µg/kg	1	1.33	1.33	--	NS
53494705	Endrin ketone	µg/kg	1	0.33	0.33	--	NS
58899	gamma-BHC (Lindane)	µg/kg	1	0.233	0.233	100	N
5103742	gamma-Chlordane	µg/kg	1	0.844	0.844	100	N
76448	Heptachlor	µg/kg	1	0.846	0.846	--	NS
1024573	Heptachlor epoxide	µg/kg	1	0.546	0.546	100	N
72435	Methoxychlor	µg/kg	1	0.336	0.336	100	N
8001352	Toxaphene	µg/kg	1	28	28	--	NS
93765	2,4,5-T	µg/kg	1	2.4	2.4	--	NS
93721	2,4,5-TP (Silvex)	µg/kg	1	4.8	4.8	--	NS
94757	2,4-D	µg/kg	1	19.2	19.2	--	NS
94826	2,4-DB	µg/kg	1	74.4	74.4	--	NS
75990	Dalapon	µg/kg	1	68.4	68.4	--	NS
1918009	Dicamba	µg/kg	1	2.4	2.4	--	NS
120365	Dichlorprop	µg/kg	1	20.4	20.4	--	NS
88857	Dinoseb	µg/kg	1	25.2	25.2	--	NS
94746	MCPA	µg/kg	1	1680	1680	--	NS
93652	MCPP	µg/kg	1	6070	6070	--	NS
PCBs							
12674112	Aroclor 1016	µg/kg	1	19.2	19.2	--	NS
11104282	Aroclor 1221	µg/kg	1	2.4	2.4	--	NS
11141165	Aroclor 1232	µg/kg	1	6	6	--	NS
53469219	Aroclor 1242	µg/kg	1	3.6	3.6	--	NS
12672296	Aroclor 1248	µg/kg	1	6	6	--	NS
11096825	Aroclor 1260	µg/kg	1	8.4	8.4	371	N
VOCs							
71556	1,1,1-Trichloroethane	µg/kg	3	1.93	1.93	300	N
79345	1,1,2,2-Tetrachloroethane	µg/kg	3	1.8	1.8	300	N
76131	1,1,2-Trichloro-1,2,2-trifluoroethane	µg/kg	3	0.775	0.775	--	NS
79005	1,1,2-Trichloroethane	µg/kg	3	1.54	1.54	300	N
75343	1,1-Dichloroethane	µg/kg	3	1.62	1.62	300	N
75354	1,1-Dichloroethene	µg/kg	3	3.47	3.47	--	NS
87616	1,2,3-Trichlorobenzene	µg/kg	3	1.13	1.13	--	NS
120821	1,2,4-Trichlorobenzene	µg/kg	3	2.11	2.11	100	N
96128	1,2-Dibromo-3-chloropropane	µg/kg	3	3.28	3.28	--	NS
106934	1,2-Dibromoethane	µg/kg	3	2.24	2.24	--	NS
95501	1,2-Dichlorobenzene	µg/kg	3	1.72	1.72	100	N

Table 10-10
Non-detected Chemicals for AOC A
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Parameter Name	Units	Number of Samples	Minimum MDL	Maximum MDL	TSV	Maximum Detection Limit Exceeds TSV
107062	1,2-Dichloroethane	µg/kg	3	1.56	1.56	870,000	N
78875	1,2-Dichloropropane	µg/kg	3	1.9	1.9	700,000	N
541731	1,3-Dichlorobenzene	µg/kg	3	2.16	2.16	--	NS
106467	1,4-Dichlorobenzene	µg/kg	3	0.833	0.833	100	N
78933	2-Butanone	µg/kg	3	5.4	5.4	--	NS
591786	2-Hexanone	µg/kg	3	2.27	2.27	--	NS
108101	4-Methyl-2-pentanone	µg/kg	3	1.22	1.22	--	NS
71432	Benzene	µg/kg	3	0.805	0.805	100	N
74975	Bromochloromethane	µg/kg	3	1.48	1.48	--	NS
75274	Bromodichloromethane	µg/kg	3	0.569	0.569	450,000	N
75252	Bromoform	µg/kg	3	1.63	1.63	--	NS
74839	Bromomethane	µg/kg	3	5.5	5.5	--	NS
75150	Carbon disulfide	µg/kg	3	1.84	1.84	--	NS
56235	Carbon tetrachloride	µg/kg	3	1.7	1.7	300	N
108907	Chlorobenzene	µg/kg	3	0.545	0.545	100	N
75003	Chloroethane	µg/kg	3	2.92	2.92	--	NS
67663	Chloroform	µg/kg	3	0.869	0.869	300	N
74873	Chloromethane	µg/kg	3	0.679	0.679	--	NS
156592	cis-1,2-Dichloroethene	µg/kg	3	2.05	2.05	300	N
10061015	cis-1,3-Dichloropropene	µg/kg	3	1.3	1.3	--	NS
110827	Cyclohexane	µg/kg	3	1.58	1.58	--	NS
124481	Dibromochloromethane	µg/kg	3	0.673	0.673	--	NS
75718	Dichlorodifluoromethane	µg/kg	3	0.84	0.84	--	NS
100414	Ethylbenzene	µg/kg	3	1.92	1.92	100	N
98828	Isopropylbenzene	µg/kg	3	1.44	1.44	--	NS
79209	Methyl acetate	µg/kg	3	4.5	4.5	--	NS
1634044	methyl tert-Butyl ether	µg/kg	3	1.55	1.55	--	NS
108872	Methylcyclohexane	µg/kg	3	1.94	1.94	--	NS
100425	Styrene	µg/kg	3	1.49	1.49	100	N
127184	Tetrachloroethene	µg/kg	3	1.54	1.54	300	N
108883	Toluene	µg/kg	3	1.38	1.38	100	N
156605	trans-1,2-Dichloroethene	µg/kg	3	2.12	2.12	300	N
10061026	trans-1,3-Dichloropropene	µg/kg	3	1.94	1.94	--	NS
79016	Trichloroethene	µg/kg	3	2.23	2.23	300	N
75694	Trichlorofluoromethane	µg/kg	3	0.841	0.841	--	NS
75014	Vinyl Chloride	µg/kg	3	1.49	1.49	300	N
1330207	Xylenes	µg/kg	3	1.82	1.82	100	N
SVOCs							
92524	1,1'-Biphenyl	µg/kg	3	2.95	2.95	--	NS
95943	1,2,4,5-Tetrachlorobenzene	µg/kg	3	34.4	34.4	--	NS
108601	2,2'-oxybis(1-Chloropropane)	µg/kg	3	1.58	1.58	--	NS
95954	2,4,5-Trichlorophenol	µg/kg	3	4.01	4.01	100	N
88062	2,4,6-Trichlorophenol	µg/kg	3	3.14	3.14	100	N
120832	2,4-Dichlorophenol	µg/kg	3	4.22	4.22	100	N
105679	2,4-Dimethylphenol	µg/kg	3	9.53	9.53	100	N
51285	2,4-Dinitrophenol	µg/kg	3	3.84	3.84	20,000	N
91587	2-Chloronaphthalene	µg/kg	3	2.76	2.76	--	NS
95578	2-Chlorophenol	µg/kg	3	2.41	2.41	100	N
91576	2-Methylnaphthalene	µg/kg	3	3.29	3.29	--	NS
95487	2-Methylphenol	µg/kg	3	5.81	5.81	100	N
88744	2-Nitroaniline	µg/kg	3	5.52	5.52	--	NS
88755	2-Nitrophenol	µg/kg	3	2.04	2.04	--	NS
91941	3,3'-Dichlorobenzidine	µg/kg	3	66.5	66.5	--	NS
99092	3-Nitroaniline	µg/kg	3	22	22	--	NS

Table 10-10
Non-detected Chemicals for AOC A
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Parameter Name	Units	Number of Samples	Minimum MDL	Maximum MDL	TSV	Maximum Detection Limit Exceeds TSV
534521	4,6-Dinitro-2-methylphenol	µg/kg	3	5.41	5.41	--	NS
101553	4-Bromophenyl-phenylether	µg/kg	3	4.06	4.06	--	NS
59507	4-Chloro-3-Methylphenol	µg/kg	3	6.25	6.25	--	NS
106478	4-Chloroaniline	µg/kg	3	1.51	1.51	--	NS
7005723	4-Chlorophenyl-phenylether	µg/kg	3	3.92	3.92	--	NS
106445	4-Methylphenol	µg/kg	3	7.64	7.64	100	N
100016	4-Nitroaniline	µg/kg	3	8.7	8.7	--	NS
100027	4-Nitrophenol	µg/kg	3	3.4	3.4	100	N
83329	Acenaphthene	µg/kg	3	2.06	2.06	100	N
208968	Acenaphthylene	µg/kg	3	1.8	1.8	100	N
98862	Acetophenone	µg/kg	3	2.28	2.28	--	NS
120127	Anthracene	µg/kg	3	5.54	5.54	100	N
1912249	Atrazine	µg/kg	3	8.26	8.26	--	NS
100527	Benzaldehyde	µg/kg	3	4.86	4.86	--	NS
56553	Benzo(a)anthracene	µg/kg	3	16	16	100	N
50328	Benzo(a)pyrene	µg/kg	1	6.85	6.85	100	N
205992	Benzo(b)fluoranthene	µg/kg	2	11.7	11.7	100	N
191242	Benzo(g,h,i)perylene	µg/kg	3	10.5	10.5	100	N
207089	Benzo(k)fluoranthene	µg/kg	3	16.1	16.1	100	N
111911	Bis(2-chloroethoxy)methane	µg/kg	3	3.77	3.77	--	NS
111444	Bis(2-chloroethyl)ether	µg/kg	3	2.08	2.08	--	NS
85687	Butylbenzylphthalate	µg/kg	2	5.38	5.38	--	NS
105602	Caprolactam	µg/kg	3	7.66	7.66	--	NS
86748	Carbazole	µg/kg	3	7.32	7.32	--	NS
218019	Chrysene	µg/kg	2	12.2	12.2	100	N
53703	Dibenz(a,h)anthracene	µg/kg	3	7.08	7.08	100	N
132649	Dibenzofuran	µg/kg	3	3.79	3.79	--	NS
131113	Dimethylphthalate	µg/kg	2	3.97	3.97	200,000	N
117840	Di-n-octylphthalate	µg/kg	2	3.72	3.72	--	NS
86737	Fluorene	µg/kg	3	2.02	2.02	100	N
118741	Hexachlorobenzene	µg/kg	3	3.01	3.01	1,000,000	N
87683	Hexachlorobutadiene	µg/kg	3	4.64	4.64	--	NS
77474	Hexachlorocyclopentadiene	µg/kg	3	2.38	2.38	10,000	N
67721	Hexachloroethane	µg/kg	3	2.8	2.8	--	NS
193395	Indeno(1,2,3-cd)pyrene	µg/kg	2	4.7	4.7	100	N
78591	Isophorone	µg/kg	3	2.08	2.08	--	NS
91203	Naphthalene	µg/kg	3	3.3	3.3	100	N
98953	Nitrobenzene	µg/kg	3	3.84	3.84	40,000	N
621647	N-Nitrosodi-n-propylamine	µg/kg	3	3.95	3.95	--	NS
87865	Pentachlorophenol	µg/kg	3	5.27	5.27	100	N
85018	Phenanthrene	µg/kg	1	2.76	2.76	100	N
108952	Phenol	µg/kg	3	4.75	4.75	100	N
PAHs							
83329	Acenaphthene	µg/kg	3	11.3	12.2	100	N
208968	Acenaphthylene	µg/kg	3	13.9	15.1	100	N
120127	Anthracene	µg/kg	3	0.84	0.91	100	N
56553	Benzo(a)anthracene	µg/kg	2	0.96	1.04	100	N
50328	Benzo(a)pyrene	µg/kg	3	1.2	1.3	100	N
205992	Benzo(b)fluoranthene	µg/kg	3	1.56	1.69	100	N
191242	Benzo(g,h,i)perylene	µg/kg	3	15	16.3	100	N
207089	Benzo(k)fluoranthene	µg/kg	3	1.2	1.3	100	N
218019	Chrysene	µg/kg	1	1.56	1.56	100	N
53703	Dibenz(a,h)anthracene	µg/kg	3	1.68	1.82	100	N
206440	Fluoranthene	µg/kg	1	2.21	2.21	100	N

Table 10-10
Non-detected Chemicals for AOC A
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Parameter Name	Units	Number of Samples	Minimum MDL	Maximum MDL	TSV	Maximum Detection Limit Exceeds TSV
86737	Fluorene	µg/kg	3	1.56	1.69	100	N
193395	Indeno(1,2,3-cd)pyrene	µg/kg	2	0.84	0.91	100	N
91203	Naphthalene	µg/kg	3	9.48	10.3	100	N
129000	Pyrene	µg/kg	1	1.17	1.17	100	N
Explosives							
99354	1,3,5-Trinitrobenzene	mg/kg	3	0.14	0.14	--	NS
99650	1,3-Dinitrobenzene	mg/kg	3	0.159	0.159	--	NS
118967	2,4,6-Trinitrotoluene	mg/kg	3	0.167	0.167	--	NS
121142	2,4-Dinitrotoluene	mg/kg	2	0.142	0.142	--	NS
606202	2,6-Dinitrotoluene	mg/kg	3	0.25	0.25	--	NS
35572782	2-Amino-4,6-dinitrotoluene	mg/kg	3	0.151	0.151	--	NS
88722	2-Nitrotoluene	mg/kg	3	0.266	0.266	--	NS
99081	3-Nitrotoluene	mg/kg	3	0.184	0.184	--	NS
1946510	4-Amino-2,6-dinitrotoluene	mg/kg	3	0.162	0.162	--	NS
99990	4-Nitrotoluene	mg/kg	3	0.251	0.251	--	NS
2691410	HMX (Octahydro-1,3,5,7-tetranitro-1,3,5,	mg/kg	3	0.229	0.229	--	NS
98953	Nitrobenzene	mg/kg	3	0.102	0.102	40,000	N
121824	RDX (Hexahydro-1,3,5-trinitro-1,3,5-tria	mg/kg	3	0.131	0.131	--	NS
Nitroglycerin/PETN							
628966	Nitroglycerin	mg/kg	3	0.197	0.203	--	NS
78115	PETN	mg/kg	3	0.271	0.28	--	NS

Notes:
CAS = Chemical Abstracts Service
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
NS = No screening value
TSV = Toxicity Screening Value
MDL = Method Detection Limit

Table 10-11
Preliminary Soil Invertebrate Risk Characterization for Area A
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Chemicals	CAS #	MDC for Surface Soil	Direct Contact TRV	TRV Source[A]	HQ
TAL Metals (mg/kg)					
Aluminum	7429-90-5	32,100	1	BTAG 1995	**32,100**
Antimony	7440-36-0	0.63	78	ECO SSL 2005	<1
Arsenic	7440-38-2	20	328	BTAG 1995	<1
Barium	7440-39-3	150	330	ECO SSL 2005	<1
Beryllium	7440-41-7	0.62	40	ECO SSL 2005	<1
Cadmium	7440-43-9	1.3	140	ECO SSL 2005	<1
Chromium	7440-47-3	100	0.0075	BTAG 1995	**13,333**
Cobalt	7440-48-4	24	200	BTAG 1995	<1
Copper	7440-50-8	510	50	ORNL 1997a	**10**
Iron	7439-89-6	53,000	12	BTAG 1995	**4,417**
Lead	7439-92-1	330	1,700	ECO SSL 2005	<1
Manganese	7439-96-5	2,400	330	BTAG 1995	**7**
Mercury	7439-97-6	0.14	0.058	BTAG 1995	**2**
Nickel	7440-02-0	14.5	100	ORNL 1997a	<1
Selenium	7782-49-2	0.56	1.8	BTAG 1995	<1
Silver	7440-22-4	0.18	20	CCME 2004	<1
Thallium	7440-28-0	0.48	1	CCME 2004	<1
Vanadium	7440-62-2	83	58	BTAG 1995	**1.4**
Zinc	7440-66-6	1,400	100	ORNL 1997a	**14**
Pesticides/PCBs (ug/kg)					
Dieldrin	60-57-1	8.6	100	BTAG 1995	<1
Aroclor 1254	11097-69-1	2,400	500	CCME 2004	**5**
VOCs (ug/kg)					
Acetone	67-64-1	420	NV	--	NC
Benzene	71-43-2	7.55	100	BTAG 1995	<1
Ethylbenzene	100-41-4	9.28	100	BTAG 1995	<1
Methyl acetate	79-20-9	140	NV	--	NC
Methylene chloride	75-09-2	95.5	300	BTAG 1995	<1
Toluene	108-88-3	44.75	100	BTAG 1995	<1
Xylenes (Total)	1330-20-7	54	100	BTAG 1995	<1
SVOCs (ug/kg)					
1,1'-Biphenyl	92-52-4	2.2	NV	--	NC
2-Methylnaphthalene	91-57-6	4.9	NV	--	NC
2,4-Dinitrotoluene	121-14-2	28,000	NV	--	NC
2,6-Dinitrotoluene	606-20-2	3,300	NV	--	NC
Acenaphthene	83-32-9	6.6	100	BTAG 1995	<1
Acenaphthylene	208-96-8	21	100	BTAG 1995	<1
Anthracene	120-12-7	21	100	BTAG 1995	<1
Benzo(a)pyrene	50-32-8	22	100	BTAG 1995	<1
Benzo(b)fluoranthene	205-99-2	120	100	BTAG 1995	**1.2**
Benzo(k)fluoranthene	207-08-9	36	100	BTAG 1995	<1
Bis(2-ethylhexyl)phthalate	117-81-7	5,700	NV	--	NC
Butylbenzylphthalate	85-68-7	240	NV	--	NC
Di-n-butylphthalate	84-74-2	130,000	NV	--	NC
Di-n-octylphthalate	117-84-0	55	NV	--	NC
Diethylphthalate	84-66-2	24	NV	--	NC
Dimethylphthalate	131-11-3	210	NV	--	NC
Fluorene	86-73-7	14	100	BTAG 1995	<1
N-Nitrosodiphenylamine	86-30-6	4,700	NV	--	NC
Pentachlorophenol	87-86-5	100	100	BTAG 1995	<1

Table 10-11
Preliminary Soil Invertebrate Risk Characterization for Area A
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Chemicals	CAS #	MDC for Surface Soil	Direct Contact TRV	TRV Source[A]	HQ
PAHs (ug/kg)					
Benzo(a)anthracene	56-55-3	3.6	100	BTAG 1995	<1
Chrysene	218-01-9	5	100	BTAG 1995	<1
Fluoranthene	206-44-0	17	100	BTAG 1995	<1
Indeno(1,2,3-cd)pyrene	193-39-5	6.2	100	BTAG 1995	<1
Phenanthrene	85-01-8	4	100	BTAG 1995	<1
Pyrene	129-00-0	21	100	BTAG 1995	<1
Explosives (mg/kg)					
2,4-Dinitrotoluene	121-14-2	20	NV	--	NC
2,6-Dinitrotoluene	606-20-2	0.25	NV	--	NC
Cyanide (mg/kg)					
Cyanide	57-12-5	0.23	0.005	BTAG 1995	**46**

Notes:

CAS = Chemical Abstracts Service
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
MDC = Maximum Detected Concentration
TRV = Toxicity Reference Value

NV = No value
HQ = Hazard Quotient
NC = Not Calculated no TRV available
BTAG = Biological Technical Assistance Group Screening Level, Draft 1995
[A] =
Region III BTAG (USEPA 1995)
Oak Ridge National Laboratory (Efroymson et al. 1997a)
USEPA Ecological SSL (ECO-SSL 2005)
Canadian Environmental Quality Guidelines (CCME 2004)

Table 10-12
Inorganic COPEC/Background Comparison for AOC A
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Measured Analytes	CAS-Number	MDC for Surface Soil	Background Point Estimate [A]	Maximum Concentration Exceeds Background Point Estimate
TAL METALS (mg/kg)				
ALUMINUM	7429-90-5	32,100	40,041	N
ARSENIC	7440-38-2	20.00	16	**Y**
CADMIUM	7440-43-9	1.30	0.69	**Y**
CHROMIUM	7440-47-3	100	65	**Y**
COPPER	7440-50-8	510	54	**Y**
IRON	7439-89-6	53,000	50,962	**Y**
LEAD	7439-92-1	330	27	**Y**
MANGANESE	7439-96-5	2,400	2,543	N
MERCURY	7439-97-6	0.14	0.13	**Y**
NICKEL	7440-02-0	14.5	63	N
SELENIUM	7782-49-2	0.56	--	NBE
VANADIUM	7440-62-2	83	108	N
ZINC	7440-66-6	1,400	202	**Y**

Notes:
CAS = Chemical Abstracts Service
mg/kg = Milligram Per Kilogram
MDC = Maximum Detected Concentration
[A] = Facility-Wide Background Point Estimate as Reported in the Facility-Wide Background Study Report (IT 2001a)

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Table 10-13
Preliminary/Refined Wildlife Risk Characterization
Screening Level Ecological Risk Assessment
SSP Report - Area A
Radford Army Ammunition Plant, Radford, Virginia

Preliminary Assessment

Parameter	Maximum Soil Concentration (mg/kg)	Wildlife TRV-Based Soil Concentrations																			
		American Robin				Red-tailed Hawk				Meadow Vole				Red Fox				Short-tailed Shrew			
		NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ
Metals																					
ARSENIC	20	1.39E+01	1.4	3.46E+01	<1	3.89E+02	<1	9.71E+02	<1	8.99E+00	2.2	8.99E+01	<1	1.34E+00	14.9	1.34E+01	1.5	3.02E-01	66.3	3.02E+00	6.6
CADMIUM	1.3	6.75E-01	1.9	9.31E+00	<1	3.91E+02	<1	5.40E+03	<1	1.50E+01	<1	1.50E+02	<1	1.48E+01	<1	1.48E+02	<1	1.16E+00	1.1	1.16E+01	<1
CHROMIUM	100	5.27E+00	19.0	2.64E+01	3.8	2.70E+01	3.7	1.35E+02	<1	8.65E+05	<1	8.65E+06	<1	2.38E+04	<1	2.38E+05	<1	1.78E+04	<1	1.78E+05	<1
COPPER	510	1.38E+02	3.7	1.82E+02	2.8	7.11E+02	<1	9.33E+02	<1	8.34E+02	<1	1.10E+03	<1	7.43E+01	6.9	9.78E+01	5.2	9.57E+01	5.3	1.26E+02	4.0
LEAD	330	5.18E+00	63.7	5.18E+01	6.4	5.69E+02	<1	5.69E+03	<1	1.05E+03	<1	1.05E+04	<1	4.97E+02	<1	4.97E+03	<1	5.45E+01	6.1	5.45E+02	<1
MERCURY	0.14	6.08E-01	<1	1.22E+00	<1	2.62E-01	<1	5.23E-01	<1	4.27E-01	<1	1.74E+00	<1	3.93E-03	35.6	1.60E-02	8.7	8.31E-02	1.7	3.39E-01	<1
NICKEL	14.5	3.86E+02	<1	5.33E+02	<1	1.95E+03	<1	2.70E+03	<1	5.54E+03	<1	1.11E+04	<1	3.23E+02	<1	6.46E+02	<1	2.86E+02	<1	5.71E+02	<1
SELENIUM	0.56	3.13E-01	1.8	6.27E-01	<1	4.03E+00	<1	8.06E+00	<1	2.73E+00	<1	4.50E+00	<1	6.09E-01	<1	1.00E+00	<1	5.27E-01	1.1	8.70E-01	<1
SILVER	0.18	2.31E+01	<1	1.73E+02	<1	8.34E+02	<1	6.26E+03	<1	1.72E+03	<1	1.72E+04	<1	2.89E+02	<1	2.89E+03	<1	5.85E+01	<1	5.85E+02	<1
ZINC	1,400	1.40E+01	100.0	1.26E+02	11.1	2.19E+01	63.9	1.98E+02	7.1	3.38E+03	<1	6.75E+03	<1	8.28E+01	16.9	1.66E+02	8.5	4.22E+02	3.3	8.44E+02	1.7
Pesticides																					
DIELDRIN	0.0086	4.39E-02	<1	4.39E-01	<1	8.24E+00	<1	8.24E+01	<1	5.36E+00	<1	5.36E+01	<1	3.22E-01	<1	3.22E+00	<1	2.08E-02	<1	2.08E-01	<1
PCBs																					
Aroclor 1254	2.4	8.69E-03	276.2	8.69E-02	27.6	1.53E+00	1.6	1.53E+01	<1	1.17E+01	<1	1.17E+02	<1	5.33E-02	45.0	5.33E-01	4.5	3.42E-03	701.5	3.42E-02	70.1
SVOCs/PAHs																					
ACENAPHTHENE	0.0066	5.84E+00	<1	2.92E+01	<1	3.05E+03	<1	1.52E+04	<1	1.16E+03	<1	5.78E+03	<1	8.83E+02	<1	4.41E+03	<1	7.82E+01	<1	3.91E+02	<1
ACENAPHTHYLENE	0.021	NC		NC		NC		NC		1.38E+04	<1	6.90E+04	<1	9.71E+03	<1	4.85E+04	<1	9.32E+02	<1	4.66E+03	<1
ANTHRACENE	0.021	NC		NC		NC		NC		5.23E+04	<1	5.23E+05	<1	2.14E+04	<1	2.14E+05	<1	2.20E+03	<1	2.20E+04	<1
BENZO(A)ANTHRACENE	0.0036	NC		NC		NC		NC		4.78E+01	<1	4.78E+02	<1	2.55E+00	<1	2.55E+01	<1	1.43E+00	<1	1.43E+01	<1
BENZO(A)PYRENE	0.022	3.56E+00	<1	1.78E+01	<1	9.73E+00	<1	4.87E+01	<1	1.66E+02	<1	1.66E+03	<1	3.48E+00	<1	3.48E+01	<1	4.23E+00	<1	4.23E+01	<1
BENZO(B)FLUORANTHENE	0.12	NC		NC		NC		NC		1.68E+02	<1	1.68E+03	<1	2.87E+00	<1	2.87E+01	<1	5.12E+00	<1	5.12E+01	<1
BENZO(K)FLUORANTHENE	0.036	NC		NC		NC		NC		1.85E+03	<1	1.85E+04	<1	3.16E+01	<1	3.16E+02	<1	5.65E+01	<1	5.65E+02	<1
CHRYSENE	0.005	NC		NC		NC		NC		2.37E+03	<1	2.37E+04	<1	1.24E+02	<1	1.24E+03	<1	5.65E+01	<1	5.65E+02	<1
FLUORANTHENE	0.017	NC		NC		NC		NC		4.11E+03	<1	2.05E+04	<1	7.02E+02	<1	3.51E+03	<1	1.24E+02	<1	6.22E+02	<1
FLUORENE	0.014	6.55E+00	<1	3.28E+01	<1	1.56E+03	<1	7.81E+03	<1	4.15E+01	<1	2.07E+02	<1	2.48E+01	<1	1.24E+02	<1	2.27E+00	<1	1.13E+01	<1
INDENO(1,2,3-CD)PYRENE	0.0062	NC		NC		NC		NC		1.92E+03	<1	1.92E+04	<1	1.15E+01	<1	1.15E+02	<1	4.26E+01	<1	4.26E+02	<1
PENTACHLOROPHENOL	0.1	NC		NC		NC		NC		5.72E+01	<1	5.72E+02	<1	1.20E+01	<1	1.20E+02	<1	1.98E+00	<1	1.98E+01	<1
PHENANTHRENE	0.004	8.17E+00	<1	4.08E+01	<1	7.63E+02	<1	3.81E+03	<1	7.32E+02	<1	3.66E+03	<1	2.98E+02	<1	1.49E+03	<1	3.22E+01	<1	1.61E+02	<1
PYRENE	0.021	NC		NC		NC		NC		1.07E+03	<1	5.35E+03	<1	1.85E+02	<1	9.25E+02	<1	3.17E+01	<1	1.58E+02	<1

Refined Assessment

Parameter	Maximum Soil Concentration (mg/kg)	Wildlife TRV-Based Soil Concentrations																			
		American Robin				Red-tailed Hawk				Meadow Vole				Red Fox				Short-tailed Shrew			
		NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ
Metals																					
ARSENIC	20	6.04E+02	<1	1.51E+03	<1	8.09E+06	<1	2.02E+07	<1	3.39E+01	<1	3.39E+02	<1	8.23E+03	<1	8.23E+04	<1	1.03E+01	1.9	1.03E+02	<1
CADMIUM	1.3	3.08E+01	<1	4.25E+02	<1	8.15E+06	<1	1.12E+08	<1	5.65E+01	<1	5.65E+02	<1	9.95E+04	<1	9.95E+05	<1	4.06E+01	<1	4.06E+02	<1
CHROMIUM	100	2.18E+02	<1	1.09E+03	<1	5.62E+05	<1	2.81E+06	<1	3.26E+06	<1	3.26E+07	<1	1.45E+08	<1	1.45E+09	<1	5.98E+05	<1	5.98E+06	<1
COPPER	510	6.00E+03	<1	7.87E+03	<1	1.48E+07	<1	1.94E+07	<1	3.14E+03	<1	4.14E+03	<1	4.56E+05	<1	6.00E+05	<1	3.22E+03	<1	4.24E+03	<1
LEAD	330	2.17E+02	1.5	2.17E+03	<1	1.19E+07	<1	1.19E+08	<1	3.94E+03	<1	3.94E+04	<1	3.11E+06	<1	3.11E+07	<1	1.83E+03	<1	1.83E+04	<1
MERCURY	0.14	2.72E+01	<1	5.45E+01	<1	5.45E+03	<1	1.09E+04	<1	1.61E+00	<1	6.57E+00	<1	2.40E+01	<1	9.78E+01	<1	2.84E+00	<1	1.16E+01	<1
SELENIUM	0.56	1.42E+01	<1	2.84E+01	<1	8.39E+04	<1	1.68E+05	<1	1.03E+01	<1	1.70E+01	<1	3.79E+03	<1	6.25E+03	<1	1.82E+01	<1	3.01E+01	<1
ZINC	1,400	6.32E+02	2.2	5.71E+03	<1	4.56E+05	<1	4.12E+06	<1	1.27E+04	<1	2.54E+04	<1	5.06E+05	<1	1.01E+06	<1	1.46E+04	<1	2.92E+04	<1
PCBs																					
Aroclor 1254	2.4	4.00E-01	6.0	4.00E+00	<1	3.18E+04	<1	3.18E+05	<1	4.40E+01	<1	4.40E+02	<1	3.25E+02	<1	3.25E+03	<1	1.21E-01	19.9	1.21E+00	2.0

Notes:
NC = Not Calculated no TRV available
TRV = Toxicity Reference Value
HQ = Hazard Quotient
LOAEL = Lowest observable adverse effects level
NOAEL = No observable adverse effects level
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
PCB = Polychlorinated Biphenyls
SVOC = Semi-Volatile Organic Compound
PAH = Poly-Aromatic Hydrocarbon

= Indicate HQs greater than 1.0

Refer to Appendix F.2 for detailed description of model parameters and results

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11.0 AREA OF CONCERN F – FORMER DRUM STORAGE AREA

11.1 SITE BACKGROUND – ENVIRONMENTAL SETTING

Physiography

AOC F is a 0.043-acre (1,883 ft^2) area located approximately 80 ft southeast of an unrelated building and 300 ft from the New River in the northern section of the MMA. The topography near AOC F is gently-to-steeply sloping upward to the south and has an elevation of approximately 1,700 ft msl (Figure 11-1). The AOC is a constructed 50 ft by 50 ft gravel-covered area, and is flanked on three sides by maintained grass areas and by an asphalt-paved road to the north (Figure 11-1). Overhead lines traverse the sites western boundary.



AOC F – August 2002 – Looking West

Tanks and Structures

Besides previously identified nearby buildings and overhead lines, no other tanks or structures exist at AOC F.

Surface Water

Based on topography, stormwater runoff within the AOC flows northwest across the site toward the road into a well-defined drainageway that flows west eventually discharging into the New River. Other surface water bodies, drainage ditches, manholes, catch basins, or other flow paths have not been associated with the site.

Soil and Geology

Area F is underlain by the Urban-Unison land soil. This soil has a medium permeability and is medium-to-strongly acidic (IT 2001a). SSP soil borings completed to the depth of refusal (up to 19 ft) indicate that the site is underlain by approximately 13 to 19 ft of unconsolidated soil overlying carbonate bedrock of the Elbrook Formation. This soil consists of micaceous, silty sand (SM) or poorly sorted sand with variable gravel (SP) to a depth of 13 to 14 ft bgs underlain by silt and clay (ML and CL). Physical testing of two representative samples at the site indicate neutral CL and SM soil with organic content of 1.4% and a vertical hydraulic conductivity of 8.6E-08 cm/sec for the CL sample.

Groundwater

An unconfined aquifer occurs within the lower portion of unconsolidated soil underlying the site; groundwater is also present within the underlying bedrock. Groundwater was encountered in borings FSB1 and FSB3 at approximately 16.5 and 16.0 feet bgs, respectively. The static water measured in monitoring well FMW1 also was approximately 16 ft bgs prior to groundwater sampling. Based on surface topography and proximity to the New River, groundwater flow in the site area is toward the New River (north).

11.2 SITE BACKGROUND - HISTORY

Empty drums from throughout RFAAP (including the Nitroglycerin Area, Rocket Area, and Green Line; ATK 2002) were stacked on their sides at AOC F prior to being sold for recycling. The drums were reportedly rinsed prior to being stored. The drums may have contained diethyl phthalate, sodium

hydrosulfide, ethyl lactate/butyl acetate solvent mix, dinitro-propylamine, waste oil or oily water, and 2-nitro-diphenylamine (ATK 2002).

11.3 PREVIOUS INVESTIGATIONS

11.3.1 Verification Investigation – 1992

In 1992, as part of a VI, Dames and Moore collected four surface soil samples from within the limits of the gravel storage area (Figure 11-2) for analysis of VOCs and SVOCs. Three VOCs were detected at concentrations below their adjusted R-RBCs (Table 11-1).

11.3.2 Installation Assessment (Air Photo Interpretation)

Activity at AOC F was first noted on a 1986 aerial photograph that showed approximately 200 drums stored at this location. The 1992 report also notes "a probable stain is visible in the vicinity of the drums" (USEPA 1992).

11.4 WORK PLAN DATA GAP ANALYSIS

The data gap analysis presented in Section 1.2.5 of WPA 016 indicated that limited soil sampling and analyses had occurred at AOC F (URS 2003b). The following data gaps were identified:

- TCL VOCs - surface and subsurface soil;
- TCL SVOCs/PAHs - surface and subsurface soil;
- TCL PCBs and pesticides - surface soil;
- Explosives - surface and subsurface soil;
- TAL inorganics - surface and subsurface soil; and
- Site-specific physical soil testing data.

11.5 SSP FIELD ACTIVITIES

Soil borings FSB1, FSB2, and FSB3 were advanced within the gravel area and boring FSB4 was advanced in the drainage ditch located adjacent to the site to evaluate for the presence or absence of chemicals in soil (Figure 11-1). Each boring was advanced to refusal using a tractor mounted, direct-push Geoprobe® unit. Discrete samples were collected from surface, intermediate, and terminal intervals for the three borings as summarized below.

AOC F SSP Samples and Boring Information

Boring ID	Total Depth of Boring (ft bgs)	Surface Sample ID	Sample Depth (ft)	Intermediate Sample ID	Sample Depth (ft)	Terminal Sample ID	Sample Depth (ft)
FSB1	19.0	FSB1A	0.0 - 1.0	FSB1B	10.0 - 12.0	FSB1C	14.0 - 16.0
FSB2	13.2	FSB2A	0.0 - 1.0	FSB2B	8.0 - 10.0	FSB2C	12.0 - 13.0
FSB3	17.0	FSB3A	0.0 - 1.0	FSB3B	10.0 - 12.0	FSB3C	14.0 - 15.5
FSB4	11.0	FSB4A	0.0 - 1.0	FSB4B	7.0	FSB3C	10.0 - 11.0

Soil samples were analyzed for TCL VOCs, TCL SVOCs, PAHs, explosives (including nitroglycerin and PETN), and TAL inorganics. Soil samples FSB2A, FSB4A, FSB4B, and FSB4C were also analyzed for TCL pesticides, TCL PCBs, and TCL herbicides. SSP analytical results (detected chemicals) are summarized in Table 11-2.

Two soil samples were collected from FSB1 (18.5-19 ft bgs) and FSB2 (7.5-8 ft bgs) for physical testing of percent moisture, grain size, pH, TOC, specific gravity, and bulk density. Additional testing was conducted on sample FSB1 including: Atterberg limits, hydrometer analysis, and hydraulic conductivity. Analytical results for these samples are summarized in Table 3-1 and the complete results are provided in Appendix E.

One monitoring well (FMW1) was installed at the site (on April 19, 2006) to evaluate potential leaching of chromium and dieldrin to groundwater due to detected concentrations in soil above the SSL for the soil-to-groundwater migration pathway (Figure 6-1). Monitoring well FMW1 was installed to a depth of 55 ft bgs and screened in the uppermost portion of aquifer across the soil/bedrock interface. One groundwater sample was collected from monitoring well FMW1 for analysis of chromium and pesticides including dieldrin. Analytical results for this sample are provided in Appendix K and discussed in Section 11.6.1.2.

Deviations to the SSP field program outlined in WPA 016 were not required to adjust to field conditions at the site.

11.6 HUMAN HEALTH RISK SCREENING

11.6.1 Identification of COPCs

11.6.1.1 Soil

Tables 11-3 and 11-4 present the results of the COPC evaluations for surface soil and total soil, respectively. COPCs identified for surface soil and total soil included:

- *TAL metals:* aluminum (NSV), arsenic, chromium, cobalt (NSV) iron, manganese, and vanadium;
- *TCL VOCs:* 2-hexanone (NSV);
- *VOC TICs:* two compounds (NSVs);
- *TCL SVOCs:* 4-chloro-3-methylphenol (NSV), di-n-octylphthalate (NSV); and
- *SVOC TICs:* 11 compounds (NSVs) for surface soil and 21 compounds (NSVs) for total soil.

11.6.1.2 Groundwater

Chromium was detected in the groundwater sample collected from monitoring well FMW1 at a concentration of 3.5 µg/L, which was below the adjusted T-RBC of 11µg/L. Pesticides were not detected in this groundwater sample. Table K-2 in Appendix K summarizes the analytical results for this sample. COPCs were not identified in groundwater.

11.6.2 Cumulative Risk Screen

Table 11-5 presents the results of the cumulative risk screening for surface soil. Tables 11-6 and 11-7 present the results of the cumulative risk screening for total soil. A summary of the screening is presented below.

Cumulative Human Health Risk Screening Results for AOC F

	Surface Soil			Total Soil		
Residential Excess Cancer Risk	Pass	5.E-06	--	Pass	7.E-06	--
Industrial Excess Cancer Risk	Pass	1.E-06	--	Pass	1.E-06	--
Residential Noncarcinogenic	Fail	3	As, Cr, Fe, Mn, V	Fail	3	As, Cr, Fe, Mn, V
Industrial Noncarcinogenic	Pass	0.2	--	Pass	0.2	--

The cumulative human health risk screens passed with the exception of the noncarcinogenic residential scenario for surface soil and total soil.

Noncarcinogenic residential cumulative risk screenings for surface soil and total soil resulted in HIs of 3, which exceeded the EPA target HI of 1. Due to multiple chemicals contributing to an HI greater than 1, the HIs have been segregated based on primary target organs for chronic exposure. The following tables present the results of the HI segregation using data obtained from Oak Ridge National Laboratory's RAIS, which includes data from various sources such as USEPA and the ATSDR:

HI Segregation for Target Organs – AOC F – Surface Soil

Target Organ	As	Cr	Fe	Mn	V	Total HI
Skin	0.09	--	--	--	--	0.09
CNS	0.09	--	--	0.6	--	***0.7***
CV	0.09	--	2	--	--	***2***
Blood	--	--	--	--	0.7	***0.7***
Liver	--	--	2	--	--	***2***
Kidney	--	--	2	--	0.7	***3***
GI	--	0.1	--	--	0.7	***0.8***
Reproductive	--	--	--	0.6	--	***0.6***

HI segregation resulted in values equal to or higher than the cumulative SSP HI threshold of 0.5 for a target organ including: the CNS, CV, blood, liver, kidney, GI, and reproductive.

HI Segregation for Target Organs – AOC F – Total Soil

Target Organ	As	Cr	Fe	Mn	V	Total HI
Skin	0.1	--	--	--	--	0.1
CNS	0.1	--	--	0.5	--	***0.6***
CV	0.1	--	2	--	--	***2***

Target Organ	As	Cr	Fe	Mn	V	Total HI
Blood	--	--	--	--	0.7	***0.7***
Liver	--	--	2	--	--	***2***
Kidney	--	--	2	--	0.7	***3***
GI	--	0.2	--	--	0.7	***0.9***
Reproductive	--	--	--	0.5	--	***0.5***

HI segregation resulted in values equal to or higher than the cumulative SSP HI threshold of 0.5 for a target organ including: the CNS, CV, blood, liver, kidney, GI, and reproductive.

11.6.3 Lead and Iron Screening

The MDC for lead at the site was 26 mg/kg, which was below the action level of 400 mg/kg; therefore, further risk characterization for lead was not required.

Iron concentrations at the site for surface soil and total soil resulted in HQs greater than the iron SSP threshold HQ of 0.5 for the residential scenario, and therefore, the site required further characterization for iron through a margin of exposure evaluation. Appendix H presents the margin of exposure evaluation for surface soil and total soil. A summary of the results for AOC F is presented below.

Iron Margin of Exposure Evaluation – Future Child Resident

	Surface Soil			Total Soil		
		Estimated Site Intake	Exposure Screening Level		Estimated Site Intake	Exposure Screening Level
RDA Screen (mg/day)	Pass	7.1	10	Pass	6.8	10
Provisional Reference Dose (RfD) Screen (mg/kg-day)	Pass	0.48	0.66	Pass	0.45	0.66

The site passed the margin of exposure evaluation for iron in soil. In addition, the MDCs for iron in surface soil and total soil were below the background point estimate.

11.6.4 Comparison to Generic SSLs

The MDC comparisons to generic SSLs (DAF 20) for detected chemicals indicated that arsenic, chromium, manganese, and dieldrin exceeded their SSLs (Table 11-8). Although the site has SSL exceedances for arsenic and manganese, the levels are below their background point estimates, and therefore, are not a concern. The chromium SSL exceedance occurred in one intermediate soil sample and the dieldrin SSL exceedance occurred in one surface soil sample. The chromium SSL exceedance occurred in one intermediate soil sample and the dieldrin SSL exceedance occurred in one surface soil sample. The soil-to-groundwater migration pathway for these SSL exceedances were evaluated by

installing monitoring well FMW1 at the site and collecting a groundwater sample from this well for analysis of chromium and pesticides.

11.6.5 Comparison to Site-Specific SSLs

The calculation of site-specific SSLs for organics was not conducted for the site.

11.6.6 COPC Comparison to Background

The comparison of MDCs for metals identified as COPCs with their background point estimates resulted in a background exceedance for chromium in total soil (Table 11-9).

11.6.7 Human Health Risk Screening Summary

COPCs with available screening value were limited to metals. Metals concentrations were below their background point estimates with the exception of chromium in total soil. The residential cumulative human health risk screens passed with the exception of the noncarcinogenic residential scenario for surface soil and total soil. COPCs were not identified for groundwater.

Noncarcinogenic residential risk screening failed for surface soil due to metals concentrations below background point estimates. This screening result is not a concern given that the elevated HI (>1) is due to background levels of metals in soil (HI of 3.0) rather than the single metal COPCs detected above background (chromium) resulting in a site-related HI of 0.1. In addition, the MDC for chromium is below its unadjusted R-RBCs.

Noncarcinogenic residential risk screening failed for total soil due to metals concentrations below background point estimates. This screening result is not a concern given that the elevated HI (>1) is due to background levels of metals in soil (HI of 2.8) rather than the single metal COPCs detected above background (HI of 0.2). In addition, the MDC for the COPC detected above background (chromium) is below its unadjusted R-RBC.

The site passed the lead screening for soil. Iron concentrations in surface soil and total soil required a margin of exposure evaluation. Surface soil and total soil passed the margin of exposure evaluation for iron.

Generic SSL exceedances were limited to arsenic, chromium, manganese, and dieldrin. Arsenic and manganese are not a concern at the site because the MDCs are below their background point estimates. The chromium SSL exceedance occurred in one intermediate soil sample and the dieldrin SSL exceedance occurred in one surface soil sample. The groundwater sample collected from monitoring well FMW-1 did not indicate leaching of pesticides to groundwater or leaching of chromium to groundwater at levels above the adjusted T-RBC.

11.7 ECOLOGICAL RISK SCREENING

11.7.1 Problem Formulation

11.7.1.1 Ecological Site Characterization

An overview of the site physiography, water resources, geology, and soil for AOC F is presented in Section 11.1. AOC F is a 0.043-acre (1,883 ft^2), small, grassed area maintained by mowing with no unique habitat features. Vegetation density and substrate quality in this area is further limited by the construction of a gravel pad that covers the entire site. Consequently, grasses provide the cover type and no shrubs or tree species have become established.

AOC F is located within the New River floodplain and subsurface borings indicate that it is underlain by alluvial deposited gravel, sand, and small amounts of silt. Therefore, site soil is incapable of supporting a

structurally complex and diverse forest community. The area is contiguous with other maintained areas and bordered to the north by a road and buildings; aboveground piping runs along the western boundary of the area.

Observations made during the site reconnaissance indicate that a viable community of transitional vegetation occurs at the site (photograph on page 11-1). Signs of chemical vegetative stress were not observed and locations devoid of vegetation occurred in areas of dense gravel substrate. Based on information from the Installation-Wide Biological Survey and observations made during the site reconnaissance, the vegetative community surrounding the site is typical of other grassed areas that are regularly maintained at RFAAP.

The limited size and habitat of the site is not likely to support diverse or abundant wildlife communities. Given the small area of the site, its proximity to the asphalt road, and its gravel substrate, few species would be expected to exclusively or extensively use the site. Species were not observed in AOC F during the site reconnaissance.

Threatened, rare, or endangered species were not observed during the site reconnaissance. These species are not likely to be present within the boundaries of the site. Threatened, rare, and endangered species information for RFAAP is discussed in Section 3.3.3.

11.7.2 Ecological Conceptual Site Model

The ECSM for AOC F (and other terrestrial sites for the SSP) is presented on Figure 3-1. The site is an exclusively upland habitat that lacks wetlands or significant drainage features. Thus, soil represents the potential exposure medium to ecological receptors. Based on the site characterization and data, the following complete exposure pathway exists: terrestrial receptor exposure to surface soil.

Detected chemical occurrence and distribution table is presented in Table 11-10. In addition, Table 11-11 summarizes the nondetected chemicals for AOC F. Potential ecological receptors may be exposed to COPECs in soil through the following exposure routes:

- Direct contact/absorption from soil;
- Direct ingestion of soil;
- Incidental ingestion of soil; and
- Direct ingestion of biota with accumulated COPECs.

Receptors of concern selected for AOC F include:

- Plants;
- Soil invertebrate/microbial community;
- Omnivorous birds (American Robin; *Turdus migratorius*);
- Carnivorous birds (Red-Tailed Hawk; *Buteo jamaicensis*);
- Herbivorous mammals (Meadow Vole; *Microtus pennsylvanicus*);
- Carnivorous mammals (Short-Tailed Shrew; *Blarina brevicauda*); and
- Omnivorous mammals (Red Fox; *Vulpes vulpes*).

Relevant assessment and measurement endpoints for the identified terrestrial receptors are presented in Section 3.3.6.1.

11.7.3 Preliminary Exposure Estimate and Risk Characterization

The preliminary exposure estimate and ecological effects evaluation considers the most conservative risk scenario. Highly conservative assumptions are used to estimate COPEC exposure to terrestrial receptors for pathways to be quantitatively evaluated. Conservative TRVs are used to evaluate the ecological effects of exposure using the two approaches discussed below.

11.7.3.1 Preliminary Exposure Estimate and Ecological Effects Evaluation

Direct Contact Approach

MDCs for detected chemicals in soil are used as the preliminary exposure concentrations to develop a conservative risk scenario for the direct contact pathway to soil invertebrates.

Dose Rate Modeling Approach

In the dose rate modeling approach, the detected bioaccumulative chemical MDCs, along with assumptions of maximum ingestion rate, minimum body weight, 100% area use, and 100% bioavailability are used in the conservative risk scenario as the preliminary exposure estimate for soil COPECs and compared to the calculated TRVs. The MDCs used in the preliminary exposure estimate for soil COPECs are presented in Table 11-10.

11.7.3.2 Background Concentrations of Metals

Background point estimates for metals were incorporated in the ecological screening to assess site soil concentrations in the context of facility-wide background levels (IT 2001a). Essential nutrients, including calcium, magnesium, potassium, and sodium were not considered COPECs in the risk screening in accordance with the SSP (USEPA 2001a) and the MWP (URS 2003b). The results of this comparison have been incorporated into the risk management decision and ecological risk summary.

11.7.3.3 Preliminary Risk Characterization

Terrestrial Plants

Qualitative characterization of vegetative communities common to grassed areas at RFAAP is provided in Section 3.3.7.4. Stressed or dead vegetation was not observed during the site reconnaissance, which could be attributed to chemical stress. Reduced plant density is likely due to poor physical substrate quality and not a response to COPEC concentrations in surface soil.

Soil Invertebrates and Microbial Communities

Direct contact HQs calculated for soil invertebrates and microbial communities are presented in Table 11-12. Other potentially complete exposure pathways to soil invertebrate and microbial communities include direct ingestion of soil and biota. However, there is insufficient information to quantify these pathways, and while these pathways exist, they are likely secondary to the direct contact/absorption pathway and should not substantially alter the risk characterization.

Of the detected chemicals for which ecological screening values were available, the concentrations of aluminum, chromium, iron, manganese, zinc, and cyanide resulted in HQ values greater than 1 (Table 11-12). However, MDCs for aluminum, chromium, iron, and manganese were below their background point estimates (Table 11-13).

Terrestrial Wildlife

Quantitative risk characterization for terrestrial wildlife is limited to direct ingestion of biota and incidental ingestion of soil. The ECSM identifies a potentially complete direct contact exposure pathway to herbivorous and omnivorous mammals; however, there is insufficient information to quantify this

pathway. This pathway is likely secondary to the ingestion of biota and the incidental ingestion of soil; therefore, it should not substantially alter the risk characterization.

The risk to each potential wildlife receptor at the site is presented in Table 11-14 and summarized as follows:

Receptor	NOAEL Only Exceedances	NOAEL and LOAEL Exceedances
American Robin	cadmium, lead	chromium, selenium, zinc, Aroclor 1254
Red-tailed Hawk	chromium	zinc
Meadow Vole	none	none
Red Fox	arsenic, selenium, Aroclor 1254	mercury, zinc
Short-tailed Shrew	arsenic, cadmium, selenium, zinc	Aroclor 1254

11.7.4 Refined Exposure Estimate, Ecological Effects Evaluation, and Risk Characterization

11.7.4.1 Refined Exposure Estimate and Ecological Effects Evaluation - Dose Modeling

The conservative assumptions used in the preliminary exposure estimate and ecological effects evaluation were replaced with more environmentally realistic assumptions resulting in a more realistic estimate of potential risk.

Refined exposure estimates and ecological effects were not developed for soil invertebrates and microbial communities because an appropriate 95% UCL could not be calculated using the surface soil data.

The refined exposure estimates and ecological effects were developed for wildlife receptors having complete exposure pathways to be quantitatively evaluated (i.e., omnivorous birds and carnivorous and herbivorous mammals). In the refined model, a realistic area use factor ($AF_{refined}$) was calculated as the ratio of the site area to the average home range of the receptor (Appendix I, Table I-16).

11.7.4.2 Refined Risk Characterization -Terrestrial Wildlife

The refined risk characterization for AOC F is presented in Table 11-14 and summarized as follows:

Receptor	NOAEL Only Exceedances	NOAEL and LOAEL Exceedances	COPECs Below Background Point Est.
American Robin	none	none	n/a
Red-tailed Hawk	none	none	n/a
Meadow Vole	none	none	n/a
Red Fox	none	none	n/a
Short-tailed Shrew	Aroclor 1254 (1.2)	none	n/a

11.7.4.3 Exposure and Risk Uncertainty Analysis

Potential risk and exposure uncertainty is discussed in Section 3.3.9. While factors such as lack of TSVs and wildlife profile assumptions may create limited uncertainty, the very small size and negligible habitat quality of the site in combination with these limited uncertainties has produced a conservative assessment of potential ecological risks associated with AOC F.

11.7.5 Ecological Risk Screening Summary

MDCs for aluminum, chromium, iron, manganese, zinc, and cyanide in surface soil exceed their respective direct contact TRVs and therefore, pose a potential risk to soil invertebrates and microbes; although metals concentrations are below their background point estimates with the exception of zinc. The refined risk characterization for wildlife ingestion resulted in HQs of less than 1 for the receptors with the exception of Aroclor 1254 (NOAEL-based HQ of 1.2 for the short-tailed shrew).

Therefore, there is adequate information to conclude that ecological risks are negligible and there is no need for further action at AOC F on the basis of ecological risk.

11.8 CONCEPTUAL SITE MODEL

A refined CSM for AOC F is presented on Figure 11-3. The AOC is located in a gently sloping area adjacent to a paved road and maintained grass areas. Subsurface geology consists of 13 to 19 ft of alluvial deposits overlying carbonate bedrock of the Elbrook Formation. Groundwater is present at 16 to 16.5 ft bgs. Based on local topography, groundwater flow in the site area is likely toward the north and the New River.

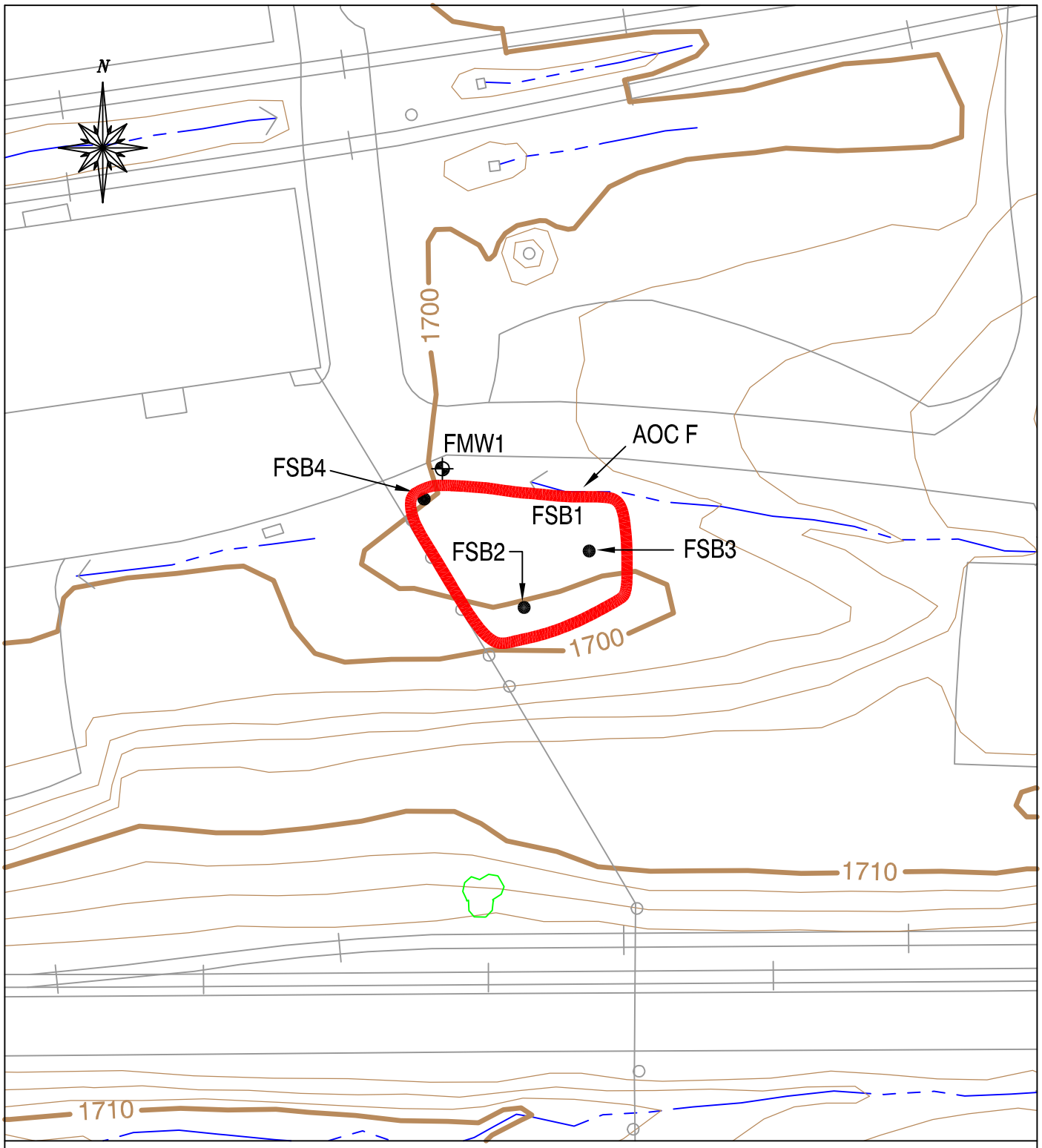
Stormwater runoff would flow northwest across AOC F discharging into the drainage ditch located adjacent to the paved road then into the New River. Potentially affected media include surface soil, subsurface soil, surface water, and groundwater. COPCs identified in soil with screening values included metals.

Although current and likely future land-use scenarios are limited to industrial operations, residential and industrial scenarios are evaluated. AOC F is enclosed by the Installation perimeter fence, and, therefore, potential receptors are limited to site workers (more conservative than trespasser scenario), future construction workers, and terrestrial biota. Site workers, construction workers, and terrestrial biota could contact surface soil. Leaching of chemicals is considered a potential release mechanism to subsurface soil that may be contacted by potential future construction workers. Leaching of chemicals to groundwater at levels of concern is unlikely given a single exceedance of the chromium SSL in an intermediate depth sample.

11.9 RECOMMENDATION FOR FUTURE ACTION

No further action is recommended for Area F based on the following results of the SSP screening:

- Cumulative risk and hazard screenings for industrial scenarios passed;
- Site-related cumulative risk and hazard screenings for residential scenarios passed;
- The MDC for lead is below the SSP screening level of 400 mg/kg;
- Surface soil and total soil passed the margin of exposure evaluation for iron;
- Generic SSL exceedances were limited to arsenic, chromium, manganese, and dieldrin. Arsenic and manganese are not a concern because the MDCs are below their background point estimates;
- The chromium SSL exceedance occurred in one intermediate soil sample and the dieldrin SSL exceedance occurred in one surface soil sample. Evaluation of the soil-to-groundwater migration pathway for pesticides and chromium did not indicate leaching of pesticides to groundwater or leaching of chromium to groundwater at levels above the adjusted T-RBC.



(SOURCE: MODIFIED FROM HERCULES, INC., 1992)

0 50'

1 Inch = 50 feet

Legend

- Soil Sampling Location
- Monitoring Well
- AOC F Approximate Boundary
- Vegetation
- Water

RFAAP

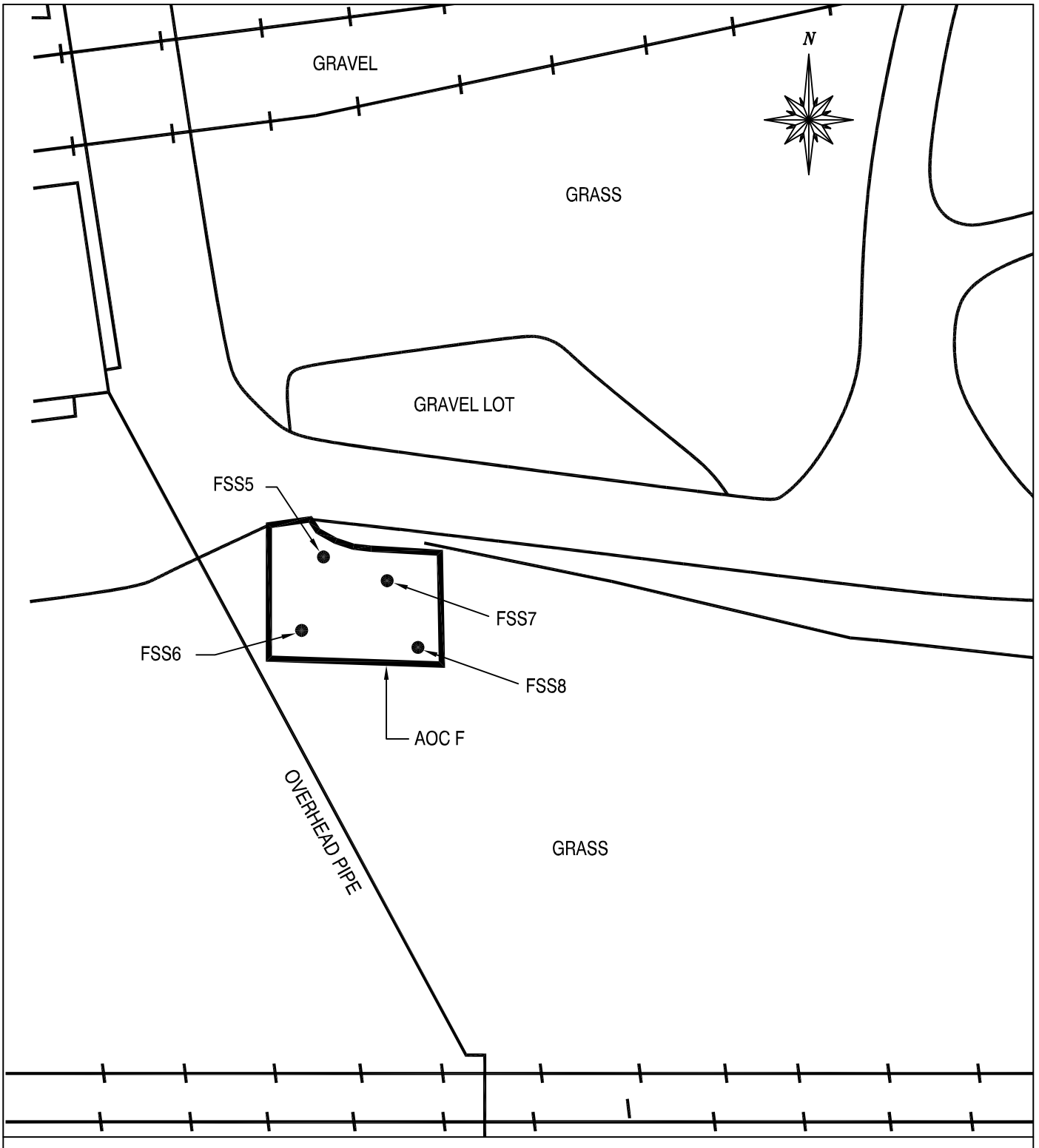
SSP REPORT

Date:	Prepared By:
December 2006	CD/DC
Scale:	**File Name:**
1"=50'	11656628

FIGURE 11-1

SSP SAMPLING LOCATION MAP

AOC F



(SOURCE: MODIFIED FROM HERCULES, INC., 1992)

0 100'

1 Inch = 100 feet

Legend

Soil Sampling Location

AOC F Boundary

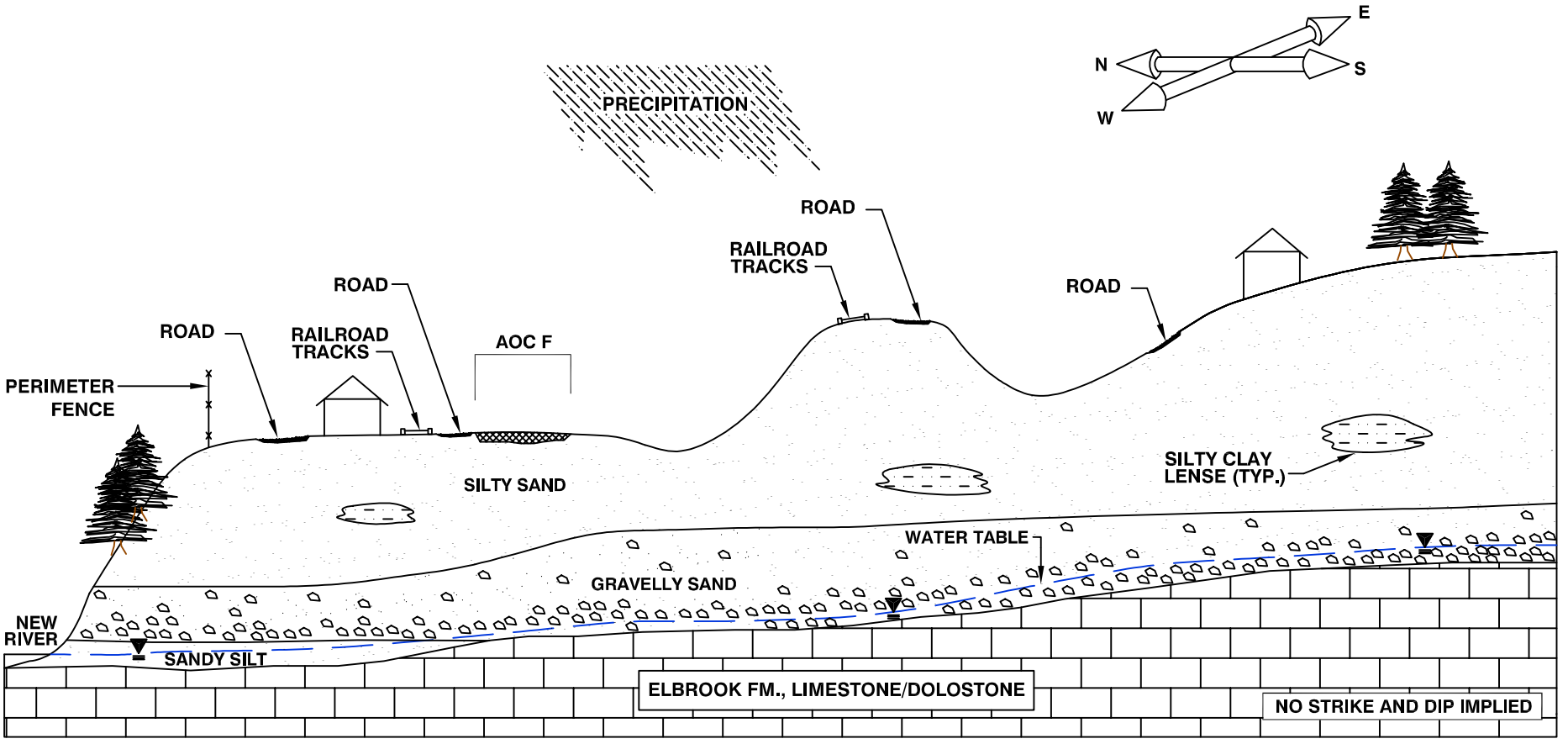
RFAAP

SSP REPORT

Date:	Prepared By:
June 2004	KDC/TDH
Scale:	File Name:
1"=100'	15900619

FIGURE 11-2

PREVIOUS INVESTIGATION SAMPLING LOCATIONS AOC F



RFAAP

SSP REPORT

Date: *June 2004*	**Prepared By:** *KDC/TDH*
Scale: *Not to Scale*	**File Name:** *15900619*

FIGURE 11-3

CONCEPTUAL SITE MODEL AOC F

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Table 11-1
Summary of Analytical Data for Soil Samples Collected at AOC F
Modified from Dames and Moore Verification Investigation Report
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

SITE ID FIELD ID SAMPLE DATE DEPTH (ft bgs) MATRIX UNITS	PQLs mg/kg	FSS5 RVFS*94 18-Feb-92 0.5 CSO mg/kg	FSS6 RVFS*95 18-Feb-92 0.5 CSO mg/kg	FSS7 RVFS*96 18-Feb-92 0.5 CSO mg/kg	FSS8 RVFS*97 18-Feb-92 0.5 CSO mg/kg	Adjusted Soil Industrial RBC mg/kg	Adjusted Soil Residential RBC mg/kg	Draft BTAG Screening Level mg/kg
Volatiles								
Acetone	0.1	<0.017	<0.017	0.049	<0.017	91,980	7039	--
Tetrachloroethylene	0.005	<0.001	<0.001	0.002	<0.001	5	1.2	0.3
Trichlorofluoromethane	0.005	0.012	0.012	0.013	0.009	30,660	2,346	--

Notes:
BTAG = USEPA Region III Draft, Biological Technical Assistance Group Screening Level
CSO = Chemical soil
ft bgs = Feet below ground surface
mg/kg = Milligrams per kilogram
PQL = Practical quantitation limit; the lowest concentration that can be reliably detected at a defined level of precision for a given analytical method
RBC = Risk-Based Concentration
USEPA = United State Environmental Protection Agency
USEPA Region III Risk-Based Concentration (RBC) values from the April 14, 2004, RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens

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Table 11-2
Area of Concern F - Summary of Detected Chemicals in Analytical Samples
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	Draft BTAG Screening Level	FSB1A 9/30/2003 0-1		MDL	RL	FSB1B 9/30/2003 10-12		MDL	RL	FSB1C 9/30/2003 14-16		MDL	RL	FSB2A 9/30/2003 0-1		MDL	RL	FSB2B 9/30/2003 8-10		MDL	RL
								Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
TAL Metals (mg/kg)																											
Aluminum	7429-90-5	--	40,041	--	--	--	1	16,500		91.5	500	17,400		91.5	500	24,400		183	1,000	17,100		91.5	500	11,900	,J,f	91.5	500
Antimony	7440-36-0	N	--	3.129	40.88	13.2	0.48	0.85	,B,p	0.0518	0.5	0.66	,B,p	0.0518	0.5	0.73	,B,p	0.0518	0.5	0.55	,B,p	0.0518	0.5	0.54	,B,p	0.0518	0.5
Arsenic	7440-38-2	C	15.8	0.426	1.91	0.026	328	***1.5***		0.0232	0.4	***1.9***		0.0232	0.4	***5.2***		0.0232	0.4	***1.7***		0.0232	0.4	***2***		0.0232	0.4
Barium	7440-39-3	N	209	1,564	20,440	6,015	440	127		0.53	5	102		0.53	5	67		0.106	1	102		0.53	5	72		0.106	1
Beryllium	7440-41-7	N	1.02	15.643	204.4	1,154	0.02	<1	U	0.0391	1	<1	U	0.0391	1	0.2	J	0.0391	1	0.087	J,B,x	0.0391	1	<1	U	0.0391	1
Cadmium	7440-43-9	N	0.69	3.911	51.1	27.4	2.5	1.9		0.182	1	1.9		0.182	1	2		0.182	1	2		0.182	1	0.99	J,B,p	0.182	1
Calcium	7440-70-2	--	--	--	--	--	--	23,300	,L,m	830	2,500	1,670	,L,m	83	250	2,050	,L,m	83	250	2,020	,L,m	83	250	27,600	,L,m	830	2,500
Chromium[2]	7440-47-3	N	65.3	23.46	306.6	42.05	0.0075	22	,J,s	0.912	5	26	,J,s	0.912	5	31	,J,s	0.912	5	25	,J,s	0.912	5	17	,J,s	0.912	5
Cobalt	7440-48-4	--	72.3	--	--	--	100	12	,J,s	0.208	1	12	,J,s	0.208	1	11	,J,s	0.208	1	14	,J,s	0.208	1	12	,J,s	0.208	1
Copper	7440-50-8	N	53.5	312.857	4,088	10,518	15	16		0.368	1	16		0.368	1	25		0.368	1	15		0.368	1	13		0.368	1
Iron	7439-89-6	N	50,962	2,346	30,660	--	12	29,500	,J,s	212	1,000	34,200	,J,s	212	1,000	35,500	,J,s	212	1,000	34,600	,J,s	212	1,000	24,400	,J,s	212	1,000
Lead[2]	7439-92-1	--	26.8	400	750	--	0.01	15		0.0218	1	14		0.0218	1	17		0.0218	1	12		0.0218	1	11		0.0218	1
Magnesium	7439-95-4	--	--	--	--	--	4,400	16,700		161	2,500	4,920		32.1	500	24,000		161	2,500	4,380		32.1	500	15,700	,J,f	80.3	1,250
Manganese	7439-96-5	N	2,543	156.429	2,044	951.9	330	529		2.64	10	553		2.64	10	463		2.64	10	607		2.64	10	481		2.64	10
Mercury[3]	7439-97-6	--	0.13	2.35	30.66	--	0.058	0.017	J	0.0077	0.1	0.013	J	0.0077	0.1	0.028	J	0.0077	0.1	0.018	J	0.0077	0.1	0.012	J	0.0077	0.1
Potassium	7440-09-7	--	--	--	--	--	--	2,160	,J,s	25	100	2,250	,J,s	25	100	5,460	,J,s	50	200	2,100	,J,s	25	100	1,840	,J,s	25	100
Nickel	7440-02-0	N	--	156.429	2,044	--	2	15	,J,s	0.0356	0.5	15	,J,s	0.0356	0.5	23	,J,s	0.0356	0.5	13	,J,s	0.0356	0.5	13	,J,s	0.0356	0.5
Selenium	7782-49-2	N	62.8	39.11	511	18.98	1.8	0.66	J	0.0502	1	0.64	J	0.0502	1	0.82	J	0.0502	1	0.66	J	0.0502	1	0.53	J	0.0502	1
Silver	7440-22-4	N	--	39.11	511	31.03	0.0000098	0.052	J	0.0044	3	0.045	J	0.0044	3	0.13	J	0.0044	3	0.041	J	0.0044	3	0.069	J	0.0044	3
Sodium	7440-23-5	--	--	--	--	--	--	55	J,B,x	8.92	100	47	J,B,x	8.92	100	64	J,B,x	8.92	100	24	J,B,x	8.92	100	52	J,B,x	8.92	100
Thallium	7440-28-0	N	2.11	0.548	7.154	3.64	0.001	0.21	J	0.027	0.5	0.22	J	0.027	0.5	0.34	J	0.027	0.5	0.19	J	0.027	0.5	0.16	J	0.027	0.5
Vanadium	7440-62-2	N	108	7.821	102.2	730.1	0.5	47		0.207	1	49		0.207	1	43		0.207	1	50		0.207	1	32		0.207	1
Zinc	7440-66-6	N	202	2,346	30,660	13,622	10	56		0.517	4	64		0.517	4	74		0.517	4	55		0.517	4	38		0.517	4
Pesticides/PCBs (ug/kg)																											
Dieldrin	60-57-1	C	--	4.0E+01	1.8E+02	2.2E+00	100	NT				NT				NT				<24	U	0.371	24	NT			
Aroclor 1254[4]	11097-69-1	C	--	1.6E+02	1.4E+03	1.1E+03	100	NT				NT				NT				<39	U	3.6	39	NT			
VOCs (ug/kg)																											
2-Butanone	78-93-3	N	--	4.7E+06	6.1E+07	2.9E+04	--	75		5.75	22	72		5.9	24	79		6.1	24	94	,J,m	5.9	24	65		5.4	22
2-Hexanone	591-78-6	--	--	--	--	--	--	14		2.6	11	<12	U	2.67	12	14		2.76	12	13		2.67	12	<11	U	2.44	11
Acetone	67-64-1	N	--	7.0E+06	9.2E+07	2.2E+04	--	220	,J,c	5.75	22	80	,J,c	5.9	24	110	,J,c	6.1	24	150	,J,c	5.9	24	93	,J,c	5.4	22
Bromomethane	74-83-9	N	--	1.1E+04	1.4E+05	4.1E+01	--	<5.7	U	1.73	5.7	<5.9	U	1.77	5.9	<6.1	U	1.83	6.1	<5.9	U	1.77	5.9	<5.4	U	1.62	5.4
Carbon disulfide	75-15-0	N	--	7.8E+05	1.0E+07	1.9E+04	--	<5.7	U	1.67	5.7	<5.9	U	1.71	5.9	<6.1	U	1.77	6.1	<5.9	U,UJ,m	1.71	5.9	<5.4	U	1.57	5.4
cis-1,2-Dichloroethene	156-59-2	--	--	7.8E+04	1.0E+06	--	300	7.8		0.817	5.7	<5.9	U	0.838	5.9	<6.1	U	0.866	6.1	<5.9	U	0.838	5.9	<5.4	U	0.767	5.4
Ethylbenzene	100-41-4	N	--	7.8E+05	1.0E+07	1.5E+04	100	0.56	J	0.486	5.7	<5.9	U	0.499	5.9	<6.1	U	0.516	6.1	<5.9	U	0.499	5.9	<5.4	U	0.457	5.4
Methylene chloride	75-09-2	C	--	8.5E+04	3.8E+05	1.9E+01	300	5.8	J,J,c	3.23	22	4	J,J,c	3.32	24	6.4	J,J,c	3.43	24	3.8	J,J,c	3.32	24	3.9	J,J,c	3.03	22
Toluene	108-88-3	N	--	6.3E+05	8.2E+06	2.7E+04	100	2.7	J	0.534	5.7	<5.9	U	0.548	5.9	<6.1	U	0.566	6.1	<5.9	U	0.548	5.9	<5.4	U	0.501	5.4
Trichloroethene	79-01-6	C	--	1.6E+03	7.2E+03	2.6E-01	300	***120***		0.779	5.7	<5.9	U	0.799	5.9	<6.1	U	0.826	6.1	<5.9	U	0.799	5.9	<5.4	U	0.731	5.4
Trichlorofluoromethane	75-69-4	N	--	2.3E+06	3.1E+07	2.3E+04	--	0.91	J	0.854	5.7	<5.9	U	0.877	5.9	<6.1	U	0.906	6.1	<5.9	U	0.877	5.9	<5.4	U	0.802	5.4
Xylenes (Total)	1330-20-7	N	--	1.6E+06	2.0E+07	3.0E+03	100	3.6	J	0.484	5.7	<5.9	U	0.497	5.9	<6.1	U	0.514	6.1	<5.9	U	0.497	5.9	<5.4	U	0.455	5.4
VOC TICs (ug/kg)																											
Butanal	123-72-8	--	--	--	--	--	--	5.3	E,NJ,t	0	1	NI				NI				7.6	E,NJ,t	0	1	NI			
Hexanal	66-25-1	--	--	--	--	--	--	6.4	E,NJ,t	0	1	NI				NI				6.7	E,NJ,t	0	1	NI			
SVOCs (ug/kg)																											
4-Chloro-3-Methylphenol	59-50-7	--	--	--	--	--	--	35	J,J,s	5.73	200	36	J	6.25	200	25	J	6.25	210	38	J	6.25	200	33	J	5.73	180
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	100	<200	U	5.08	200	<200	U	5.54	200	<210	U	5.54	210	<200	U	5.54	200	<180	U	5.08	180
Benzo(a)anthracene	56-55-3	C	--	2.2E+02	3.9E+03	4.8E+02	100	<200	U	14.6	200	<200	U	16	200	<210	U	16	210	<200	U	16	200	<180	U	14.6	180
Benzo(a)pyrene	50-32-8	C	--	2.2E+01	3.9E+02	1.2E+02	100	<200	U	6.28	200	<200	U	6.85	200	<210	U	6.85	210	<200	U	6.85	200	17	J	6.28	180
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	100	<200	U	10.7	200	<200	U	11.7	200	<210	U	11.7	210	<200	U	11.7	200	40	J	10.7	180
Benzo(k)fluoranthene	207-08-9	C	--	2.2E+03	3.9E+04	1.5E+04	100	<200	U	14.7	200	<200	U	16.1	200	<210	U	16.1	210	<200	U	16.1	200	<180	U	14.7	180
Bis(2-ethylhexyl)phthalate	117-81-7	C	--	4.6E+04	2.0E+05	2.9E+06	--	<200	U	2.28	200	51	J,B,x	2.48	200	46	J,B,x	2.48	210	54	J,B,x	2.48	200	56	J,B,x	2.28	180
Butylbenzylphthalate	85-68-7	N	--	1.6E+06	2.0E+07	1.7E+07	--	<200	U	4.93	200	40	J,B,x	5.38	200	<210	U	5.38	210	38	J,B,x	5.38	200	39	J,B,x	4.93	180
Carbazole	86-74-8	C	--	3.2E+04	1.4E+05	4.7E+02	--	<200	U	6.71	200	<200	U	7.32	200	<210	U	7.32	210	<200	U	7.32	200	<180	U	6.71	180
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	100	<200	U	11.2	200	<200	U	12.2	200	<210	U	12.2	210	<200	U	12.2	200	<180	U	11.2	180
Di-n-butylphthalate	84-74-2	N	--	7.8E+05	1.0E+07	5.0E+06	--	25	J	4.2	200	40	J	4.58	200	35	J	4.58	210	45	J	4.58	200	39	J	4.2	180
Di-n-octylphthalate	117-84-0	--	--	--	--	--	--	<200	U	3.41	200	<200	U	3.72	200	<210	U	3.72	210	<200	U	3.72	200	<180	U	3.41	180
Diethylphthalate	84-66-2	N	--	6.3E+06	8.2E+07	4.5E+05	--	10	J,B,x	2.09	200	4.3	J,B,x	2.28	200	2.8	J,B,x	2.28	210	3.9	J,B,x	2.28	200	35	J	2.09	180
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	100	<200	U	2.59	200	<200	U	2.82	200	<210	U	2.82	210	<200	U	2.82	200	7	J	2.59	180
Indeno(1,2,3-cd)pyrene	193-39-5	C	--	2.2E+02	3.9E+03	4.2E+03	100	<200	U	4.31	200	<200	U	4.7	200	<210	U	4.72	210	<200	U	4.72	200	<180	U	4.31	180
Phenanthrene[5]	85-01-8	N	--	2.3E+05	3.1E+06	--	100	<200	U	2.53	200	<200	U	2.76	200	<210	U	2.76	210	<200	U	2.76	200	3	J	2.53	180
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	100	<200	U	1.63	200	<200	U	1.78	200	<210	U	1.78	210	<200	U	1.78	200	6	J	1.63	180
SVOC TICs (ug/kg)																											
(M) 1-Eicosanol	629-96-9	--	--	--	--	--	--	NI				NI				NI				44	E,NJ,t	0	10	NI			
(Z)-9-Octadecenamide	301-02-0	--	--	--	--	--	--	NI				NI				100	E,B,x	0	100	NI				NI			
1,2-Benzenedicarboxylic acid, butyl 2-me	17851-53-5	--	--	--	--	--	--	NI				NI				NI				NI				NI			
1,2-Benzenedicarboxylicacid, bis(2-methy	84-69-5	--	--	--	--	--	--	35	E,B,x	0	100	63	E,B,x	0	100	47	E,B,x	0	100	69	E,B,x	0	100	55	E,B,x	0	100
1-Heptadecanol	1454-85-9	--	--				--	NI				NI				NI				22	E,NJ,t	0	10	NI			
1-Hexadecanol		--	--	--	--	--	--	NI				NI				NI				NI				NI			
1-Octadecanol	112-92-5	--	--	--	--	--	--	NI				NI				28	E,NJ,t	0	100	NI				NI			
1-Pentadecanol	629-76-5	--	--	--	--	--	--	NI				NI				NI				NI				62	E,NJ,t	0	10
2(3H)-Furanone, 5-acetyldihydro-	29393-32-6	--	--	--	--	--	--	74	E,NJ,t	0	10	NI				NI				NI				NI			
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	--	--	--	--	--	--	NI				94	E,B,x	0	100	70	E,B,x	0	100	NI				92	E,B,x	0	100

Table 11-2
Area of Concern F - Summary of Detected Chemicals in Analytical Samples
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	Draft BTAG Screening Level	FSB1A 9/30/2003 0-1		MDL	RL	FSB1B 9/30/2003 10-12		MDL	RL	FSB1C 9/30/2003 14-16		MDL	RL	FSB2A 9/30/2003 0-1		MDL	RL	FSB2B 9/30/2003 8-10		MDL	RL
								Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
2,5-Cyclohexadiene-1,4-dione, 2,6-bis(1,	719-22-2	--	--	--	--	--	--	86	E,NJ,t	0	100	NI				NI				NI				NI			
2-Cyclopentene-1,4-dione	930-60-9	--	--	--	--	--	--	61	E,NJ,t	0	10	NI				NI				NI				NI			
2-Ethyl-1-Hexanol	104-76-7	--	--	--	--	--	--	22	E,NJ,t	0	1,700	30	E,NJ,t	0	1,700	23	E,NJ,t	0	1,700	30	E,NJ,t	0	1,700	31	E,NJ,t	0	1,700
3-Hexene-2,5-dione	4436-75-3	--	--	--	--	--	--	NI				NI				NI				NI				NI			
Butyl Ester Octadecanioc	123-9-55	--	--	--	--	--	--	NI				NI				NI				35	E,NJ,t	0	10	NI			
Cyclopentadecane	295-48-7	--	--	--	--	--	--	NI				NI				NI				NI				NI			
Docosane	629-97-0	--	--	--	--	--	--	NI				NI				NI				NI				NI			
Erucylamide	112-84-5	--	--	--	--	--	--	NI				640	E,NJ,t	0	10	490	E,NJ,t	0	10	730	E,NJ,t	0	10	590	E,NJ,t	0	10
Hexadecanoic acid, 1,1-dimethylethyl est	31158-91-5	--	--	--	--	--	--	NI				NI				NI				42	E,NJ,t	0	10	NI			
Oxirane, hexadecyl-	7390-81-0	--	--	--	--	--	--	NI				NI				NI				NI				NI			
Phenytoin	57-41-0	--	--	--	--	--	--	NI				NI				480	E,NJ,t	0	10	NI				29	E,NJ,t	0	10
Cyanide (mg/kg)																											
Cyanide	57-12-5	N	--	156.43	2,044	147.46	0.005	<0.5	U	0.0356	0.5	<0.5	U	0.178	0.5	0.05	J	0.0356	0.5	<0.5	U	0.0356	0.5	<0.53	U	0.356	0.53
Percent Solids (%)																											
Percent Solids	--	--	--	--	--	--	--	87		0.1	0.1	85		0.1	0.1	82		0.1	0.1	85		0.1	0.1	93		0.1	0.1

Table 11-2
Area of Concern F - Summary of Detected Chemicals in Analytical Samples
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	Draft BTAG Screening Level	FSB2B-DUP(SBD-1) 9/30/2003 8-10		MDL	RL	FSB2C 9/30/2003 12-13.2		MDL	RL	FSB3A 10/1/2003 0-1		MDL	RL	FSB3B 10/1/2003 10-12		MDL	RL	FSB3C 10/1/2003 14-15.5		MDL	RL
								Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
TAL Metals (mg/kg)																											
Aluminum	7429-90-5	--	40,041	--	--	--	1	17,600	,J,f	91.5	500	16,500		91.5	500	18,200		91.5	500	18,600		91.5	500	25,700		183	1,000
Antimony	7440-36-0	N	--	3.129	40.88	13.2	0.48	0.46	J,B,p	0.0518	0.5	0.38	J,B,p	0.0518	0.5	0.34	J,B,p	0.0518	0.5	0.36	J,B,p	0.0518	0.5	0.37	J,B,p	0.0518	0.5
Arsenic	7440-38-2	C	15.8	0.426	1.91	0.026	328	***2.6***		0.0232	0.4	***1.9***		0.0232	0.4	***1.7***		0.0232	0.4	***2***		0.0232	0.4	***6***		0.0232	0.4
Barium	7440-39-3	N	209	1,564	20,440	6,015	440	96		0.106	1	76		0.106	1	107		0.53	5	96		0.106	1	87		0.106	1
Beryllium	7440-41-7	N	1.02	15.643	204.4	1,154	0.02	<1	U	0.0391	1	<1	U	0.0391	1	0.098	J,B,x	0.0391	1	<1	U	0.0391	1	0.17	J	0.0391	1
Cadmium	7440-43-9	N	0.69	3.911	51.1	27.4	2.5	2.2		0.182	1	2.1		0.182	1	2.1		0.182	1	1.8		0.182	1	1.7		0.182	1
Calcium	7440-70-2	--	--	--	--	--	--	9,030	,L,m	415	1,250	34,600	,L,m	830	2,500	3,890	,L,m	166	500	1,710	,L,m	83	250	1,530	,L,m	83	250
Chromium[(2)]	7440-47-3	N	65.3	23.46	306.6	42.05	0.0075	23	,J,s	0.912	5	22	,J,s	0.912	5	26	,J,s	0.912	5	***142***	,J,s	4.56	25	26	,J,s	0.912	5
Cobalt	7440-48-4	--	72.3	--	--	--	100	12	,J,s	0.208	1	9.3	,J,s	0.208	1	13	,J,s	0.208	1	12	,J,s	0.208	1	10	,J,s	0.208	1
Copper	7440-50-8	N	53.5	312.857	4,088	10,518	15	16		0.368	1	15		0.368	1	18		0.368	1	22		0.368	1	22		0.368	1
Iron	7439-89-6	N	50,962	2,346	30,660	--	12	36,500	,J,s	212	1,000	32,900	,J,s	212	1,000	37,200	,J,s	212	1,000	38,900	,J,s	212	1,000	34,800	,J,s	212	1,000
Lead[(2)]	7439-92-1	--	26.8	400	750	--	0.01	15		0.0218	1	13		0.0218	1	14		0.0218	1	12		0.0218	1	11		0.0218	1
Magnesium	7439-95-4	--	--	--	--	--	4,400	7,780	,J,f	80.3	1,250	16,500		80.3	1,250	6,000		32.1	500	5,190		32.1	500	22,000		160.5	2,500
Manganese	7439-96-5	N	2,543	156.429	2,044	951.9	330	590		2.64	10	469		2.64	10	558		2.64	10	625		2.64	10	***1,170***		6.6	25
Mercury[(3)]	7439-97-6	--	0.13	2.35	30.66	--	0.058	0.019	J	0.0077	0.1	0.015	J	0.0077	0.1	0.013	J	0.0077	0.1	0.017	J	0.0077	0.1	0.033	J	0.0077	0.1
Potassium	7440-09-7	--	--	--	--	--	--	2,090	,J,s	25	100	2,430	,J,s	25	100	2,470	,J,s	25	100	2,160	,J,s	25	100	6,880	,J,s	50	200
Nickel	7440-02-0	N	--	156.429	2,044	--	2	15	,J,s	0.0356	0.5	14	,J,s	0.0356	0.5	17	,J,s	0.0356	0.5	15	,J,s	0.0356	0.5	23	,J,s	0.0356	0.5
Selenium	7782-49-2	N	62.8	39.11	511	18.98	1.8	0.63	J	0.0502	1	0.59	J	0.0502	1	0.69	J	0.0502	1	0.64	J	0.0502	1	0.68	J	0.0502	1
Silver	7440-22-4	N	--	39.11	511	31.03	0.0000098	0.06	J	0.0044	3	0.067	J	0.0044	3	0.056	J	0.0044	3	0.063	J	0.0044	3	0.15	J	0.0044	3
Sodium	7440-23-5	--	--	--	--	--	--	38	J,B,x	8.92	100	70	J,B,x	8.92	100	42	J,B,x	8.92	100	40	J,B,x	8.92	100	50	J,B,x	8.92	100
Thallium	7440-28-0	N	2.11	0.548	7.154	3.64	0.001	0.23	J	0.027	0.5	0.21	J	0.027	0.5	0.27	J	0.027	0.5	0.22	J	0.027	0.5	0.38	J	0.027	0.5
Vanadium	7440-62-2	N	108	7.821	102.2	730.1	0.5	44		0.207	1	39		0.207	1	54		0.207	1	54		0.207	1	44		0.207	1
Zinc	7440-66-6	N	202	2,346	30,660	13,622	10	54		0.517	4	46		0.517	4	65		0.517	4	52		0.517	4	41		0.517	4
Pesticides/PCBs (ug/kg)																											
Dieldrin	60-57-1	C	--	4.0E+01	1.8E+02	2.2E+00	100	NT				NT				NT				NT				NT			
Aroclor 1254[(4)]	11097-69-1	C	--	1.6E+02	1.4E+03	1.1E+03	100	NT				NT				NT				NT				NT			
VOCs (ug/kg)																											
2-Butanone	78-93-3	N	--	4.7E+06	6.1E+07	2.9E+04	--	59		5.7	22	78		5.9	24	78		5.8	24	58		5.55	22	150		7.05	28
2-Hexanone	591-78-6	--	--	--	--	--	--	<11	U	2.58	11	<12	U	2.67	12	<12	U	2.62	12	<11	U	2.51	11	19		3.19	14
Acetone	67-64-1	N	--	7.0E+06	9.2E+07	2.2E+04	--	97	,J,c	5.7	22	100	,J,c	5.9	24	77	,B,z	5.8	24	71	,B,z	5.55	22	290	,J,c	7.05	28
Bromomethane	74-83-9	N	--	1.1E+04	1.4E+05	4.1E+01	--	<5.7	U	1.71	5.7	<5.9	U	1.77	5.9	<5.8	U	1.74	5.8	<5.6	U	1.67	5.6	<7	U	2.12	7
Carbon disulfide	75-15-0	N	--	7.8E+05	1.0E+07	1.9E+04	--	<5.7	U	1.65	5.7	<5.9	U	1.71	5.9	<5.8	U	1.68	5.8	<5.6	U	1.61	5.6	<7	U	2.04	7
cis-1,2-Dichloroethene	156-59-2	--	--	7.8E+04	1.0E+06	--	300	<5.7	U	0.809	5.7	<5.9	U	0.838	5.9	<5.8	U	0.824	5.8	<5.6	U	0.788	5.6	<7	U	1	7
Ethylbenzene	100-41-4	N	--	7.8E+05	1.0E+07	1.5E+04	100	<5.7	U	0.482	5.7	<5.9	U	0.499	5.9	<5.8	U	0.491	5.8	<5.6	U	0.47	5.6	<7	U	0.596	7
Methylene chloride	75-09-2	C	--	8.5E+04	3.8E+05	1.9E+01	300	9.5	J,J,c	3.2	22	4.2	J,J,c	3.32	24	3.4	J,J,c	3.26	24	4.2	J,J,c	3.12	22	5.9	J,J,c	3.96	28
Toluene	108-88-3	N	--	6.3E+05	8.2E+06	2.7E+04	100	<5.7	U	0.529	5.7	<5.9	U	0.548	5.9	<5.8	U	0.538	5.8	<5.6	U	0.515	5.6	<7	U	0.654	7
Trichloroethene	79-01-6	C	--	1.6E+03	7.2E+03	2.6E-01	300	<5.7	U	0.772	5.7	<5.9	U	0.799	5.9	<5.8	U	0.785	5.8	<5.6	U	0.751	5.6	<7	U	0.955	7
Trichlorofluoromethane	75-69-4	N	--	2.3E+06	3.1E+07	2.3E+04	--	1.2	J	0.847	5.7	<5.9	U	0.877	5.9	<5.8	U	0.862	5.8	<5.6	U	0.825	5.6	<7	U	1.05	7
Xylenes (Total)	1330-20-7	N	--	1.6E+06	2.0E+07	3.0E+03	100	<5.7	U	0.48	5.7	<5.9	U	0.497	5.9	<5.8	U	0.488	5.8	<5.6	U	0.467	5.6	<7	U	0.594	7
VOC TICs (ug/kg)																											
Butanal	123-72-8	--	--	--	--	--	--	NI				6.9	E,NJ,t	0	1	NI				NI				14	E,NJ,t	0	1
Hexanal	66-25-1	--	--	--	--	--	--	NI				30	E,NJ,t	0	1	NI				NI				49	E,NJ,t	0	1
SVOCs (ug/kg)																											
4-Chloro-3-Methylphenol	59-50-7	--	--	--	--	--	--	19	J	5.73	190	27	J	6.25	200	28	J	6.25	200	18	J	5.73	190	41	J	7.29	240
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	100	<190	U	5.08	190	<200	U	5.54	200	<200	U	5.54	200	<190	U	5.08	190	<240	U	6.47	240
Benzo(a)anthracene	56-55-3	C	--	2.2E+02	3.9E+03	4.8E+02	100	<190	U,UJ,l	14.6	190	<200	U	16	200	<200	U	16	200	<190	U	14.6	190	<240	U	18.6	240
Benzo(a)pyrene	50-32-8	C	--	2.2E+01	3.9E+02	1.2E+02	100	19	J	6.28	190	<200	U	6.85	200	<200	U	6.85	200	<190	U	6.28	190	<240	U	7.99	240
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	100	40	J	10.7	190	<200	U	11.7	200	<200	U	11.7	200	<190	U	10.7	190	<240	U	13.7	240
Benzo(k)fluoranthene	207-08-9	C	--	2.2E+03	3.9E+04	1.5E+04	100	<190	U	14.7	190	<200	U	16.1	200	<200	U	16.1	200	<190	U	14.7	190	<240	U	18.8	240
Bis(2-ethylhexyl)phthalate	117-81-7	C	--	4.6E+04	2.0E+05	2.9E+06	--	50	J,B,x	2.28	190	50	J,B,x	2.48	200	51	J,B,x	2.48	200	44	J,B,x	2.28	190	61	J,B,x	2.9	240
Butylbenzylphthalate	85-68-7	N	--	1.6E+06	2.0E+07	1.7E+07	--	37	J,B,x	4.93	190	40	J,B,x	5.38	200	<200	U	5.38	200	<190	U	4.93	190	49	J,B,x	6.27	240
Carbazole	86-74-8	C	--	3.2E+04	1.4E+05	4.7E+02	--	<190	U	6.71	190	<200	U	7.32	200	<200	U	7.32	200	<190	U	6.71	190	<240	U	8.54	240
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	100	<190	U	11.2	190	<200	U	12.2	200	<200	U	12.2	200	<190	U	11.2	190	<240	U	14.3	240
Di-n-butylphthalate	84-74-2	N	--	7.8E+05	1.0E+07	5.0E+06	--	31	J	4.2	190	44	J	4.58	200	27	J	4.58	200	24	J	4.2	190	48	J	5.35	240
Di-n-octylphthalate	117-84-0	--	--	--	--	--	--	<190	U	3.41	190	<200	U	3.72	200	<200	U	3.72	200	<190	U	3.41	190	<240	U	4.34	240
Diethylphthalate	84-66-2	N	--	6.3E+06	8.2E+07	4.5E+05	--	24	J,B,x	2.09	190	17	J,B,x	2.28	200	4	J,B,x	2.28	200	3	J,B,x	2.09	190	5	J,B,x	2.66	240
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	100	13	J	2.59	190	<200	U	2.82	200	<200	U	2.82	200	<190	U	2.59	190	<240	U	3.29	240
Indeno(1,2,3-cd)pyrene	193-39-5	C	--	2.2E+02	3.9E+03	4.2E+03	100	32	J	4.31	190	<200	U	4.72	200	<200	U	4.72	200	<190	U	4.31	190	<240	U	5.49	240
Phenanthrene[(5)]	85-01-8	N	--	2.3E+05	3.1E+06	--	100	6	J	2.53	190	<200	U	2.76	200	<200	U	2.76	200	<190	U	2.53	190	<240	U	3.22	240
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	100	11	J	1.63	190	<200	U	1.78	200	<200	U	1.78	200	<190	U	1.63	190	<240	U	2.07	240
SVOC TICs (ug/kg)																											
(M) 1-Eicosanol	629-96-9	--	--	--	--	--	--	51	E,NJ,t	0	10	NI				NI				NI				NI			
(Z)-9-Octadecenamide	301-02-0	--	--	--	--	--	--	NI				500	E,B,x	0	100	NI				27	E,B,x	0	100	NI			
1,2-Benzenedicarboxylic acid, butyl 2-me	17851-53-5	--	--	--	--	--	--	NI				49	E,NJ,t	0	10	NI				31	E,NJ,t	0	10	NI			
1,2-Benzenedicarboxylicacid, bis(2-methy	84-69-5	--	--	--	--	--	--	46	E,B,x	0	100	NI				42	E,B,x	0	100	NI				65	E,B,x	0	100
1-Heptadecanol	1454-85-9	--	--				--	NI				NI				NI				NI				NI			
1-Hexadecanol		--	--	--	--	--	--	NI				NI				NI				NI				27	E,NJ,t	0	100
1-Octadecanol	112-92-5	--	--	--	--	--	--	NI				51	E,NJ,t	0	100	NI				NI				61	E,NJ,t	0	100
1-Pentadecanol	629-76-5	--	--	--	--	--	--	NI				NI				NI				NI				NI			
2(3H)-Furanone, 5-acetyldihydro-	29393-32-6	--	--	--	--	--	--	NI				NI				NI				NI				NI			
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	--	--	--	--	--	--	54	E,B,x	0	100	NI				NI				59	E,B,x	0	100	NI			

Table 11-2
Area of Concern F - Summary of Detected Chemicals in Analytical Samples
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	Draft BTAG Screening Level	FSB2B-DUP(SBD-1) 9/30/2003 8-10		MDL	RL	FSB2C 9/30/2003 12-13.2		MDL	RL	FSB3A 10/1/2003 0-1		MDL	RL	FSB3B 10/1/2003 10-12		MDL	RL	FSB3C 10/1/2003 14-15.5		MDL	RL
								Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
2,5-Cyclohexadiene-1,4-dione, 2,6-bis(1,	719-22-2	--	--	--	--	--	--	NI				NI				NI				NI				NI			
2-Cyclopentene-1,4-dione	930-60-9	--	--	--	--	--	--	NI				NI				NI				NI				NI			
2-Ethyl-1-Hexanol	104-76-7	--	--	--	--	--	--	28	E,NJ,t	0	1,700	32	E,NJ,t	0	1,700	NI				28	E,NJ,t	0	1,700	NI			
3-Hexene-2,5-dione	4436-75-3	--	--	--	--	--	--	NI				NI				230	E,NJ,t	0	10	NI				230	E,NJ,t	0	10
Butyl Ester Octadecanioc	123-9-55	--	--	--	--	--	--	NI				NI				NI				NI				NI			
Cyclopentadecane	295-48-7	--	--	--	--	--	--	NI				92	E,NJ,t	0	10	NI				NI				NI			
Docosane	629-97-0	--	--	--	--	--	--	NI				34	ENJ,t	0	10	NI				NI				NI			
Erucylamide	112-84-5	--	--	--	--	--	--	340	E,NJ,t	0	10	NI				190	E,NJ,t	0	10	380	E,NJ,t	0	10	1,000	E,NJ,t	0	10
Hexadecanoic acid, 1,1-dimethylethyl est	31158-91-5	--	--	--	--	--	--	NI				NI				NI				NI				NI			
Oxirane, hexadecyl-	7390-81-0	--	--	--	--	--	--	NI				91	E,NJ,t	0	10	NI				NI				NI			
Phenytoin	57-41-0	--	--	--	--	--	--	NI				NI				NI				NI				NI			
Cyanide (mg/kg)																											
Cyanide	57-12-5	N	--	156.43	2,044	147.46	0.005	<0.56	U	0.356	0.56	<0.56	U	0.356	0.56	0.06	J	0.0356	0.5	<0.5	U	0.0356	0.5	<0.5	U	0.0356	0.5
Percent Solids (%)																											
Percent Solids	--	--	--	--	--	--	--	88		0.1	0.1	85		0.1	0.1	86		0.1	0.1	90		0.1	0.1	71		0.1	0.1

Table 11-2
Area of Concern F - Summary of Detected Chemicals in Analytical Samples
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	Draft BTAG Screening Level	FSB4A 4/19/2006 0-1		MDL	RL	FSB4B 4/19/2006 7		MDL	RL	FSB4C 4/20/2006 10-11		MDL	RL
								Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
TAL Metals (mg/kg)																			
Aluminum	7429-90-5	--	40,041	--	--	--	1	17,000		160	5,000	18,000		1.6	50	14,000		1.6	50
Antimony	7440-36-0	N	--	3.129	40.88	13.2	0.48	0.082	J	0.036	0.5	<0.5	U	0.036	0.5	<0.5	U	0.036	0.5
Arsenic	7440-38-2	C	15.8	0.426	1.91	0.026	328	***2.2***		0.023	0.4	***1.6***		0.023	0.4	***2***		0.023	0.4
Barium	7440-39-3	N	209	1,564	20,440	6,015	440	110		0.1	5	100		0.1	5	88		0.1	5
Beryllium	7440-41-7	N	1.02	15.643	204.4	1,154	0.02	0.95	J	0.016	1	0.84	J	0.016	1	0.74	J	0.016	1
Cadmium	7440-43-9	N	0.69	3.911	51.1	27.4	2.5	0.2	J	0.0073	1	0.1	J	0.0073	1	0.12	J	0.0073	1
Calcium	7440-70-2	--	--	--	--	--	--	5,700		10	250	1,500		10	250	1,400		10	250
Chromium[2]	7440-47-3	N	65.3	23.46	306.6	42.05	0.0075	31		0.57	5	33		0.57	5	30		0.57	5
Cobalt	7440-48-4	--	72.3	--	--	--	100	13		0.35	1	12		0.35	1	12		0.35	1
Copper	7440-50-8	N	53.5	312.857	4,088	10,518	15	16	,J,s	0.022	1	17	,J,s	0.022	1	16	,J,s	0.022	1
Iron	7439-89-6	N	50,962	2,346	30,660	--	12	33,000		230	5,000	34,000		23	500	34,000		23	500
Lead[2]	7439-92-1	--	26.8	400	750	--	0.01	26		0.041	1	14		0.041	1	16		0.041	1
Magnesium	7439-95-4	--	--	--	--	--	4,400	6,100		3.4	250	4,000		3.4	250	3,500		3.4	250
Manganese	7439-96-5	N	2,543	156.429	2,044	951.9	330	900		1.4	100	550		0.14	10	670		0.14	10
Mercury[3]	7439-97-6	--	0.13	2.35	30.66	--	0.058	0.025	J	0.0048	0.1	0.012	J	0.0048	0.1	0.015	J	0.0048	0.1
Potassium	7440-09-7	--	--	--	--	--	--	2,200		7.5	100	2,000		7.5	100	1,800		7.5	100
Nickel	7440-02-0	N	--	156.429	2,044	--	2	16	,J,s	0.027	0.5	17	,J,s	0.027	0.5	15	,J,s	0.027	0.5
Selenium	7782-49-2	N	62.8	39.11	511	18.98	1.8	0.26	J	0.063	1	0.11	J	0.063	1	0.13	J	0.063	1
Silver	7440-22-4	N	--	39.11	511	31.03	0.0000098	0.089	J	0.017	3	0.056	J	0.017	3	0.088	J	0.017	3
Sodium	7440-23-5	--	--	--	--	--	--	<100	U	19	100	<100	U	19	100	<100	U	19	100
Thallium	7440-28-0	N	2.11	0.548	7.154	3.64	0.001	0.24	J	0.0085	0.5	0.25	J	0.0085	0.5	0.21	J	0.0085	0.5
Vanadium	7440-62-2	N	108	7.821	102.2	730.1	0.5	53	,K,m	0.047	2	60	,K,m	0.047	2	49	,K,m	0.024	1
Zinc	7440-66-6	N	202	2,346	30,660	13,622	10	600		8.5	40	62		0.85	4	73		0.85	4
Pesticides/PCBs (ug/kg)																			
Dieldrin	60-57-1	C	--	4.0E+01	1.8E+02	2.2E+00	100	***9.2***	J,J,m	0.6	26	<24	U	0.57	24	<23	U	0.55	23
Aroclor 1254[4]	11097-69-1	C	--	1.6E+02	1.4E+03	1.1E+03	100	140		7.7	42	<40	U	7.2	40	<38	U	7	38
VOCs (ug/kg)																			
2-Butanone	78-93-3	N	--	4.7E+06	6.1E+07	2.9E+04	--	25	JB,B,z	3.7	26	6.4	JB,B,z	3.4	24	15	JB,B,z	3.1	22
2-Hexanone	591-78-6	--	--	--	--	--	--	<13	U	0.9	13	<12	U	0.84	12	<11	U	0.75	11
Acetone	67-64-1	N	--	7.0E+06	9.2E+07	2.2E+04	--	140	B,B,z	6.4	26	37	B,B,z	6	24	110	B,B,z	5.3	22
Bromomethane	74-83-9	N	--	1.1E+04	1.4E+05	4.1E+01	--	1.2	J	0.4	6.4	<6	U	0.38	6	<5.4	U	0.34	5.4
Carbon disulfide	75-15-0	N	--	7.8E+05	1.0E+07	1.9E+04	--	<6.4	U	0.37	6.4	<6	U	0.35	6	0.71	J	0.31	5.4
cis-1,2-Dichloroethene	156-59-2	--	--	7.8E+04	1.0E+06	--	300	<6.4	U	0.28	6.4	<6	U	0.26	6	<5.4	U	0.23	5.4
Ethylbenzene	100-41-4	N	--	7.8E+05	1.0E+07	1.5E+04	100	<6.4	U	0.17	6.4	<6	U	0.16	6	<5.4	U	0.14	5.4
Methylene chloride	75-09-2	C	--	8.5E+04	3.8E+05	1.9E+01	300	<26	U	4.1	26	<24	U	3.8	24	<22	U	3.4	22
Toluene	108-88-3	N	--	6.3E+05	8.2E+06	2.7E+04	100	<6.4	U	0.52	6.4	<6	U	0.48	6	<5.4	U	0.43	5.4
Trichloroethene	79-01-6	C	--	1.6E+03	7.2E+03	2.6E-01	300	<6.4	U	0.16	6.4	<6	U	0.15	6	<5.4	U	0.14	5.4
Trichlorofluoromethane	75-69-4	N	--	2.3E+06	3.1E+07	2.3E+04	--	<6.4	U	0.49	6.4	<6	U	0.46	6	<5.4	U	0.41	5.4
Xylenes (Total)	1330-20-7	N	--	1.6E+06	2.0E+07	3.0E+03	100	<6.4	U	0.32	6.4	<6	U	0.3	6	<5.4	U	0.27	5.4
VOC TICs (ug/kg)																			
Butanal	123-72-8	--	--	--	--	--	--	NT				NT				NT			
Hexanal	66-25-1	--	--	--	--	--	--	NT				NT				NT			
SVOCs (ug/kg)																			
4-Chloro-3-Methylphenol	59-50-7	--	--	--	--	--	--	<22	U	2.3	22	<20	U	2.2	20	<20	U	2.1	20
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	100	5.1	J	2.1	22	<20	U	2	20	<20	U	1.9	20
Benzo(a)anthracene	56-55-3	C	--	2.2E+02	3.9E+03	4.8E+02	100	20	J	3.9	22	<20	U	3.7	20	<20	U	3.5	20
Benzo(a)pyrene	50-32-8	C	--	2.2E+01	3.9E+02	1.2E+02	100	16	J	3.9	22	<20	U	3.7	20	<20	U	3.5	20
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	100	35		3.9	22	<20	U	3.6	20	3.7	J	3.5	20
Benzo(k)fluoranthene	207-08-9	C	--	2.2E+03	3.9E+04	1.5E+04	100	6.3	J	2.8	22	<20	U	2.6	20	<20	U	2.5	20
Bis(2-ethylhexyl)phthalate	117-81-7	C	--	4.6E+04	2.0E+05	2.9E+06	--	60	J	25	87	47	J	24	82	510		23	79
Butylbenzylphthalate	85-68-7	N	--	1.6E+06	2.0E+07	1.7E+07	--	29	J	27	87	<82	U	26	82	<79	U	25	79
Carbazole	86-74-8	C	--	3.2E+04	1.4E+05	4.7E+02	--	3.9	J	2.1	22	<20	U	2	20	<20	U	1.9	20
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	100	24		3.6	22	<20	U	3.4	20	<20	U	3.2	20
Di-n-butylphthalate	84-74-2	N	--	7.8E+05	1.0E+07	5.0E+06	--	34		3.4	22	39		3.2	20	8.8	J	3.1	20
Di-n-octylphthalate	117-84-0	--	--	--	--	--	--	12	J	2.6	22	<20	U	2.4	20	<20	U	2.3	20
Diethylphthalate	84-66-2	N	--	6.3E+06	8.2E+07	4.5E+05	--	10	J	2	22	8.2	J	1.9	20	7.7	J	1.8	20
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	100	27		2.4	22	<20	U	2.2	20	2.2	J	2.2	20
Indeno(1,2,3-cd)pyrene	193-39-5	C	--	2.2E+02	3.9E+03	4.2E+03	100	<87	U	25	87	<82	U	23	82	<79	U	22	79
Phenanthrene[5]	85-01-8	N	--	2.3E+05	3.1E+06	--	100	18	J	2.3	22	<20	U	2.1	20	<20	U	2	20
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	100	32		2.6	22	<20	U	2.5	20	2.8	J	2.4	20
SVOC TICs (ug/kg)																			
(M) 1-Eicosanol	629-96-9	--	--	--	--	--	--	NT				NT				NT			
(Z)-9-Octadecenamide	301-02-0	--	--	--	--	--	--	NT				NT				NT			
1,2-Benzenedicarboxylic acid, butyl 2-me	17851-53-5	--	--	--	--	--	--	NT				NT				NT			
1,2-Benzenedicarboxylicacid, bis(2-methy	84-69-5	--	--	--	--	--	--	NT				NT				NT			
1-Heptadecanol	1454-85-9	--	--				--	NT				NT				NT			
1-Hexadecanol		--	--	--	--	--	--	NT				NT				NT			
1-Octadecanol	112-92-5	--	--	--	--	--	--	NT				NT				NT			
1-Pentadecanol	629-76-5	--	--	--	--	--	--	NT				NT				NT			
2(3H)-Furanone, 5-acetyldihydro-	29393-32-6	--	--	--	--	--	--	NT				NT				NT			
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	--	--	--	--	--	--	NT				NT				NT			

Table 11-2
Area of Concern F - Summary of Detected Chemicals in Analytical Samples
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	Draft BTAG Screening Level	FSB4A 4/19/2006 0-1		MDL	RL	FSB4B 4/19/2006 7		MDL	RL	FSB4C 4/20/2006 10-11		MDL	RL
								Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
2,5-Cyclohexadiene-1,4-dione, 2,6-bis(1,	719-22-2	--	--	--	--	--	--	NT				NT				NT			
2-Cyclopentene-1,4-dione	930-60-9	--	--	--	--	--	--	NT				NT				NT			
2-Ethyl-1-Hexanol	104-76-7	--	--	--	--	--	--	NT				NT				NT			
3-Hexene-2,5-dione	4436-75-3	--	--	--	--	--	--	NT				NT				NT			
Butyl Ester Octadecanioc	123-9-55	--	--	--	--	--	--	NT				NT				NT			
Cyclopentadecane	295-48-7	--	--	--	--	--	--	NT				NT				NT			
Docosane	629-97-0	--	--	--	--	--	--	NT				NT				NT			
Erucylamide	112-84-5	--	--	--	--	--	--	NT				NT				NT			
Hexadecanoic acid, 1,1-dimethylethyl est	31158-91-5	--	--	--	--	--	--	NT				NT				NT			
Oxirane, hexadecyl-	7390-81-0	--	--	--	--	--	--	NT				NT				NT			
Phenytoin	57-41-0	--	--	--	--	--	--	NT				NT				NT			
Cyanide (mg/kg)																			
Cyanide	57-12-5	N	--	156.43	2,044	147.46	0.005	0.079	J	0.046	0.26	0.075	J	0.043	0.24	0.051	J	0.041	0.23
Percent Solids (%)																			
Percent Solids	--	--	--	--	--	--	--	78		0.1	0.1	83		0.1	0.1	86		0.1	0.1

Notes:

CAS = Chemical Abstracts Service
ft bgs = Feet Below Ground Surface
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyl
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
PAH = Polynuclear Aromatic Compound
TIC = Tentatively Identified Compound
(1) = Chromium VI RBC value was used
(2) = Lead criteria are Action Levels; see USEPA Region III guidance
(3) = Mercuric chloride soil RBC value used
(4) = Noncarcinogenic Residential RBC value for Aroclor 1254 was used for screening
(5) = RBC value for pyrene was used for these compounds
[A] = Facility-Wide Background Point Estimate as Reported in the Facility-Wide Background Study Report (IT 2001a)

MDL = Method Detection Limit
RL = Reporting Limit
NT = Not Tested
NI = Not Identified
LQ = Laboratory Qualifier
VQ = Validation Qualifier
r = Reason Code
NA = Not Applicable

RBC = USEPA Region III Risk-Based Concentration (RBC) values from the October 31, 2006, RBC Table and October 10, 2006, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
C = Carcinogenic per EPA RBC Table (October 2006)
N = Noncarcinogenic per EPA RBC Table (October 2006)
SSL DAF20 = Soil Screening Levels at a Dilution Attenuation Factor of 20
BTAG = Biological Technical Assistance Group Screening Level, Draft 1995

= Concentration Exceeds Adjusted Soil Residential RBC
= Concentration Exceeds Adjusted Soil Industrial RBC
underline = Concentration Exceeds Site Background Values
bold italic = Concentration Exceeds SSL DAF20
= Concentration Exceeds BTAG Screening Level

Laboratory Qualifiers

U	The compound was analyzed for but not detected. The reporting limit will be adjusted to reflect any dilution, and for soil, the percent moisture.
J	Estimated value.
B	Analyte found in associated blank as well as in the sample.
E	Concentration exceeded the upper level of the calibration range of the instrument for that specific analysis. For TICs, compound not present in calibration standard, calculated using total peak areas ion chromatographs and response factor of 1.

Validation Qualifiers

B	Not detected substantially above the level reported in laboratory or field blanks.
J	Analyte present. Reported value may not be accurate or precise.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
N	Tentative Identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.

Reason Codes

GC/MS Organics

c	Calibration failure; poor (RRF) or unstable (%D) response
l	MS/MSD recovery failure
m	Internal standard failure
s	Surrogate failure
t	Tentatively identified Compound
x	Field and/or equipment blank contamination
z	Method blank and/or storage blank contamination

Inorganics and Conventionals

f	Field duplicate imprecision
m	MS/MSD recovery failure
p	Concentration exceeded the linear range
s	No confirmation column
x	Trip blank contamination

GC and HPLC Organics

c	Calibration failure; poor or unstable (%D) response
l	LCS recovery failure
m	MS/MSD recovery failure
s	No confirmation column
x	Trip blank contamination
z	Method blank and/or storage blank contamination

Table 11-3
HHRS COPC Selection (Surface Soil) for AOC F
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	C/N	Adjusted RBC Residential	Adjusted RBC Industrial	COPC Flag (Y/N)	Rationale for Selection or Deletion
	TAL Metals (mg/kg)												
7429905	Aluminum	16,500	18,200	mg/kg	FSB3A	4/4	91.5 - 160	18,200	--	--	--	Y	NSV
7440360	Antimony	0.082	0.85	mg/kg	FSB1A	4/4	0.036 - 0.0518	0.85	N	3.13	40.88	N	BSL
7440382	Arsenic	1.5	2.2	mg/kg	FSB4A	4/4	0.023 - 0.0232	2.2	C	0.43	1.91	Y	***ARES/IND***
7440393	Barium	102	127	mg/kg	FSB1A	4/4	0.1 - 0.53	127	N	1,564	20,440	N	BSL
7440417	Beryllium	0.087	0.95	mg/kg	FSB4A	3/4	0.016 - 0.0391	0.95	N	15.6	204	N	BSL
7440439	Cadmium	0.2	2.1	mg/kg	FSB3A	4/4	0.0073 - 0.182	2.1	N	3.91	51	N	BSL
7440702	Calcium	2,020	23,300	mg/kg	FSB1A	4/4	10 - 830	23,300	--	Nutrient	Nutrient	N	Nutrient
7440473	Chromium[1]	22	31	mg/kg	FSB4A	4/4	0.57 - 0.912	31	N	23.5	306.6	Y	**ARES**
7440484	Cobalt	12	14	mg/kg	FSB2A	4/4	0.208 - 0.35	14	--	--	--	Y	NSV
7440508	Copper	15	18	mg/kg	FSB3A	4/4	0.022 - 0.368	18	N	312.9	4,088	N	BSL
7439896	Iron	29,500	37,200	mg/kg	FSB3A	4/4	212 - 230	37,200	N	2,346	30,660	Y	***ARES/IND***
7439921	Lead[2]	12	26	mg/kg	FSB4A	4/4	0.0218 - 0.041	26	--	400	750	N	BSL
7439954	Magnesium	4,380	16,700	mg/kg	FSB1A	4/4	3.4 - 161	16,700	--	Nutrient	Nutrient	N	Nutrient
7439965	Manganese	529	900	mg/kg	FSB4A	4/4	1.4 - 2.64	900	N	156.4	2,044	Y	**ARES**
7439976	Mercury[3]	0.013	0.025	mg/kg	FSB4A	4/4	0.0048 - 0.0077	0.025	--	0.8	10	N	BSL
7440097	Potassium	2,100	2,470	mg/kg	FSB3A	4/4	7.5 - 25	2,470	--	--	--	Y	NSV
7440020	Nickel	13	17	mg/kg	FSB3A	4/4	0.027 - 0.0356	17	N	Nutrient	Nutrient	N	Nutrient
7782492	Selenium	0.26	0.69	mg/kg	FSB3A	4/4	0.0502 - 0.063	0.69	N	39.1	511	N	BSL
7440224	Silver	0.041	0.089	mg/kg	FSB4A	4/4	0.0044 - 0.017	0.089	N	39.1	511	N	BSL
7440235	Sodium	24	55	mg/kg	FSB1A	3/4	8.92 - 19	55	--	Nutrient	Nutrient	N	Nutrient
7440280	Thallium	0.19	0.27	mg/kg	FSB3A	4/4	0.0085 - 0.027	0.27	N	0.55	7.15	N	BSL
7440622	Vanadium	47	54	mg/kg	FSB3A	4/4	0.047 - 0.207	54	N	7.82	102.20	Y	**ARES**
7440666	Zinc	55	600	mg/kg	FSB4A	4/4	0.517 - 8.5	600	N	2,346	30,660	N	BSL
	Pesticides/PCBs (ug/kg)												
60571	Dieldrin	9.2E+00	9.2E+00	µg/kg	FSB4A	1/2	0.371 - 0.6	9.2E+00	C	4.0E+01	1.8E+02	N	BSL
11097691	Aroclor 1254[4]	1.4E+02	1.4E+02	µg/kg	FSB4A	1/2	3.6 - 7.7	1.4E+02	C	1.6E+02	1.4E+03	N	BSL
	VOCs (ug/kg)												
78933	2-Butanone	2.5E+01	9.4E+01	µg/kg	FSB2A	4/4	3.7 - 5.9	9.4E+01	N	4.7E+06	6.1E+07	N	BSL
591786	2-Hexanone	1.3E+01	1.4E+01	µg/kg	FSB1A	2/4	0.9 - 2.67	1.4E+01	--	--	--	Y	NSV
67641	Acetone	7.7E+01	2.2E+02	µg/kg	FSB1A	4/4	5.75 - 6.4	2.2E+02	N	7.0E+06	9.2E+07	N	BSL
74839	Bromomethane	1.2E+00	1.2E+00	µg/kg	FSB4A	1/4	0.4 - 1.77	1.2E+00	N	1.1E+04	1.4E+05	N	BSL
156592	cis-1,2-Dichloroethene	7.8E+00	7.8E+00	µg/kg	FSB1A	1/4	0.28 - 0.838	7.8E+00	--	7.8E+04	1.0E+06	N	BSL
100414	Ethylbenzene	5.6E-01	5.6E-01	µg/kg	FSB1A	1/4	0.17 - 0.499	5.6E-01	N	7.8E+05	1.0E+07	N	BSL
75092	Methylene chloride	3.4E+00	5.8E+00	µg/kg	FSB1A	3/4	3.23 - 4.1	5.8E+00	C	8.5E+04	3.8E+05	N	BSL
108883	Toluene	2.7E+00	2.7E+00	µg/kg	FSB1A	1/4	0.52 - 0.548	2.7E+00	N	6.3E+05	8.2E+06	N	BSL
79016	Trichloroethene	1.2E+02	1.2E+02	µg/kg	FSB1A	1/4	0.16 - 0.799	1.2E+02	C	1.6E+03	7.2E+03	N	BSL
75694	Trichlorofluoromethane	9.1E-01	9.1E-01	µg/kg	FSB1A	1/4	0.49 - 0.877	9.1E-01	N	2.3E+06	3.1E+07	N	BSL
1330207	Xylenes (Total)	3.6E+00	3.6E+00	µg/kg	FSB1A	1/4	0.32 - 0.497	3.6E+00	N	1.6E+06	2.0E+07	N	BSL
	VOC TICs (ug/kg)												
123728	Butanal	5.3E+00	7.6E+00	µg/kg	FSB2A	2/3	0 - 0	7.6E+00	--	--	--	Y	NSV
66251	Hexanal	6.4E+00	6.7E+00	µg/kg	FSB2A	2/3	0 - 0	6.7E+00	--	--	--	Y	NSV
	SVOCs (ug/kg)												
59507	4-Chloro-3-Methylphenol	2.8E+01	3.8E+01	µg/kg	FSB2A	3/4	2.3 - 6.25	3.8E+01	--	--	--	Y	NSV
120127	Anthracene	5.1E+00	5.1E+00	µg/kg	FSB4A	1/4	2.1 - 5.54	5.1E+00	N	2.3E+06	3.1E+07	N	BSL
56553	Benzo(a)anthracene	2.0E+01	2.0E+01	µg/kg	FSB4A	1/4	3.9 - 16	2.0E+01	C	2.2E+02	3.9E+03	N	BSL
50328	Benzo(a)pyrene	1.6E+01	1.6E+01	µg/kg	FSB4A	1/4	3.9 - 6.85	1.6E+01	C	2.2E+01	3.9E+02	N	BSL
205992	Benzo(b)fluoranthene	3.5E+01	3.5E+01	µg/kg	FSB4A	1/4	3.9 - 11.7	3.5E+01	C	2.2E+02	3.9E+03	N	BSL
207089	Benzo(k)fluoranthene	6.3E+00	6.3E+00	µg/kg	FSB4A	1/4	2.8 - 16.1	6.3E+00	C	2.2E+03	3.9E+04	N	BSL
117817	Bis(2-ethylhexyl)phthalate	5.1E+01	6.0E+01	µg/kg	FSB4A	3/4	2.28 - 25	6.0E+01	C	4.6E+04	2.0E+05	N	BSL
85687	Butylbenzylphthalate	2.9E+01	3.8E+01	µg/kg	FSB2A	2/4	4.93 - 27	3.8E+01	N	1.6E+06	2.0E+07	N	BSL
86748	Carbazole	3.9E+00	3.9E+00	µg/kg	FSB4A	1/4	2.1 - 7.32	3.9E+00	C	3.2E+04	1.4E+05	N	BSL
218019	Chrysene	2.4E+01	2.4E+01	µg/kg	FSB4A	1/4	3.6 - 12.2	2.4E+01	C	2.2E+04	3.9E+05	N	BSL
84742	Di-n-butylphthalate	2.5E+01	4.5E+01	µg/kg	FSB2A	4/4	3.4 - 4.58	4.5E+01	N	7.8E+05	1.0E+07	N	BSL
117840	Di-n-octylphthalate	1.2E+01	1.2E+01	µg/kg	FSB4A	1/4	2.6 - 3.72	1.2E+01	--	--	--	Y	NSV
84662	Diethylphthalate	3.9E+00	1.0E+01	µg/kg	FSB1A	4/4	2 - 2.28	1.0E+01	N	6.3E+06	8.2E+07	N	BSL
206440	Fluoranthene	2.7E+01	2.7E+01	µg/kg	FSB4A	1/4	2.4 - 2.82	2.7E+01	N	3.1E+05	4.1E+06	N	BSL
85018	Phenanthrene[5]	1.8E+01	1.8E+01	µg/kg	FSB4A	1/4	2.3 - 2.76	1.8E+01	N	2.3E+05	3.1E+06	N	BSL
129000	Pyrene	3.2E+01	3.2E+01	µg/kg	FSB4A	1/4	1.63 - 2.6	3.2E+01	N	2.3E+05	3.1E+06	N	BSL

Table 11-3
HHRS COPC Selection (Surface Soil) for AOC F
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	C/N	Adjusted RBC Residential	Adjusted RBC Industrial	COPC Flag (Y/N)	Rationale for Selection or Deletion
	SVOC TICs (ug/kg)												
629969	(M) 1-Eicosanol	4.4E+01	4.4E+01	µg/kg	FSB2A	1/3	0 - 0	4.4E+01	--	--	--	Y	NSV
84695	1,2-Benzenedicarboxylicacid, bis(2-methy	3.5E+01	6.9E+01	µg/kg	FSB2A	3/3	0 - 0	6.9E+01	--	--	--	Y	NSV
1454859	1-Heptadecanol	2.2E+01	2.2E+01	µg/kg	FSB2A	1/3	0 - 0	2.2E+01	--	--	--	Y	NSV
29393326	2(3H)-Furanone, 5-acetyldihydro-	7.4E+01	7.4E+01	µg/kg	FSB1A	1/3	0 - 0	7.4E+01	--	--	--	Y	NSV
719222	2,5-Cyclohexadiene-1,4-dione, 2,6-bis(1,	8.6E+01	8.6E+01	µg/kg	FSB1A	1/3	0 - 0	8.6E+01	--	--	--	Y	NSV
930609	2-Cyclopentene-1,4-dione	6.1E+01	6.1E+01	µg/kg	FSB1A	1/3	0 - 0	6.1E+01	--	--	--	Y	NSV
104767	2-Ethyl-1-Hexanol	2.2E+01	3.0E+01	µg/kg	FSB2A	2/3	0 - 0	3.0E+01	--	--	--	Y	NSV
4436753	3-Hexene-2,5-dione	2.3E+02	2.3E+02	µg/kg	FSB3A	1/3	0 - 0	2.3E+02	--	--	--	Y	NSV
123955	Butyl Ester Octadecanioc	3.5E+01	3.5E+01	µg/kg	FSB2A	1/3	0 - 0	3.5E+01	--	--	--	Y	NSV
112845	Erucylamide	1.9E+02	7.3E+02	µg/kg	FSB2A	2/3	0 - 0	7.3E+02	--	--	--	Y	NSV
31158915	Hexadecanoic acid, 1,1-dimethylethyl est	4.2E+01	4.2E+01	µg/kg	FSB2A	1/3	0 - 0	4.2E+01	--	--	--	Y	NSV
	Cyanide (mg/kg)												
57125	Cyanide	6.0E-02	7.9E-02	mg/kg	FSB4A	2/4	0.0356 - 0.046	7.9E-02	N	1.6E+02	2.0E+03	N	BSL

Notes:

CAS = Chemical Abstracts Service
COPC = Chemical of Potential Concern
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyls
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
PAH = Polynuclear Aromatic Compound
TIC = Tentatively Identified Compound
[1] = Chromium VI RBC value was used
[2] = Lead criteria are Action Levels; see USEPA Region III guidance
[3] = Mercuric chloride soil RBC value used
[4] = Noncarcinogenic Residential RBC value for Aroclor 1254 was used for screening
[5] = RBC value for pyrene was used for these compounds

RBC = USEPA Region III Risk-Based Concentration (RBC) values from the October 31, 2006, RBC Table and October 10, 2006, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
C = Carcinogenic per EPA RBC Table (October 2006)
N = Noncarcinogenic per EPA RBC Table (October 2006)

ARES = Above Residential RBC
ARES/IND = Above Residential RBC/Industrial RBC
BSL = Below Residential/Industrial RBC Screening Levels
NSV = No Screening Value Available

Table 11-4
HHRS COPC Selection (Total Soil) for AOC F
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	C/N	Adjusted RBC Residential	Adjusted RBC Industrial	COPC Flag (Y/N)	Rationale for Selection or Deletion
	TAL Metals (mg/kg)												
7429905	Aluminum	14,000	25,700	mg/kg	FSB3C	12/12	1.6 - 183	25,700	--	--	--	Y	NSV
7440360	Antimony	0.082	0.85	mg/kg	FSB1A	10/12	0.036 - 0.0518	0.85	N	3.13	40.88	N	BSL
7440382	Arsenic	1.5	6	mg/kg	FSB3C	12/12	0.023 - 0.0232	6	C	0.43	1.91	Y	***ARES/IND***
7440393	Barium	67	127	mg/kg	FSB1A	12/12	0.1 - 0.53	127	N	1,564	20,440	N	BSL
7440417	Beryllium	0.087	0.95	mg/kg	FSB4A	7/12	0.016 - 0.0391	0.95	N	15.6	204	N	BSL
7440439	Cadmium	0.1	2.1	mg/kg	FSB2C	12/12	0.0073 - 0.182	2.10	N	3.91	51	N	BSL
7440702	Calcium	1,400	34,600	mg/kg	FSB2C	12/12	10 - 830	34,600	--	Nutrient	Nutrient	N	Nutrient
7440473	Chromium[1]	20	142	mg/kg	FSB3B	12/12	0.57 - 4.56	142	N	23.5	306.6	Y	**ARES**
7440484	Cobalt	9.3	14	mg/kg	FSB2A	12/12	0.208 - 0.35	14	--	--	--	Y	NSV
7440508	Copper	14.5	25	mg/kg	FSB1C	12/12	0.022 - 0.368	25	N	312.9	4,088	N	BSL
7439896	Iron	29,500	38,900	mg/kg	FSB3B	12/12	23 - 230	38,900	N	2,346	30,660	Y	***ARES/IND***
7439921	Lead[2]	11	26	mg/kg	FSB4A	12/12	0.0218 - 0.041	26	--	400	750	N	BSL
7439954	Magnesium	3,500	24,000	mg/kg	FSB1C	12/12	3.4 - 161	24,000	--	Nutrient	Nutrient	N	Nutrient
7439965	Manganese	463	1170	mg/kg	FSB3C	12/12	0.14 - 6.6	1,170	N	156.4	2,044	Y	**ARES**
7439976	Mercury [3]	0.012	0.033	mg/kg	FSB3C	12/12	0.0048 - 0.0077	0.03	--	0.8	10	N	BSL
7440097	Potassium	1,800	6,880	mg/kg	FSB3C	12/12	7.5 - 50	6,880	--	--	--	Y	NSV
7440020	Nickel	13	23	mg/kg	FSB1C	12/12	0.027 - 0.0356	23	N	Nutrient	Nutrient	N	Nutrient
7782492	Selenium	0.11	0.82	mg/kg	FSB1C	12/12	0.0502 - 0.063	0.82	N	39.1	511	N	BSL
7440224	Silver	0.041	0.15	mg/kg	FSB3C	12/12	0.0044 - 0.017	0.15	N	39.1	511	N	BSL
7440235	Sodium	24	70	mg/kg	FSB2C	9/12	8.92 - 19	70	--	Nutrient	Nutrient	N	Nutrient
7440280	Thallium	0.19	0.38	mg/kg	FSB3C	12/12	0.0085 - 0.027	0.38	N	0.55	7.15	N	BSL
7440622	Vanadium	38	60	mg/kg	FSB4B	12/12	0.024 - 0.207	60	N	7.82	102.20	Y	**ARES**
7440666	Zinc	41	600	mg/kg	FSB4A	12/12	0.517 - 8.5	600	N	2,346	30,660	N	BSL
	Pesticides/PCBs (ug/kg)												
60571	Dieldrin	9.2E+00	9.2E+00	µg/kg	FSB4A	1/4	0.371 - 0.6	9.2E+00	C	4.0E+01	1.8E+02	N	BSL
11097691	Aroclor 1254 [4]	1.4E+02	1.4E+02	µg/kg	FSB4A	1/4	3.6 - 7.7	1.4E+02	C	1.6E+02	1.4E+03	N	BSL
	VOCs (ug/kg)												
78933	2-Butanone	6.4E+00	1.5E+02	µg/kg	FSB3C	12/12	3.1 - 7.05	1.5E+02	N	4.7E+06	6.1E+07	N	BSL
591786	2-Hexanone	1.3E+01	1.9E+01	µg/kg	FSB3C	4/12	0.75 - 3.19	1.9E+01	--	--	--	Y	NSV
67641	Acetone	3.7E+01	2.9E+02	µg/kg	FSB3C	12/12	5.3 - 7.05	2.9E+02	N	7.0E+06	9.2E+07	N	BSL
74839	Bromomethane	1.2E+00	1.2E+00	µg/kg	FSB4A	1/12	0.34 - 2.12	1.2E+00	N	1.1E+04	1.4E+05	N	BSL
75150	Carbon disulfide	7.1E-01	7.1E-01	µg/kg	FSB4C	1/12	0.31 - 2.04	7.1E-01	N	7.8E+05	1.0E+07	N	BSL
156592	cis-1,2-Dichloroethene	7.8E+00	7.8E+00	µg/kg	FSB1A	1/12	0.23 - 1	7.8E+00	--	7.8E+04	1.0E+06	N	BSL
100414	Ethylbenzene	5.6E-01	5.6E-01	µg/kg	FSB1A	1/12	0.14 - 0.596	5.6E-01	N	7.8E+05	1.0E+07	N	BSL
75092	Methylene chloride	3.4E+00	6.7E+00	µg/kg	FSB2B-DUP AVG	9/12	3.12 - 4.1	6.7E+00	C	8.5E+04	3.8E+05	N	BSL
108883	Toluene	2.7E+00	2.7E+00	µg/kg	FSB1A	1/12	0.43 - 0.654	2.7E+00	N	6.3E+05	8.2E+06	N	BSL
79016	Trichloroethene	1.2E+02	1.2E+02	µg/kg	FSB1A	1/12	0.14 - 0.955	1.2E+02	C	1.6E+03	7.2E+03	N	BSL
75694	Trichlorofluoromethane	8.0E-01	9.1E-01	µg/kg	FSB1A	2/12	0.41 - 1.05	9.1E-01	N	2.3E+06	3.1E+07	N	BSL
1330207	Xylenes (Total)	3.6E+00	3.6E+00	µg/kg	FSB1A	1/12	0.27 - 0.594	3.6E+00	N	1.6E+06	2.0E+07	N	BSL
	VOC TICs (ug/kg)												
123728	Butanal	5.3E+00	1.4E+01	µg/kg	FSB3C	4/9	0 - 0	1.4E+01	--	--	--	Y	NSV
66251	Hexanal	6.4E+00	4.9E+01	µg/kg	FSB3C	4/9	0 - 0	4.9E+01	--	--	--	Y	NSV
	SVOCs (ug/kg)												
59507	4-Chloro-3-Methylphenol	1.8E+01	4.1E+01	µg/kg	FSB3C	9/12	2.1 - 7.29	4.1E+01	--	--	--	Y	NSV
120127	Anthracene	5.1E+00	5.1E+00	µg/kg	FSB4A	1/12	1.9 - 6.47	5.1E+00	N	2.3E+06	3.1E+07	N	BSL
56553	Benzo(a)anthracene	2.0E+01	2.0E+01	µg/kg	FSB4A	1/12	3.5 - 18.6	2.0E+01	C	2.2E+02	3.9E+03	N	BSL
50328	Benzo(a)pyrene	1.6E+01	1.8E+01	µg/kg	FSB2B-DUP AVG	2/12	3.5 - 7.99	1.8E+01	C	2.2E+01	3.9E+02	N	BSL
205992	Benzo(b)fluoranthene	3.7E+00	4.0E+01	µg/kg	FSB2B-DUP AVG	3/12	3.5 - 13.7	4.0E+01	C	2.2E+02	3.9E+03	N	BSL
207089	Benzo(k)fluoranthene	6.3E+00	6.3E+00	µg/kg	FSB4A	1/12	2.5 - 18.8	6.3E+00	C	2.2E+03	3.9E+04	N	BSL
117817	Bis(2-ethylhexyl)phthalate	4.4E+01	5.1E+02	µg/kg	FSB4C	11/12	2.28 - 25	5.1E+02	C	4.6E+04	2.0E+05	N	BSL
85687	Butylbenzylphthalate	2.9E+01	4.9E+01	µg/kg	FSB3C	6/12	4.93 - 27	4.9E+01	N	1.6E+06	2.0E+07	N	BSL
86748	Carbazole	3.9E+00	3.9E+00	µg/kg	FSB4A	1/12	1.9 - 8.54	3.9E+00	C	3.2E+04	1.4E+05	N	BSL
218019	Chrysene	2.4E+01	2.4E+01	µg/kg	FSB4A	1/12	3.2 - 14.3	2.4E+01	C	2.2E+04	3.9E+05	N	BSL
84742	Di-n-butylphthalate	8.8E+00	4.8E+01	µg/kg	FSB3C	12/12	3.1 - 5.35	4.8E+01	N	7.8E+05	1.0E+07	N	BSL
117840	Di-n-octylphthalate	1.2E+01	1.2E+01	µg/kg	FSB4A	1/12	2.3 - 4.34	1.2E+01	--	--	--	Y	NSV
84662	Diethylphthalate	2.8E+00	3.0E+01	µg/kg	FSB2B-DUP AVG	12/12	1.8 - 2.66	3.0E+01	N	6.3E+06	8.2E+07	N	BSL
206440	Fluoranthene	2.2E+00	2.7E+01	µg/kg	FSB4A	3/12	2.2 - 3.29	2.7E+01	N	3.1E+05	4.1E+06	N	BSL
193395	Indeno(1,2,3-cd)pyrene	1.7E+01	1.7E+01	µg/kg	FSB2B-DUP AVG	1/12	4.31 - 25	1.7E+01	C	2.2E+02	3.9E+03	N	BSL
85018	Phenanthrene [5]	4.5E+00	1.8E+01	µg/kg	FSB4A	2/12	2 - 3.22	1.8E+01	N	2.3E+05	3.1E+06	N	BSL
129000	Pyrene	2.8E+00	3.2E+01	µg/kg	FSB4A	3/12	1.63 - 2.6	3.2E+01	N	2.3E+05	3.1E+06	N	BSL

Table 11-4
HHRS COPC Selection (Total Soil) for AOC F
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	C/N	Adjusted RBC Residential	Adjusted RBC Industrial	COPC Flag (Y/N)	Rationale for Selection or Deletion
	SVOC TICs (ug/kg)												
629969	(M) 1-Eicosanol	2.6E+01	4.4E+01	µg/kg	FSB2A	2/9	0 - 0	4.4E+01	--	--	--	Y	NSV
301020	(Z)-9-Octadecenamide	2.7E+01	5.0E+02	µg/kg	FSB2C	3/9	0 - 0	5.0E+02	--	--	--	Y	NSV
17851535	1,2-Benzenedicarboxylic acid, butyl 2-me	3.1E+01	4.9E+01	µg/kg	FSB2C	2/9	0 - 0	4.9E+01	--	--	--	Y	NSV
84695	1,2-Benzenedicarboxylicacid, bis(2-methy	3.5E+01	6.9E+01	µg/kg	FSB2A	7/9	0 - 0	6.9E+01	--	--	--	Y	NSV
1454859	1-Heptadecanol	2.2E+01	2.2E+01	µg/kg	FSB2A	1/9	0 - 0	2.2E+01	--	--	--	Y	NSV
36653824	1-Hexadecanol	2.7E+01	2.7E+01	µg/kg	FSB3C	1/9	0 - 0	2.7E+01	--	--	--	Y	NSV
112925	1-Octadecanol	2.8E+01	6.1E+01	µg/kg	FSB3C	3/9	0 - 0	6.1E+01	--	--	--	Y	NSV
629765	1-Pentadecanol	3.1E+01	3.1E+01	µg/kg	FSB2B-DUP AVG	1/9	0 - 0	3.1E+01	--	--	--	Y	NSV
29393326	2(3H)-Furanone, 5-acetyldihydro-	7.4E+01	7.4E+01	µg/kg	FSB1A	1/9	0 - 0	7.4E+01	--	--	--	Y	NSV
101371	2,4,6-Triallyloxy-1,3,5-triazine	5.9E+01	9.4E+01	µg/kg	FSB1B	4/9	0 - 0	9.4E+01	--	--	--	Y	NSV
719222	2,5-Cyclohexadiene-1,4-dione, 2,6-bis(1,	8.6E+01	8.6E+01	µg/kg	FSB1A	1/9	0 - 0	8.6E+01	--	--	--	Y	NSV
930609	2-Cyclopentene-1,4-dione	6.1E+01	6.1E+01	µg/kg	FSB1A	1/9	0 - 0	6.1E+01	--	--	--	Y	NSV
104767	2-Ethyl-1-Hexanol	2.2E+01	3.2E+01	µg/kg	FSB2C	7/9	0 - 0	3.2E+01	--	--	--	Y	NSV
4436753	3-Hexene-2,5-dione	2.3E+02	2.3E+02	µg/kg	FSB3A	2/9	0 - 0	2.3E+02	--	--	--	Y	NSV
123955	Butyl Ester Octadecanioc	3.5E+01	3.5E+01	µg/kg	FSB2A	1/9	0 - 0	3.5E+01	--	--	--	Y	NSV
295487	Cyclopentadecane	9.2E+01	9.2E+01	µg/kg	FSB2C	1/9	0 - 0	9.2E+01	--	--	--	Y	NSV
629970	Docosane	3.4E+01	3.4E+01	µg/kg	FSB2C	1/9	0 - 0	3.4E+01	--	--	--	Y	NSV
112845	Erucylamide	1.9E+02	1.0E+03	µg/kg	FSB3C	7/9	0 - 0	1.0E+03	--	--	--	Y	NSV
31158915	Hexadecanoic acid, 1,1-dimethylethyl est	4.2E+01	4.2E+01	µg/kg	FSB2A	1/9	0 - 0	4.2E+01	--	--	--	Y	NSV
7390810	Oxirane, hexadecyl-	9.1E+01	9.1E+01	µg/kg	FSB2C	1/9	0 - 0	9.1E+01	--	--	--	Y	NSV
57410	Phenytoin	1.5E+01	4.8E+02	µg/kg	FSB1C	2/9	0 - 0	4.8E+02	--	--	--	Y	NSV
	Cyanide (mg/kg)												
57125	Cyanide	5.0E-02	7.9E-02	mg/kg	FSB4A	5/12	0.0356 - 0.356	7.9E-02	N	1.6E+02	2.0E+03	N	BSL

Notes:

CAS = Chemical Abstracts Service
COPC = Chemical of Potential Concern
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyls
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
PAH = Polynuclear Aromatic Compound
TIC = Tentatively Identified Compound
[1] = Chromium VI RBC value was used
[2] = Lead criteria are Action Levels; see USEPA Region III guidance
[3] = Mercuric chloride soil RBC value used
[4] = Noncarcinogenic Residential RBC value for Aroclor 1254 was used for screening
[5] = RBC value for pyrene was used for these compounds

RBC = USEPA Region III Risk-Based Concentration
(RBC) values from the October 31, 2006,
RBC Table and October 10, 2006, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
C = Carcinogenic per EPA RBC Table (October 2006)
N = Noncarcinogenic per EPA RBC Table (October 2006)

ARES = Above Residential RBC
ARES/IND = Above Residential RBC/Industrial RBC
BSL = Below Residential/Industrial RBC Screening Levels
NSV = No Screening Value Available

Table 11-5
Cumulative HHRS for AOC F (Surface Soil)
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Units	MDC	C/N	RBC Residential	RBC Industrial	Non Carcinogenic HI (RBC_{Res})	Excess Cancer Risk (RBC_{Res})	Non Carcinogenic HI (RBC_{Ind})	Excess Cancer Risk (RBC_{Ind})
	TAL Metals									
7429905	Aluminum	mg/kg	1.82E+04	--	--	--	--	--	--	--
7440382	Arsenic	mg/kg	2.20E+00	C	4.26E-01	1.91E+00	--	5.E-06	--	1.E-06
7440382	Arsenic	mg/kg	2.20E+00	N	2.35E+01	3.07E+02	9.E-02	--	7.E-03	--
7440473	Chromium[1]	mg/kg	3.10E+01	N	2.35E+02	3.07E+03	1.E-01	--	1.E-02	--
7440484	Cobalt	mg/kg	1.40E+01	--	--	--	--	--	--	--
7439896	Iron	mg/kg	3.72E+04	N	2.35E+04	3.07E+05	2.E+00	--	1.E-01	--
7439965	Manganese	mg/kg	9.00E+02	N	1.56E+03	2.04E+04	6.E-01	--	4.E-02	--
7440622	Vanadium	mg/kg	5.40E+01	N	7.82E+01	1.02E+03	7.E-01	--	5.E-02	--
	TCL VOCs									
591786	2-Hexanone	µg/kg	1.40E+01	--	--	--	--	--	--	--
	VOC TICs									
123728	Butanal	µg/kg	7.60E+00	--	--	--	--	--	--	--
66251	Hexanal	µg/kg	6.70E+00	--	--	--	--	--	--	--
	TCL SVOCs									
59507	4-Chloro-3-Methylphenol	µg/kg	3.80E+01	--	--	--	--	--	--	--
117840	Di-n-octylphthalate	µg/kg	1.20E+01	--	--	--	--	--	--	--
	SVOC TICs									
629969	(M) 1-Eicosanol	µg/kg	4.40E+01	--	--	--	--	--	--	--
1454859	1-Heptadecanol	µg/kg	2.20E+01	--	--	--	--	--	--	--
84695	1,2-Benzenedicarboxylicacid, bis(2-methy	µg/kg	6.90E+01	--	--	--	--	--	--	--
29393326	2(3H)-Furanone, 5-acetyldihydro-	µg/kg	7.40E+01	--	--	--	--	--	--	--
930609	2-Cyclopentene-1,4-dione	µg/kg	6.10E+01	--	--	--	--	--	--	--
104767	2-Ethyl-1-Hexanol	µg/kg	3.00E+01	--	--	--	--	--	--	--
719222	2,5-Cyclohexadiene-1,4-dione, 2,6-bis(1,	µg/kg	8.60E+01	--	--	--	--	--	--	--
4436753	3-Hexene-2,5-dione	µg/kg	2.30E+02	--	--	--	--	--	--	--
123955	Butyl Ester Octadecanioc	µg/kg	3.50E+01	--	--	--	--	--	--	--
112845	Erucylamide	µg/kg	7.30E+02	--	--	--	--	--	--	--
31158915	Hexadecanoic acid, 1,1-dimethylethyl est	µg/kg	4.20E+01	--	--	--	--	--	--	--
						Cumulative Risk	3.E+00	5.E-06	2.E-01	1.E-06

Notes:
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
CAS = Chemical Abstracts Service
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyls
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
TIC = Tentatively Identified Compound
[1] = Chromium VI RBC value was used

MDC = Maximum Detected Concentration
HI = Hazard Index
RBC = USEPA Region III Risk-Based Concentration
(RBC) values from the October 31, 2006,
RBC Table and October 10, 2006, Alternate RBC Table
C = Carcinogenic per EPA RBC Table (October 2006)
N = Noncarcinogenic per EPA RBC Table (October 2006)

Table 11-6
Exposure Point Concentration Summary for AOC F
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Medium:	Total Soil
Exposure Medium:	Total Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic (1)	Rationale (2)
Total Soil	Aluminum	mg/kg	1.79E+04	2.00E+04	2.6E+04	2.00E+04	mg/kg	95% UCL (Land's)	85% < FOD, Logormal
	Arsenic	mg/kg	2.50E+00	2.85E+00	6.0E+00	2.85E+00	mg/kg	95% UCL (Bootstrap)	85% < FOD, Unknown
	Chromium	mg/kg	3.62E+01	3.80E+01	1.4E+02	3.80E+01	mg/kg	95% UCL (Bootstrap)	85% < FOD, Unknown
	Cobalt	mg/kg	1.19E+01	1.25E+01	1.4E+01	1.25E+01	mg/kg	95% UCL (Student's t)	85% < FOD, Normal
	Iron	mg/kg	3.41E+04	3.54E+04	3.9E+04	3.54E+04	mg/kg	95% UCL (Student's t)	85% < FOD, Normal
	Manganese	mg/kg	6.36E+02	7.30E+02	1.2E+03	7.30E+02	mg/kg	95% UCL (Bootstrap)	85% < FOD, Unknown
	Vanadium	mg/kg	4.83E+01	5.17E+01	6.0E+01	5.17E+01	mg/kg	95% UCL (Student's t)	85% < FOD, Normal

Notes:
UCL = Upper Confidence Limit
mg/kg = Milligram Per Kilogram

(1) See Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites (OSWER Directive 9285.6-10, December 2002) for details on the following methods for calculating the 95% UCL:
95% UCL (Bounding) = The frequency of detection is less than 50%; therefore, the 95% UCL is calculated by the bounding method.
95% UCL (Student's t, adj) = The frequency of detection is between 50% and 85%, and the underlying distribution (detects only) is normal; therefore, Aitchison's Method is used to adjust the detects-only mean and standard deviaiton, and the 95% UCL is calculated using the Student's t method.
95% UCL (Land, adj) = The frequency of detection is between 50% and 85%, and the underlying distribution (detects only) is lognormal; therefore, Aitchison's Method is used to adjust the detects-only mean and standard deviation, and the 95% UCL is calculated using Land's method.
95% UCL (Student's t) = The frequency of detection is greater than 85%, and the distribution is normal.; therefore, the 95% UCL is calculated using the Student's t method.
95% UCL (Bootstrap) = The frequency of detection is between 50% and 85% and the underlying distribution (detects only) is neither normal nor lognormal, OR the frequency of detection is greater than 85% and the distribution (with non-detects represented by half of the detection limit) is neither normal nor lognormal; therefore, the 95% UCL is calculated using Hall's bootstrap method.
Maximum: The 95% UCL exceeds the maximum detected concentration; therefore, the maximum detected concentration is used to represent the 95% UCL.

(2) FOD = Frequency of detection
FOD < 50%: Frequency of detection is less than 50%
50% < FOD < 85%, Normal: Frequency of detection is between 50% and 85%, and the underlying distribution (detects only) is normal.
50% < FOD < 85%, Lognormal: Frequency of detection is between 50% and 85%, and the underlying distribution (detects only) is lognormal.
50% < FOD < 85%, Unknown: Frequency of detection is between 50% and 85%, and the underlying distribution (detects only) is neither normal nor lognormal.
85% < FOD, Normal: Frequency of detection is greater than 85%, and the distribution is normal.
85% < FOD, Lognormal: Frequency of detection is greater than 85%, and the distribution is lognormal.
85% < FOD, Unknown: Frequency of detection is greater than 85%, and the distribution is neither normal nor lognormal.

Table 11-7
Cumulative HHRS for AOC F (Total Soil)
SSP Report
Radford Army Ammunitions Plant, Radford, Virginia

CAS #	Chemical	Units	Maximum EPC	C/N	RBC Residential	RBC Industrial	Non Carcinogenic HI (RBC_{Res})	Excess Cancer Risk (RBC_{Res})	Non Carcinogenic HI (RBC_{Ind})	Excess Cancer Risk (RBC_{Ind})
	TAL Metals									
7429905	Aluminum	mg/kg	2.00E+04	--	--	--	--	--	--	--
7440382	Arsenic	mg/kg	2.85E+00	C	4.26E-01	1.91E+00	--	7.E-06	--	1.E-06
7440382	Arsenic	mg/kg	2.85E+00	N	2.35E+01	3.07E+02	1.E-01	--	9.E-03	--
7440473	Chromium[1]	mg/kg	5.79E+01	N	2.35E+02	3.07E+03	2.E-01	--	2.E-02	--
7440484	Cobalt	mg/kg	1.25E+01	--	--	--	--	--	--	--
7439896	Iron	mg/kg	3.54E+04	N	2.35E+04	3.07E+05	2.E+00	--	1.E-01	--
7439965	Manganese	mg/kg	7.30E+02	N	1.56E+03	2.04E+04	5.E-01	--	4.E-02	--
7440622	Vanadium	mg/kg	5.17E+01	N	7.82E+01	1.02E+03	7.E-01	--	5.E-02	--
	TCL VOCs									
591786	2-Hexanone	µg/kg	1.90E+01	--	--	--	--	--	--	--
	VOC TICs									
123728	Butanal	µg/kg	1.40E+01	--	--	--	--	--	--	--
66251	Hexanal	µg/kg	4.90E+01	--	--	--	--	--	--	--
	TCL SVOCs									
59507	4-Chloro-3-Methylphenol	µg/kg	4.10E+01	--	--	--	--	--	--	--
117840	Di-n-octylphthalate	µg/kg	1.20E+01	--	--	--	--	--	--	--
	SVOC TICs								--	
629969	(M) 1-Eicosanol	µg/kg	4.40E+01	--	--	--	--	--	--	--
301020	(Z)-9-Octadecenamide	µg/kg	5.00E+02	--	--	--	--	--	--	--
1454859	1-Heptadecanol	µg/kg	2.20E+01	--	--	--	--	--	--	--
112925	1-Octadecanol	µg/kg	6.10E+01	--	--	--	--	--	--	--
629765	1-Pentadecanol	µg/kg	3.10E+01	--	--	--	--	--	--	--
84695	1,2-Benzenedicarboxylicacid, bis(2-methy	µg/kg	6.90E+01	--	--	--	--	--	--	--
17851535	1,2-Benzenedicarboxylic acid, butyl 2-me	µg/kg	4.90E+01	--	--	--	--	--	--	--
29393326	2(3H)-Furanone, 5-acetyldihydro-	µg/kg	7.40E+01	--	--	--	--	--	--	--
930609	2-Cyclopentene-1,4-dione	µg/kg	6.10E+01	--	--	--	--	--	--	--
104767	2-Ethyl-1-Hexanol	µg/kg	3.20E+01	--	--	--	--	--	--	--
101371	2,4,6-Triallyloxy-1,3,5-triazine	µg/kg	9.40E+01	--	--	--	--	--	--	--
719222	2,5-Cyclohexadiene-1,4-dione, 2,6-bis(1,	µg/kg	8.60E+01	--	--	--	--	--	--	--
4436753	3-Hexene-2,5-dione	µg/kg	2.30E+02	--	--	--	--	--	--	--
123955	Butyl Ester Octadecanioc	µg/kg	3.50E+01	--	--	--	--	--	--	--
295487	Cyclopentadecane	µg/kg	9.20E+01	--	--	--	--	--	--	--
629970	Docosane	µg/kg	3.40E+01	--	--	--	--	--	--	--
112845	Erucylamide	µg/kg	1.00E+03	--	--	--	--	--	--	--
31158915	Hexadecanoic acid, 1,1-dimethylethyl est	µg/kg	4.20E+01	--	--	--	--	--	--	--
7390810	Oxirane, hexadecyl-	µg/kg	9.10E+01	--	--	--	--	--	--	--
57410	Phenytoin	µg/kg	4.80E+02	--	--	--	--	--	--	--
						Cumulative Risk	3.E+00	7.E-06	2.E-01	1.E-06

Notes:

mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
CAS = Chemical Abstracts Service
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyls
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
TIC = Tentatively Identified Compound
[1] = Chromium VI RBC value was used

MDC = Maximum Detected Concentration
HI = Hazard Index
RBC = USEPA Region III Risk-Based Concentration (RBC) values from the October 31, 2006, RBC Table and October 10, 2006, Alternate RBC Table
C = Carcinogenic per EPA RBC Table (October 2006)
N = Noncarcinogenic per EPA RBC Table (October 2006)

Table 11-8
HHRS SSL Comparison for AOC F
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Soil to Groundwater SSL (DAF 20)	SSL Flag (Y/N)	Rationale for Selection or Deletion
	TAL Metals (mg/kg)										
7429905	Aluminum	14,000	25,700	mg/kg	FSB3C	6/6	91.5 - 183	25,700	--	Y	NSV
7440360	Antimony	0.36	0.73	mg/kg	FSB1C	6/6	0.0518 - 0.0518	0.73	13.2	N	BSL
7440382	Arsenic	2	6	mg/kg	FSB3C	6/6	0.0232 - 0.0232	6.00	0.026	Y	**ASSL**
7440393	Barium	67	102	mg/kg	FSB1B	6/6	0.106 - 0.53	102	6,015	N	BSL
7440417	Beryllium	0.17	0.20	mg/kg	FSB1C	2/6	0.0391 - 0.0391	0.20	1,154	N	BSL
7440439	Cadmium	1.60	2.10	mg/kg	FSB2C	6/6	0.182 - 0.182	2.10	27.4	N	BSL
7440702	Calcium	1,530	34,600	mg/kg	FSB2C	6/6	83 - 830	34,600	Nutrient	N	Nutrient
7440473	Chromium[1]	20	142	mg/kg	FSB3B	6/6	0.912 - 4.56	142	42	Y	**ASSL**
7440484	Cobalt	9.30	12	mg/kg	FSB1B	6/6	0.208 - 0.208	12	--	Y	NSV
7440508	Copper	14.50	25	mg/kg	FSB1C	6/6	0.368 - 0.368	25	10,518	N	BSL
7439896	Iron	30,450	38,900	mg/kg	FSB3B	6/6	212 - 212	38,900	--	Y	NSV
7439921	Lead	11.00	17	mg/kg	FSB1C	6/6	0.0218 - 0.0218	17	--	Y	NSV
7439954	Magnesium	4,920	24,000	mg/kg	FSB1C	6/6	32.1 - 161	24,000	Nutrient	N	Nutrient
7439965	Manganese	463	1,170	mg/kg	FSB3C	6/6	2.64 - 6.6	1,170	951.9	Y	**ASSL**
7439976	Mercury	0.01	0.03	mg/kg	FSB3C	6/6	0.0077 - 0.0077	0.03	--	Y	NSV
7440097	Potassium	1,965.00	6,880.00	mg/kg	FSB3C	6/6	25 - 50	6,880	--	Y	NSV
7440020	Nickel	14	23	mg/kg	FSB1C	6/6	0.0356 - 0.0356	23	Nutrient	N	Nutrient
7782492	Selenium	0.58	0.82	mg/kg	FSB1C	6/6	0.0502 - 0.0502	0.82	19	N	BSL
7440224	Silver	0.05	0.15	mg/kg	FSB3C	6/6	0.0044 - 0.0044	0.15	31	N	BSL
7440235	Sodium	40	70	mg/kg	FSB2C	6/6	8.92 - 8.92	70	Nutrient	N	Nutrient
7440280	Thallium	0.20	0.38	mg/kg	FSB3C	6/6	0.027 - 0.027	0.38	3.6	N	BSL
7440622	Vanadium	38	54	mg/kg	FSB3B	6/6	0.207 - 0.207	54	730	N	BSL
7440666	Zinc	41	74	mg/kg	FSB1C	6/6	0.517 - 0.517	74	13,622	N	BSL
	Pesticides/PCBs (ug/kg)										
60571	Dieldrin	9.2E+00	9.2E+00	µg/kg	FSB4A	1/4	0.371 - 0.6	9.2E+00	2.2E+00	Y	**ASSL**
11097691	Aroclor 1254	1.4E+02	1.4E+02	µg/kg	FSB4A	1/4	3.6 - 7.7	1.4E+02	1.1E+03	N	BSL
	VOCs (ug/kg)										
67641	Acetone	7.1E+01	2.9E+02	µg/kg	FSB3C	6/6	5.55 - 7.05	2.9E+02	2.2E+04	N	BSL
75092	Methylene chloride	4.0E+00	6.7E+00	µg/kg	FSB2B-DUP AVG	6/6	3.12 - 3.96	6.7E+00	1.9E+01	N	BSL
75694	Trichlorofluoromethane	8.0E-01	8.0E-01	µg/kg	FSB2B-DUP AVG	1/6	0.825 - 1.05	8.0E-01	2.3E+04	N	BSL
123728	Butanal	6.9E+00	1.4E+01	µg/kg	FSB3C	2/6	0 - 0	1.4E+01	--	Y	NSV
66251	Hexanal	3.0E+01	4.9E+01	µg/kg	FSB3C	2/6	0 - 0	4.9E+01	--	Y	NSV
	SVOCs (ug/kg)										
59507	4-Chloro-3-Methylphenol	1.8E+01	4.1E+01	µg/kg	FSB3C	6/6	5.73 - 7.29	4.1E+01	--	Y	NSV
50328	Benzo(a)pyrene	1.8E+01	1.8E+01	µg/kg	FSB2B-DUP AVG	1/6	6.28 - 7.99	1.8E+01	1.2E+02	N	BSL
205992	Phenanthrene	4.0E+01	4.0E+01	µg/kg	FSB2B-DUP AVG	1/6	10.7 - 13.7	4.0E+01	1.5E+03	N	BSL
117817	Bis(2-ethylhexyl)phthalate	4.4E+01	6.1E+01	µg/kg	FSB3C	6/6	2.28 - 2.9	6.1E+01	2.9E+06	N	BSL
85687	Butylbenzylphthalate	3.8E+01	4.9E+01	µg/kg	FSB3C	4/6	4.93 - 6.27	4.9E+01	1.7E+07	N	BSL
84742	Di-n-butylphthalate	2.4E+01	4.8E+01	µg/kg	FSB3C	6/6	4.2 - 5.35	4.8E+01	5.0E+06	N	BSL
84662	Diethylphthalate	2.8E+00	3.0E+01	µg/kg	FSB2B-DUP AVG	6/6	2.09 - 2.66	3.0E+01	4.5E+05	N	BSL
206440	Fluoranthene	1.0E+01	1.0E+01	µg/kg	FSB2B-DUP AVG	1/6	2.59 - 3.29	1.0E+01	6.3E+06	N	BSL
129000	Pyrene	8.5E+00	8.5E+00	µg/kg	FSB2B-DUP AVG	1/6	1.63 - 2.07	8.5E+00	6.8E+05	N	BSL
	SVOC TICs (ug/kg)										
301020	(Z)-9-Octadecenamide	2.7E+01	5.0E+02	µg/kg	FSB2C	3/6	0 - 0	5.0E+02	--	Y	NSV
84695	1,2-Benzenedicarboxylicacid, bis(2-methy	4.7E+01	6.5E+01	µg/kg	FSB3C	4/6	0 - 0	6.5E+01	--	Y	NSV
36653824	1-Hexadecanol	2.7E+01	2.7E+01	µg/kg	FSB3C	1/6	0 - 0	2.7E+01	--	Y	NSV
629765	1-Pentadecanol	3.1E+01	3.1E+01	µg/kg	FSB2B-DUP AVG	1/6	0 - 0	3.1E+01	--	Y	NSV
101371	2,4,6-Triallyloxy-1,3,5-triazine	5.9E+01	9.4E+01	µg/kg	FSB1B	4/6	0 - 0	9.4E+01	--	Y	NSV
104767	2-Ethyl-1-Hexanol	2.3E+01	3.2E+01	mg/kg	FSB2C	5/6	0 - 0	3.2E+01	--	Y	NSV
4436753	3-Hexene-2,5-dione	2.3E+02	2.3E+02	mg/kg	FSB3C	1/6	0 - 0	2.3E+02	--	Y	NSV
295487	Cyclopentadecane	9.2E+01	9.2E+01	mg/kg	FSB2C	1/6	0 - 0	9.2E+01	--	Y	NSV
629970	Docosane	3.4E+01	3.4E+01	mg/kg	FSB2C	1/6	0 - 0	3.4E+01	--	Y	NSV
112845	Erucylamide	3.8E+02	1.0E+03	mg/kg	FSB3C	5/6	0 - 0	1.0E+03	--	Y	NSV
7390810	Oxirane, hexadecyl-	9.1E+01	9.1E+01	mg/kg	FSB2C	1/6	0 - 0	9.1E+01	--	Y	NSV
57410	Phenytoin	1.5E+01	4.8E+02	mg/kg	FSB1C	2/6	0 - 0	4.8E+02	--	Y	NSV

Table 11-8
HHRS SSL Comparison for AOC F
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Soil to Groundwater SSL (DAF 20)	SSL Flag (Y/N)	Rationale for Selection or Deletion
	Cyanide (mg/kg)										
57125	Cyanide	5.0E-02	5.0E-02	mg/kg	FSB1C	1/6	0.0356 - 0.356	5.0E-02	1.5E+02	N	BSL

Notes:

CAS = Chemical Abstracts Service
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyls
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
PAH = Polynuclear Aromatic Compound
TIC = Tentatively Identified Compound
[1] = Chromium VI SSL DAF20 value was used

SSL DAF20 = Soil Screening Levels at a Dilution Attenuation Factor of 20 Per (SSL) values from the October 31, 2006, RBC Table

ASSL = Above Soil Screening Level
BSL = Below Soil Screening Levels
NSV = No Screening Value Available
* = Surface Soil Detections used for SSL Screening due to testing of one surface soil sample for PCB/Pesticides/Herbicides

Table 11-9
COPC/Background Comparison for AOC F
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Surface Soil COPC/Background Comparison

CAS #	Chemical	Minimum Concentration Surface Soil	Maximum Concentration Surface Soil	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Point Estimate[A]	Background Comparison
	TAL Metals (mg/kg)									
7429905	Aluminum	16,500	18,200	mg/kg	FSB3A	4/4	91.5 - 160	18,200	40,041	N
7440382	Arsenic	1.5	2.2	mg/kg	FSB4A	4/4	0.023 - 0.0232	2.2	16	N
7440473	Chromium	22	31	mg/kg	FSB4A	4/4	0.57 - 0.912	31	65	N
7440484	Cobalt	12	14	mg/kg	FSB2A	4/4	0.208 - 0.35	14	72	N
7439896	Iron	29,500	37,200	mg/kg	FSB3A	4/4	212 - 230	37,200	50,962	N
7439965	Manganese	529	900	mg/kg	FSB4A	4/4	1.4 - 2.64	900	2,543	N
7440622	Vanadium	47	54	mg/kg	FSB3A	4/4	0.047 - 0.207	54	108	N

Total Soil COPC/Background Comparison

CAS #	Chemical	Minimum Concentration Total Soil	Maximum Concentration Total Soil	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Point Estimate[A]	Background Comparison
	TAL Metals (mg/kg)									
7429905	Aluminum	14,000	25,700	mg/kg	FSB3C	12/12	1.6 - 183	25,700	40,041	N
7440382	Arsenic	1.5	6	mg/kg	FSB3C	12/12	0.023 - 0.0232	6	16	N
7440473	Chromium	20	142	mg/kg	FSB3B	12/12	0.57 - 4.56	142	65	**Y**
7440484	Cobalt	9.3	14	mg/kg	FSB2A	12/12	0.208 - 0.35	14	72	N
7439896	Iron	29,500	38,900	mg/kg	FSB3B	12/12	23 - 230	38,900	50,962	N
7439965	Manganese	463	1,170	mg/kg	FSB3C	12/12	0.14 - 6.6	1,170	2,543	N
7440622	Vanadium	38	60	mg/kg	FSB4B	12/12	0.024 - 0.207	60	108	N

Notes:
CAS = Chemical Abstracts Service
TAL = Target Analyte List
mg/kg = Milligram Per Kilogram
[A] = Facility-Wide Background Point Estimate as
Reported in the Facility-Wide Background Study Report (IT 2001a)

Table 11-10
Detected Chemicals Occurrence for AOC F
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Chemical	CAS #	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening
TAL Metals (mg/kg)								
Aluminum	7429-90-5	16,500	18,200	mg/kg	FSB3A	4/4	91.5 - 160	18,200
Antimony	7440-36-0	0.082	0.85	mg/kg	FSB1A	4/4	0.036 - 0.0518	0.85
Arsenic	7440-38-2	1.5	2.2	mg/kg	FSB4A	4/4	0.023 - 0.0232	2.2
Barium	7440-39-3	102	127	mg/kg	FSB1A	4/4	0.1 - 0.53	127
Beryllium	7440-41-7	0.09	0.95	mg/kg	FSB4A	3/4	0.016 - 0.0391	0.95
Cadmium	7440-43-9	0.20	2.10	mg/kg	FSB3A	4/4	0.0073 - 0.182	2.10
Calcium	7440-70-2	2,020	23,300	mg/kg	FSB1A	4/4	10 - 830	23,300
Chromium	7440-47-3	22	31	mg/kg	FSB4A	4/4	0.57 - 0.912	31
Cobalt	7440-48-4	12	14	mg/kg	FSB2A	4/4	0.208 - 0.35	14
Copper	7440-50-8	15	18	mg/kg	FSB3A	4/4	0.022 - 0.368	18
Iron	7439-89-6	29,500	37,200	mg/kg	FSB3A	4/4	212 - 230	37,200
Lead	7439-92-1	12	26	mg/kg	FSB4A	4/4	0.0218 - 0.041	26
Magnesium	7439-95-4	4,380	16,700	mg/kg	FSB1A	4/4	3.4 - 161	16,700
Manganese	7439-96-5	529	900	mg/kg	FSB4A	4/4	1.4 - 2.64	900
Mercury	7439-97-6	0.013	0.025	mg/kg	FSB4A	4/4	0.0048 - 0.0077	0.025
Potassium	7440-09-7	2,100	2,470	mg/kg	FSB3A	4/4	7.5 - 25	2,470
Nickel	7440-02-0	13	17	mg/kg	FSB3A	4/4	0.027 - 0.0356	17
Selenium	7782-49-2	0.26	0.69	mg/kg	FSB3A	4/4	0.0502 - 0.063	0.69
Silver	7440-22-4	0.04	0.089	mg/kg	FSB4A	4/4	0.0044 - 0.017	0.089
Sodium	7440-23-5	24	55	mg/kg	FSB1A	3/4	8.92 - 19	55
Thallium	7440-28-0	0.19	0.27	mg/kg	FSB3A	4/4	0.0085 - 0.027	0.27
Vanadium	7440-62-2	47	54	mg/kg	FSB3A	4/4	0.047 - 0.207	54
Zinc	7440-66-6	55	600	mg/kg	FSB4A	4/4	0.517 - 8.5	600
Pesticides/PCBs (ug/kg)								
Dieldrin	60-57-1	9.2	9.2	µg/kg	FSB4A	1/2	0.371 - 0.6	9.2
Aroclor 1254	11097-69-1	140	140	µg/kg	FSB4A	1/2	3.6 - 7.7	140
VOCs (ug/kg)								
2-Butanone	78-93-3	25	94	µg/kg	FSB2A	4/4	3.7 - 5.9	94
2-Hexanone	591-78-6	13	14	µg/kg	FSB1A	2/4	0.9 - 2.67	14
Acetone	67-64-1	77	220	µg/kg	FSB1A	4/4	5.75 - 6.4	220
Bromomethane	74-83-9	1.2	1.2	µg/kg	FSB4A	1/4	0.4 - 1.77	1.2
cis-1,2-Dichloroethene	156-59-2	7.8	7.8	µg/kg	FSB1A	1/4	0.28 - 0.838	7.8
Ethylbenzene	100-41-4	0.56	0.56	µg/kg	FSB1A	1/4	0.17 - 0.499	0.56
Methylene chloride	75-09-2	3.4	5.8	µg/kg	FSB1A	3/4	3.23 - 4.1	5.8
Toluene	108-88-3	2.7	2.7	µg/kg	FSB1A	1/4	0.52 - 0.548	2.7
Trichloroethene	79-01-6	120	120	µg/kg	FSB1A	1/4	0.16 - 0.799	120
Trichlorofluoromethane	75-69-4	0.91	0.91	µg/kg	FSB1A	1/4	0.49 - 0.877	0.91
Xylenes (Total)	1330-20-7	3.6	3.6	µg/kg	FSB1A	1/4	0.32 - 0.497	3.6

Table 11-10
Detected Chemicals Occurrence for AOC F
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Chemical	CAS #	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening
SVOCs (ug/kg)								
4-Chloro-3-Methylphenol	59-50-7	28	38	µg/kg	FSB2A	3/4	2.3 - 6.25	38
Anthracene	120-12-7	5.1	5.1	µg/kg	FSB4A	1/4	2.1 - 5.54	5.1
Benzo(a)anthracene	56-55-3	20	20	µg/kg	FSB4A	1/4	3.9 - 16	20
Benzo(a)pyrene	50-32-8	16	16	µg/kg	FSB4A	1/4	3.9 - 6.85	16
Benzo(b)fluoranthene	205-99-2	35	35	µg/kg	FSB4A	1/4	3.9 - 11.7	35
Benzo(k)fluoranthene	207-08-9	6.3	6.3	µg/kg	FSB4A	1/4	2.8 - 16.1	6.3
Bis(2-ethylhexyl)phthalate	117-81-7	51	60	µg/kg	FSB4A	3/4	2.28 - 25	60
Butylbenzylphthalate	85-68-7	29	38	µg/kg	FSB2A	2/4	4.93 - 27	38
Carbazole	86-74-8	3.9	3.9	µg/kg	FSB4A	1/4	2.1 - 7.32	3.9
Chrysene	218-01-9	24	24	µg/kg	FSB4A	1/4	3.6 - 12.2	24
Di-n-butylphthalate	84-74-2	25	45	µg/kg	FSB2A	4/4	3.4 - 4.58	45
Di-n-octylphthalate	117-84-0	12	12	µg/kg	FSB4A	1/4	2.6 - 3.72	12
Diethylphthalate	84-66-2	3.9	10	µg/kg	FSB1A	4/4	2 - 2.28	10
Fluoranthene	206-44-0	27	27	µg/kg	FSB4A	1/4	2.4 - 2.82	27
Phenanthrene	85-01-8	18	18	µg/kg	FSB4A	1/4	2.3 - 2.76	18
Pyrene	129-00-0	32	32	µg/kg	FSB4A	1/4	1.63 - 2.6	32
Cyanide (mg/kg)								
Cyanide	57-12-5	0.060	0.079	mg/kg	FSB4A	2/4	0.0356 - 0.046	0.079

Notes:

CAS = Chemical Abstracts Service
COPEC = Chemical of Potential Ecological Concern
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyl
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon
TIC = Tentatively Identified Compound
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram

Table 11-11
Non-detected Chemical for AOC F
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Parameter Name	Units	Number of Samples	Minimum MDL	Maximum MDL	TSV	Maximum Detection Limit Exceeds TSV
Inorganics							
7440417	Beryllium	mg/kg	1	0.0391	0.0391	10	N
57125	Cyanide	mg/kg	2	0.0356	0.0356	0.005	**Y**
Pesticides/Herbicides							
72548	4,4'-DDD	µg/kg	1	0.286	0.286	--	NS
72559	4,4'-DDE	µg/kg	1	0.21	0.21	100	**Y**
50293	4,4'-DDT	µg/kg	1	0.216	0.216	100	N
309002	Aldrin	µg/kg	1	0.365	0.365	100	N
319846	alpha-BHC	µg/kg	1	0.364	0.364	100	N
5103719	alpha-Chlordane	µg/kg	1	0.521	0.521	100	N
319857	beta-BHC	µg/kg	1	1.36	1.36	100	N
319868	delta-BHC	µg/kg	1	0.982	0.982	100	N
60571	Dieldrin	µg/kg	1	0.371	0.371	100	N
959988	Endosulfan I	µg/kg	1	1.09	1.09	--	NS
33213659	Endosulfan II	µg/kg	1	0.257	0.257	--	NS
1031078	Endosulfan Sulfate	µg/kg	1	0.604	0.604	--	NS
72208	Endrin	µg/kg	1	0.358	0.358	100	N
7421934	Endrin aldehyde	µg/kg	1	1.33	1.33	--	NS
53494705	Endrin ketone	µg/kg	1	0.33	0.33	--	NS
58899	gamma-BHC (Lindane)	µg/kg	1	0.233	0.233	100	N
5103742	gamma-Chlordane	µg/kg	1	0.844	0.844	100	N
76448	Heptachlor	µg/kg	1	0.846	0.846	--	NS
1024573	Heptachlor epoxide	µg/kg	1	0.546	0.546	100	N
72435	Methoxychlor	µg/kg	1	0.336	0.336	100	N
8001352	Toxaphene	µg/kg	1	28	28	--	NS
93765	2,4,5-T	µg/kg	1	2.4	2.4	--	NS
93721	2,4,5-TP (Silvex)	µg/kg	1	4.8	4.8	--	NS
94757	2,4-D	µg/kg	1	19.2	19.2	--	NS
94826	2,4-DB	µg/kg	1	74.4	74.4	--	NS
75990	Dalapon	µg/kg	1	68.4	68.4	--	NS
1918009	Dicamba	µg/kg	1	2.4	2.4	--	NS
120365	Dichlorprop	µg/kg	1	20.4	20.4	--	NS
88857	Dinoseb	µg/kg	1	25.2	25.2	--	NS
94746	MCPA	µg/kg	1	1680	1680	--	NS
93652	MCPP	µg/kg	1	6070	6070	--	NS
PCBs							
12674112	Aroclor 1016	µg/kg	1	19.2	19.2	--	NS
11104282	Aroclor 1221	µg/kg	1	2.4	2.4	--	NS
11141165	Aroclor 1232	µg/kg	1	6	6	--	NS
53469219	Aroclor 1242	µg/kg	1	3.6	3.6	--	NS
12672296	Aroclor 1248	µg/kg	1	6	6	--	NS
11097691	Aroclor 1254	µg/kg	1	3.6	3.6	371	N
11096825	Aroclor 1260	µg/kg	1	8.4	8.4	371	N
VOCs							
71556	1,1,1-Trichloroethane	µg/kg	3	0.49	0.503	300	N
79345	1,1,2,2-Tetrachloroethane	µg/kg	3	0.751	0.771	300	N
76131	1,1,2-Trichloro-1,2,2-trifluoroethane	µg/kg	3	0.873	0.896	--	NS
79005	1,1,2-Trichloroethane	µg/kg	3	0.682	0.7	300	N
75343	1,1-Dichloroethane	µg/kg	3	0.833	0.854	300	N
75354	1,1-Dichloroethene	µg/kg	3	0.843	0.865	--	NS
87616	1,2,3-Trichlorobenzene	µg/kg	3	0.626	0.642	--	NS
120821	1,2,4-Trichlorobenzene	µg/kg	3	0.472	0.484	100	N
96128	1,2-Dibromo-3-chloropropane	µg/kg	3	2.39	2.45	--	NS
106934	1,2-Dibromoethane	µg/kg	3	0.788	0.808	--	NS
95501	1,2-Dichlorobenzene	µg/kg	3	0.557	0.571	100	N
107062	1,2-Dichloroethane	µg/kg	3	0.496	0.509	870,000	N
78875	1,2-Dichloropropane	µg/kg	3	0.674	0.691	700,000	N

Table 11-11
Non-detected Chemical for AOC F
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Parameter Name	Units	Number of Samples	Minimum MDL	Maximum MDL	TSV	Maximum Detection Limit Exceeds TSV
541731	1,3-Dichlorobenzene	µg/kg	3	0.308	0.316	--	NS
106467	1,4-Dichlorobenzene	µg/kg	3	0.817	0.838	100	N
591786	2-Hexanone	µg/kg	1	2.62	2.62	--	NS
108101	4-Methyl-2-pentanone	µg/kg	3	1.68	1.72	--	NS
71432	Benzene	µg/kg	3	0.606	0.622	100	N
74975	Bromochloromethane	µg/kg	3	0.875	0.898	--	NS
75274	Bromodichloromethane	µg/kg	3	0.576	0.591	450,000	N
75252	Bromoform	µg/kg	3	0.665	0.682	--	NS
74839	Bromomethane	µg/kg	3	1.73	1.77	--	NS
75150	Carbon disulfide	µg/kg	3	1.67	1.71	--	NS
56235	Carbon tetrachloride	µg/kg	3	0.536	0.55	300	N
108907	Chlorobenzene	µg/kg	3	0.76	0.78	100	N
75003	Chloroethane	µg/kg	3	1.55	1.59	--	NS
67663	Chloroform	µg/kg	3	0.513	0.526	300	N
74873	Chloromethane	µg/kg	3	0.959	0.984	--	NS
156592	cis-1,2-Dichloroethene	µg/kg	2	0.824	0.838	300	N
10061015	cis-1,3-Dichloropropene	µg/kg	3	0.565	0.579	--	NS
110827	Cyclohexane	µg/kg	3	0.363	0.373	--	NS
124481	Dibromochloromethane	µg/kg	3	0.595	0.61	--	NS
75718	Dichlorodifluoromethane	µg/kg	3	0.768	0.788	--	NS
100414	Ethylbenzene	µg/kg	2	0.491	0.499	100	N
98828	Isopropylbenzene	µg/kg	3	0.628	0.644	--	NS
79209	Methyl acetate	µg/kg	3	3.99	4.09	--	NS
1634044	methyl tert-Butyl ether	µg/kg	3	0.737	0.756	--	NS
108872	Methylcyclohexane	µg/kg	3	0.972	0.997	--	NS
100425	Styrene	µg/kg	3	0.508	0.522	100	N
127184	Tetrachloroethene	µg/kg	3	0.705	0.723	300	N
108883	Toluene	µg/kg	2	0.538	0.548	100	N
156605	trans-1,2-Dichloroethene	µg/kg	3	0.808	0.83	300	N
10061026	trans-1,3-Dichloropropene	µg/kg	3	0.599	0.615	--	NS
79016	Trichloroethene	µg/kg	2	0.785	0.799	300	N
75694	Trichlorofluoromethane	µg/kg	2	0.862	0.877	--	NS
75014	Vinyl Chloride	µg/kg	3	0.426	0.437	300	N
SVOCs							
92524	1,1'-Biphenyl	µg/kg	3	2.71	2.95	--	NS
95943	1,2,4,5-Tetrachlorobenzene	µg/kg	3	31.6	34.4	--	NS
108601	2,2'-oxybis(1-Chloropropane)	µg/kg	3	1.45	1.58	--	NS
95954	2,4,5-Trichlorophenol	µg/kg	3	3.67	4.01	100	N
88062	2,4,6-Trichlorophenol	µg/kg	3	2.88	3.14	100	N
120832	2,4-Dichlorophenol	µg/kg	3	3.87	4.22	100	N
105679	2,4-Dimethylphenol	µg/kg	3	8.73	9.53	100	N
51285	2,4-Dinitrophenol	µg/kg	3	3.52	3.84	20,000	N
121142	2,4-Dinitrotoluene	µg/kg	3	3.47	3.78	--	NS
606202	2,6-Dinitrotoluene	µg/kg	3	30.5	33.2	--	NS
91587	2-Chloronaphthalene	µg/kg	3	2.53	2.76	--	NS
95578	2-Chlorophenol	µg/kg	3	2.21	2.41	100	N
91576	2-Methylnaphthalene	µg/kg	3	3.01	3.29	--	NS
95487	2-Methylphenol	µg/kg	3	5.32	5.81	100	N
88744	2-Nitroaniline	µg/kg	3	5.06	5.52	--	NS
88755	2-Nitrophenol	µg/kg	3	1.87	2.04	--	NS
91941	3,3'-Dichlorobenzidine	µg/kg	3	73.4	80	--	NS
99092	3-Nitroaniline	µg/kg	3	36.6	40	--	NS
534521	4,6-Dinitro-2-methylphenol	µg/kg	3	4.96	5.41	--	NS
101553	4-Bromophenyl-phenylether	µg/kg	3	3.72	4.06	--	NS
106478	4-Chloroaniline	µg/kg	3	1.39	1.51	--	NS
7005723	4-Chlorophenyl-phenylether	µg/kg	3	3.6	3.92	--	NS
106445	4-Methylphenol	µg/kg	3	7.01	7.64	100	N

Table 11-11
Non-detected Chemical for AOC F
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Parameter Name	Units	Number of Samples	Minimum MDL	Maximum MDL	TSV	Maximum Detection Limit Exceeds TSV
100016	4-Nitroaniline	µg/kg	3	7.98	8.7	--	NS
100027	4-Nitrophenol	µg/kg	3	3.11	3.4	100	N
83329	Acenaphthene	µg/kg	3	1.89	2.06	100	N
208968	Acenaphthylene	µg/kg	3	1.65	1.8	100	N
98862	Acetophenone	µg/kg	3	2.09	2.28	--	NS
120127	Anthracene	µg/kg	3	5.08	5.54	100	N
1912249	Atrazine	µg/kg	3	7.57	8.26	--	NS
100527	Benzaldehyde	µg/kg	3	4.46	4.86	--	NS
56553	Benzo(a)anthracene	µg/kg	3	14.6	16	100	N
50328	Benzo(a)pyrene	µg/kg	3	6.28	6.85	100	N
205992	Benzo(b)fluoranthene	µg/kg	3	10.7	11.7	100	N
191242	Benzo(g,h,i)perylene	µg/kg	3	9.59	10.5	100	N
207089	Benzo(k)fluoranthene	µg/kg	3	14.7	16.1	100	N
111911	Bis(2-chloroethoxy)methane	µg/kg	3	3.45	3.77	--	NS
111444	Bis(2-chloroethyl)ether	µg/kg	3	1.9	2.08	--	NS
117817	Bis(2-ethylhexyl)phthalate	µg/kg	1	2.28	2.28	--	NS
85687	Butylbenzylphthalate	µg/kg	2	4.93	5.38	--	NS
105602	Caprolactam	µg/kg	3	7.02	7.66	--	NS
86748	Carbazole	µg/kg	3	6.71	7.32	--	NS
218019	Chrysene	µg/kg	3	11.2	12.2	100	N
53703	Dibenz(a,h)anthracene	µg/kg	3	6.49	7.08	100	N
132649	Dibenzofuran	µg/kg	3	3.48	3.79	--	NS
131113	Dimethylphthalate	µg/kg	3	3.64	3.97	200,000	N
117840	Di-n-octylphthalate	µg/kg	3	3.41	3.72	--	NS
206440	Fluoranthene	µg/kg	3	2.59	2.82	100	N
86737	Fluorene	µg/kg	3	1.85	2.02	100	N
118741	Hexachlorobenzene	µg/kg	3	2.76	3.01	1,000,000	N
87683	Hexachlorobutadiene	µg/kg	3	4.26	4.64	--	NS
77474	Hexachlorocyclopentadiene	µg/kg	3	2.18	2.38	10,000	N
67721	Hexachloroethane	µg/kg	3	2.57	2.8	--	NS
193395	Indeno(1,2,3-cd)pyrene	µg/kg	3	4.31	4.7	100	N
78591	Isophorone	µg/kg	3	1.9	2.08	--	NS
91203	Naphthalene	µg/kg	3	3.03	3.3	100	N
98953	Nitrobenzene	µg/kg	3	3.52	3.84	40,000	N
621647	N-Nitrosodi-n-propylamine	µg/kg	3	3.62	3.95	--	NS
86306	N-Nitrosodiphenylamine	µg/kg	3	5.23	5.7	20,000	N
87865	Pentachlorophenol	µg/kg	3	4.83	5.27	100	N
85018	Phenanthrene	µg/kg	3	2.53	2.76	100	N
108952	Phenol	µg/kg	3	4.36	4.75	100	N
129000	Pyrene	µg/kg	3	1.63	1.78	100	N
PAHs							
83329	Acenaphthene	µg/kg	3	10.8	11.1	100	N
208968	Acenaphthylene	µg/kg	3	13.3	13.7	100	N
120127	Anthracene	µg/kg	3	0.805	0.826	100	N
56553	Benzo(a)anthracene	µg/kg	3	0.92	0.944	100	N
50328	Benzo(a)pyrene	µg/kg	3	1.15	1.18	100	N
205992	Benzo(b)fluoranthene	µg/kg	3	1.5	1.53	100	N
191242	Benzo(g,h,i)perylene	µg/kg	3	14.4	14.8	100	N
207089	Benzo(k)fluoranthene	µg/kg	3	1.15	1.18	100	N
218019	Chrysene	µg/kg	3	1.38	1.42	100	N
53703	Dibenz(a,h)anthracene	µg/kg	3	1.61	1.65	100	N
206440	Fluoranthene	µg/kg	3	1.96	2.01	100	N
86737	Fluorene	µg/kg	3	1.5	1.53	100	N
193395	Indeno(1,2,3-cd)pyrene	µg/kg	3	0.805	0.826	100	N
91203	Naphthalene	µg/kg	3	9.09	9.32	100	N
85018	Phenanthrene	µg/kg	3	0.69	0.708	100	N
129000	Pyrene	µg/kg	3	1.04	1.06	100	N

Table 11-11
Non-detected Chemical for AOC F
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

CAS #	Parameter Name	Units	Number of Samples	Minimum MDL	Maximum MDL	TSV	Maximum Detection Limit Exceeds TSV
Explosives							
99354	1,3,5-Trinitrobenzene	mg/kg	3	0.14	0.14	--	NS
99650	1,3-Dinitrobenzene	mg/kg	3	0.159	0.159	--	NS
118967	2,4,6-Trinitrotoluene	mg/kg	3	0.167	0.167	--	NS
121142	2,4-Dinitrotoluene	mg/kg	3	0.142	0.142	--	NS
606202	2,6-Dinitrotoluene	mg/kg	3	0.25	0.25	--	NS
35572782	2-Amino-4,6-dinitrotoluene	mg/kg	3	0.151	0.151	--	NS
88722	2-Nitrotoluene	mg/kg	3	0.266	0.266	--	NS
99081	3-Nitrotoluene	mg/kg	3	0.184	0.184	--	NS
1946510	4-Amino-2,6-dinitrotoluene	mg/kg	3	0.162	0.162	--	NS
99990	4-Nitrotoluene	mg/kg	3	0.251	0.251	--	NS
2691410	HMX (Octahydro-1,3,5,7-tetranitro-1,3,5,	mg/kg	3	0.229	0.229	--	NS
98953	Nitrobenzene	mg/kg	3	0.102	0.102	40,000	N
121824	RDX (Hexahydro-1,3,5-trinitro-1,3,5-tria	mg/kg	3	0.131	0.131	--	NS
Nitroglycerin/PETN							
628966	Nitroglycerin	mg/kg	3	0.189	0.221	--	NS
78115	PETN	mg/kg	3	0.261	0.304	--	NS

Notes:
CAS = Chemical Abstracts Service
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
NS = No screening value
TSV = Toxicity Screening Value
MDL = Method Detection Limit

Table 11-12
Preliminary Soil Invertebrate Risk Characterization for Area F
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Chemicals	CAS #	MDC for Surface Soil	Direct Contact TRV	TRV Source[A]	HQ
TAL Metals (mg/kg)					
Aluminum	7429-90-5	18,200	1	BTAG 1995	**18,200**
Antimony	7440-36-0	0.85	78	ECO SSL 2005	<1
Arsenic	7440-38-2	2.2	328	BTAG 1995	<1
Barium	7440-39-3	127	330	ECO SSL 2005	<1
Beryllium	7440-41-7	0.95	40	ECO SSL 2005	<1
Cadmium	7440-43-9	2.10	140	ECO SSL 2005	<1
Chromium	7440-47-3	31	0.0075	BTAG 1995	**4,133**
Cobalt	7440-48-4	14	200	BTAG 1995	<1
Copper	7440-50-8	18	50	ORNL 1997a	<1
Iron	7439-89-6	37,200	12	BTAG 1995	**3,100**
Lead	7439-92-1	26	1,700	ECO SSL 2005	<1
Manganese	7439-96-5	900	330	BTAG 1995	**3**
Mercury	7439-97-6	0.025	0.058	BTAG 1995	<1
Nickel	7440-02-0	17	100	ORNL 1997a	<1
Selenium	7782-49-2	0.69	1.8	BTAG 1995	<1
Silver	7440-22-4	0.089	20	CCME 2004	<1
Thallium	7440-28-0	0.27	1	CCME 2004	<1
Vanadium	7440-62-2	54	58	BTAG 1995	<1
Zinc	7440-66-6	600	100	ORNL 1997a	**6**
Pesticides/PCBs (ug/kg)					
Dieldrin	60-57-1	9.2	100	BTAG 1995	<1
Aroclor 1254	11097-69-1	140	500	CCME 2004	<1
VOCs (ug/kg)					
2-Butanone	78-93-3	94	NV	--	NC
2-Hexanone	591-78-6	14	NV	--	NC
Acetone	67-64-1	220	NV	--	NC
Bromomethane	74-83-9	1.2	NV	--	NC
cis-1,2-Dichloroethene	156-59-2	7.8	300	BTAG 1995	<1
Ethylbenzene	100-41-4	0.56	100	BTAG 1995	<1
Methylene chloride	75-09-2	5.8	300	BTAG 1995	<1
Toluene	108-88-3	2.7	100	BTAG 1995	<1
Trichloroethene	79-01-6	120	300	BTAG 1995	<1
Trichlorofluoromethane	75-69-4	0.91	NV	--	NC
Xylenes (Total)	1330-20-7	3.6	100	BTAG 1995	<1
SVOCs (ug/kg)					
4-Chloro-3-Methylphenol	59-50-7	38	NV	--	NC
Anthracene	120-12-7	5.1	100	BTAG 1995	<1
Benzo(a)anthracene	56-55-3	20	100	BTAG 1995	<1
Benzo(a)pyrene	50-32-8	16	100	BTAG 1995	<1
Benzo(b)fluoranthene	205-99-2	35	100	BTAG 1995	<1
Benzo(k)fluoranthene	207-08-9	6.3	100	BTAG 1995	<1
Bis(2-ethylhexyl)phthalate	117-81-7	60	NV	--	NC
Butylbenzylphthalate	85-68-7	38	NV	--	NC
Carbazole	86-74-8	3.9	NV	--	NC
Chrysene	218-01-9	24	100	BTAG 1995	<1
Di-n-butylphthalate	84-74-2	45	NV	--	NC
Di-n-octylphthalate	117-84-0	12	NV	--	NC
Diethylphthalate	84-66-2	10	NV	--	NC
Fluoranthene	206-44-0	27	100	BTAG 1995	<1
Phenanthrene	85-01-8	18	100	BTAG 1995	<1
Pyrene	129-00-0	32	100	BTAG 1995	<1

Table 11-12
Preliminary Soil Invertebrate Risk Characterization for Area F
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Chemicals	CAS #	MDC for Surface Soil	Direct Contact TRV	TRV Source[A]	HQ
Cyanide (mg/kg)					
Cyanide	57-12-5	0.079	0.005	BTAG 1995	**16**

Notes:

CAS = Chemical Abstracts Service
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
MDC = Maximum Detected Concentration
TRV = Toxicity Reference Value
NV = No value
HQ = Hazard Quotient
NC = Not Calculated no TRV available
BTAG = Biological Technical Assistance Group Screening Level, Draft 1995
[A] =
Region III BTAG (USEPA 1995)
Oak Ridge National Laboratory (Efroymson et al. 1997a)
USEPA Ecological SSL (ECO-SSL 2005)
Canadian Environmental Quality Guidelines (CCME 2004)

Table 11-13
Inorganic COPEC/Background Comparison for AOC F
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Measured Analytes	CAS-Number	MDC for Surface Soil	Background Point Estimate [A]	Maximum Concentration Exceeds Background Point Estimate
TAL METALS (mg/kg)				
ALUMINUM	7429-90-5	18,200	40,041	N
ARSENIC	7440-38-2	2.2	16	N
CADMIUM	7440-43-9	2.1	0.69	**Y**
CHROMIUM	7440-47-3	31	65	N
COPPER	7440-50-8	18	54	N
IRON	7439-89-6	37,200	50,962	N
LEAD	7439-92-1	26	27	N
MANGANESE	7439-96-5	900	2,543	N
MERCURY	7439-97-6	0.025	0.13	N
NICKEL	7440-02-0	17	63	N
SELENIUM	7782-49-2	0.69	--	NBE
SILVER	7440-22-4	0.089	--	NBE
ZINC	7440-66-6	600	202	**Y**

Notes:
CAS = Chemical Abstracts Service
mg/kg = Milligram Per Kilogram
MDC = Maximum Detected Concentration
[A] = Facility-Wide Background Point Estimate as
Reported in the Facility-Wide Background Study Report (IT 2001a)

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Table 11-14
Preliminary/Refined Wildlife Risk Characterization
Screening Level Ecological Risk Assessment
SSP Report - Area F
Radford Army Ammunition Plant, Radford, Virginia

Preliminary Assessment

Parameter	Maximum Soil Concentration (mg/kg)	Wildlife TRV-Based Soil Concentrations																			
		American Robin				Red-tailed Hawk				Meadow Vole				Red Fox				Short-tailed Shrew			
		NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ
Metals																					
ARSENIC	2.2	1.39E+01	<1	3.46E+01	<1	3.89E+02	<1	9.71E+02	<1	8.99E+00	<1	8.99E+01	<1	1.34E+00	1.6	1.34E+01	<1	3.02E-01	7.3	3.02E+00	<1
CADMIUM	2.1	6.75E-01	3.1	9.31E+00	<1	3.91E+02	<1	5.40E+03	<1	1.50E+01	<1	1.50E+02	<1	1.48E+01	<1	1.48E+02	<1	1.16E+00	1.8	1.16E+01	<1
CHROMIUM	31	5.27E+00	5.9	2.64E+01	1.2	2.70E+01	1.1	1.35E+02	<1	8.65E+05	<1	8.65E+06	<1	2.38E+04	<1	2.38E+05	<1	1.78E+04	<1	1.78E+05	<1
COPPER	18	1.38E+02	<1	1.82E+02	<1	7.11E+02	<1	9.33E+02	<1	8.34E+02	<1	1.10E+03	<1	7.43E+01	<1	9.78E+01	<1	9.57E+01	<1	1.26E+02	<1
LEAD	26	5.18E+00	5.0	5.18E+01	<1	5.69E+02	<1	5.69E+03	<1	1.05E+03	<1	1.05E+04	<1	4.97E+02	<1	4.97E+03	<1	5.45E+01	<1	5.45E+02	<1
MERCURY	0.025	6.08E-01	<1	1.22E+00	<1	2.62E-01	<1	5.23E-01	<1	4.27E-01	<1	1.74E+00	<1	3.93E-03	6.4	1.60E-02	1.6	8.31E-02	<1	3.39E-01	<1
NICKEL	17	3.86E+02	<1	5.33E+02	<1	1.95E+03	<1	2.70E+03	<1	5.54E+03	<1	1.11E+04	<1	3.23E+02	<1	6.46E+02	<1	2.86E+02	<1	5.71E+02	<1
SELENIUM	0.69	3.13E-01	2.2	6.27E-01	1.1	4.03E+00	<1	8.06E+00	<1	2.73E+00	<1	4.50E+00	<1	6.09E-01	1.1	1.00E+00	<1	5.27E-01	1.3	8.70E-01	<1
SILVER	0.089	2.31E+01	<1	1.73E+02	<1	8.34E+02	<1	6.26E+03	<1	1.72E+03	<1	1.72E+04	<1	2.89E+02	<1	2.89E+03	<1	5.85E+01	<1	5.85E+02	<1
ZINC	600	1.40E+01	42.9	1.26E+02	4.7	2.19E+01	27.4	1.98E+02	3.0	3.38E+03	<1	6.75E+03	<1	8.28E+01	7.2	1.66E+02	3.6	4.22E+02	1.4	8.44E+02	<1
Pesticides																					
DIELDRIN	0.0092	4.39E-02	<1	4.39E-01	<1	8.24E+00	<1	8.24E+01	<1	5.36E+00	<1	5.36E+01	<1	3.22E-01	<1	3.22E+00	<1	2.08E-02	<1	2.08E-01	<1
PCBs																					
Aroclor 1254	0.14	8.69E-03	16.1	8.69E-02	1.6	1.53E+00	<1	1.53E+01	<1	1.17E+01	<1	1.17E+02	<1	5.33E-02	2.6	5.33E-01	<1	3.42E-03	40.9	3.42E-02	4.1
SVOCs/PAHs																					
ANTHRACENE	0.0051	NC		NC		NC		NC		5.23E+04	<1	5.23E+05	<1	2.14E+04	<1	2.14E+05	<1	2.20E+03	<1	2.20E+04	<1
BENZO(A)ANTHRACENE	0.02	NC		NC		NC		NC		4.78E+01	<1	4.78E+02	<1	2.55E+00	<1	2.55E+01	<1	1.43E+00	<1	1.43E+01	<1
BENZO(A)PYRENE	0.016	3.56E+00	<1	1.78E+01	<1	9.73E+00	<1	4.87E+01	<1	1.66E+02	<1	1.66E+03	<1	3.48E+00	<1	3.48E+01	<1	4.23E+00	<1	4.23E+01	<1
BENZO(B)FLUORANTHENE	0.035	NC		NC		NC		NC		1.68E+02	<1	1.68E+03	<1	2.87E+00	<1	2.87E+01	<1	5.12E+00	<1	5.12E+01	<1
BENZO(K)FLUORANTHENE	0.0063	NC		NC		NC		NC		1.85E+03	<1	1.85E+04	<1	3.16E+01	<1	3.16E+02	<1	5.65E+01	<1	5.65E+02	<1
CHRYSENE	0.024	NC		NC		NC		NC		2.37E+03	<1	2.37E+04	<1	1.24E+02	<1	1.24E+03	<1	5.65E+01	<1	5.65E+02	<1
FLUORANTHENE	0.024	NC		NC		NC		NC		4.11E+03	<1	2.05E+04	<1	7.02E+02	<1	3.51E+03	<1	1.24E+02	<1	6.22E+02	<1
PHENANTHRENE	0.018	8.17E+00	<1	4.08E+01	<1	7.63E+02	<1	3.81E+03	<1	7.32E+02	<1	3.66E+03	<1	2.98E+02	<1	1.49E+03	<1	3.22E+01	<1	1.61E+02	<1
PYRENE	0.032	NC		NC		NC		NC		1.07E+03	<1	5.35E+03	<1	1.85E+02	<1	9.25E+02	<1	3.17E+01	<1	1.58E+02	<1

Refined Assessment

Parameter	Maximum Soil Concentration (mg/kg)	Wildlife TRV-Based Soil Concentrations																			
		American Robin				Red-tailed Hawk				Meadow Vole				Red Fox				Short-tailed Shrew			
		NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ	NOAEL	HQ	LOAEL	HQ
Metals																					
ARSENIC	2.2	6.04E+02	<1	1.51E+03	<1	8.09E+06	<1	2.02E+07	<1	3.39E+01	<1	3.39E+02	<1	8.23E+03	<1	8.23E+04	<1	1.03E+01	<1	1.03E+02	<1
CADMIUM	2.1	3.08E+01	<1	4.25E+02	<1	8.15E+06	<1	1.12E+08	<1	5.65E+01	<1	5.65E+02	<1	9.95E+04	<1	9.95E+05	<1	4.06E+01	<1	4.06E+02	<1
CHROMIUM	31	2.18E+02	<1	1.09E+03	<1	5.62E+05	<1	2.81E+06	<1	3.26E+06	<1	3.26E+07	<1	1.45E+08	<1	1.45E+09	<1	5.98E+05	<1	5.98E+06	<1
LEAD	26	2.17E+02	<1	2.17E+03	<1	1.19E+07	<1	1.19E+08	<1	3.94E+03	<1	3.94E+04	<1	3.11E+06	<1	3.11E+07	<1	1.83E+03	<1	1.83E+04	<1
MERCURY	0.025	2.72E+01	<1	5.45E+01	<1	5.45E+03	<1	1.09E+04	<1	1.61E+00	<1	6.57E+00	<1	2.40E+01	<1	9.78E+01	<1	2.84E+00	<1	1.16E+01	<1
SELENIUM	0.69	1.42E+01	<1	2.84E+01	<1	8.39E+04	<1	1.68E+05	<1	1.03E+01	<1	1.70E+01	<1	3.79E+03	<1	6.25E+03	<1	1.82E+01	<1	3.01E+01	<1
ZINC	600	6.32E+02	<1	5.71E+03	<1	4.56E+05	<1	4.12E+06	<1	1.27E+04	<1	2.54E+04	<1	5.06E+05	<1	1.01E+06	<1	1.46E+04	<1	2.92E+04	<1
PCBs																					
Aroclor 1254	0.14	4.00E-01	<1	4.00E+00	<1	3.18E+04	<1	3.18E+05	<1	4.40E+01	<1	4.40E+02	<1	3.25E+02	<1	3.25E+06	<1	1.21E-01	1.2	1.21E+03	<1

Notes:
NC = Not Calculated no TRV available
TRV = Toxicity Reference Value
HQ = Hazard Quotient
LOAEL = Lowest observable adverse effects level
NOAEL = No observable adverse effects level
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
PCB = Polychlorinated Biphenyls
SVOC = Semi-Volatile Organic Compound
PAH = Poly-Aromatic Hydrocarbon

= Indicate HQs greater than 1.0

Refer to Appendix F.2 for detailed description of model parameters and results

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12.0 SUMMARY CONCLUSIONS AND RECOMMENDATIONS

12.1 HUMAN HEALTH RISK SCREENING

Human health risk screening was conducted for the 10 SSP sites. Table 12-1 summarizes the results of each screening element including COPC identification, cumulative risk screening, lead and iron screening, SSL comparisons, and background evaluation.

12.1.1 COPCs

Metals were the primary COPCs identified at the sites. Additional COPCs with screening values identified included: Aroclor 1254 (SWMUs 37, 38, 69, and Area A), benzo(a)pyrene (SWMUs 13, 57, and 68), and 2,4-DNT (SWMUs 13, 37, and AOC A). COPCs were not identified for groundwater evaluated at SWMU 46 and AOC F.

12.1.2 Cumulative Human Health Risk Screening

Carcinogenic risk screening passed for the residential scenario at SWMU 46 (surface soil), SWMU 68 (surface soil), AOC F (surface and total soil), and AOC Q (surface and total soil). With the exception of AOC A where the maximum arsenic concentration exceeded its background point estimate, carcinogenic risk screenings failed for residential surface soil and/or total soil primarily due to arsenic concentrations below its background point estimates; therefore, these screening are not a concern for the site given that the potential site-related risk does not exceed 1.E-05.

With the exception of SWMU 57 and AOC A, noncarcinogenic cumulative risk screening failed for residential surface soil and total soil due to metals concentrations below background point estimates. These screening results are not a concern given that the elevated HIs (>1) are due to background levels of metals in soil rather than COPCs detected above background. SWMU 57 failed the noncarcinogenic cumulative risk screening for residential scenarios due to cadmium, chromium, iron, and manganese concentrations above their background point estimates.

With the exception of AOC A, each of the sites passed the industrial cumulative risk screening.

12.1.3 Lead and Iron Screening

Nine of 10 sites passed the lead screening, with the exception of SWMU 13, which failed for surface soil and for total soil using both the MDC comparison and IEUBK modeling. Eight of the 10 sites passed the iron screening, which included margin of exposure evaluations. SWMU 57 (surface and total soil) and AOC A (surface soil) did not pass the margin of exposure evaluation for iron.

12.1.4 Comparison to SSLs

SSL exceedances for one or more metals occurred at each of the sites, except for SWMU 13. SSL exceedances of metals above background point estimates are limited to chromium in one intermediate sample at AOC F and in one terminal sample at SWMU 57.

Organic SSL exceedances (excluding laboratory artifact methylene chloride) occurred at SWMUs 13, 37, 46, 57, and AOC F. Chemicals exceeding generic SSLs in included bromodichloromethane, 1,3-dinitrobenzene, dieldrin, chloroform, and TCE (also sediment). Concentrations of the organic chemicals were below site-specific SSLs except at SWMU 13 (TCE and 1,3-Dinitrobenzene), SWMU 37 (TCE), SWMU 46 (TCE), and SWMU 57 (chloroform).

To further evaluate the soil-to-groundwater pathway as part of the SSP, groundwater samples were collected at SWMU 46 and AOC F in November 2006 from monitoring wells 46MW1 and FMW1, which were installed for the SSP in April 2006. The groundwater sample collected from FMW1 was analyzed for chromium and pesticides. Evaluation of the soil-to-groundwater migration pathway for pesticides and

chromium did not indicate leaching of pesticides to groundwater or leaching of chromium to groundwater at levels above the adjusted T-RBC. The groundwater sample collected from 46MW1 was analyzed for TCE, tetrachloroethene and degradation products 1,1-dichloroethene, cis-1,2-dichloroethene, trans-1,2-dichloethene, and vinyl chloride. Evaluation of the soil-to-groundwater migration pathway did not indicate leaching of TCE or its byproducts to groundwater

12.1.5 COPC Comparison to Background

COPCs detected at concentrations above background at one or more sites included: aluminum, cadmium, chromium, copper, iron, lead, and manganese.

12.1.6 Conclusions

The results of the human health risk screening indicated that there is no need for further action at SWMUs 46, 68, 69, and AOC F based on human health risk. Further investigation and human health risk assessment is recommended for SWMUs 13, 37, 38, 57, AOC A, and AOC Q based on the results of the human health risk screening.

12.2 ECOLOGICAL RISK SCREENING

Ecological risk screening was conducted for the 10 sites sampled for the SSP. Table 12-2 summarizes the results of each screening element including COPEC identification, preliminary cumulative risk screen, refined cumulative risk screen, and background evaluation.

12.2.1 Ecological Conceptual Model

With the exception of SWMU 13, sites are exclusively upland habitats that lack wetland and significant drainage features. Therefore, soil represents the potential exposure medium for ecological receptors. SWMU 13 is located on the New River and hence, in addition to terrestrial pathways associated with the land portion of the SWMU, aquatic pathways associated with the New River were also considered.

12.2.2 Preliminary Exposure Assessment and Risk Characterization

12.2.2.1 Direct Contact – Soil and Invertebrates

Metals and cyanide were the primary COPECs identified at the sites. Additional COPECs with screening values identified included: Aroclor 1254 (SWMUs 37, 38, 57, 68, 69, AOC A, and AOC F), PAHs (SWMU 13), fluoranthene (SWMU 38), pyrene (SWMU 68), and benzo(b)fluoranthene (AOC A).

12.2.2.2 Dose Rate – Terrestrial and Aquatic Wildlife

Each of the 10 sites had one or more COPEC MDCs above LOAEL and NOAEL values, and therefore, refined exposure assessments and risk characterizations were conducted for each of the sites, with the exception for soil terrestrial at SWMU 13 due to lead levels in soil and the results of the human health lead screening. At SWMU 13, preliminary NOAEL based calculations for lead resulted in HQs higher than 1 for the American Robin and Meadow Vole.

12.2.3 Refined Exposure Assessment and Risk Characterization - Wildlife

Excluding SWMUs 13, 37, 38, 57 and AOC A, the results of the refined risk characterization indicated that receptor HQs were less than 1 for LOAEL based calculations at each of the sites. Receptor HQs were less than 1 for NOAEL based calculations for SWMU 46, SWMU 68, and SWMU 69.

12.2.4 COPEC Comparison to Background

COPECs detected at concentrations above background at one or more sites included: cadmium, chromium, copper, lead, manganese, mercury, and zinc. COPECs were not detected at concentrations above their point estimates at SWMU 69, AOC 46, AOC F, and AOC Q.

12.2.5 Conclusions

The results of the preliminary invertebrate direct contact and refined wildlife ingestion risk characterization at each of the sites indicated there is adequate information to conclude that ecological risks are negligible at SWMUs 46, 68, 69, and AOC F, and therefore, there is no need for further action at these SSP sites on the basis of ecological risk.

12.3 RECOMMENDATIONS

Table 12-3 summarizes the recommendations for each site resulting from application of the SSP risk screening process and supporting evaluations. Based on the results of the SSP evaluations:

- No further action is recommended for SWMU 46, SWMU 68, SWMU 69, and AOC F;
- Further investigation and completion of RFIs are recommended at SWMU 13-outside operational area (lead), SWMUs 37, 38, and AOC Q (metals, pesticides, PCBs, and VOCs), SWMU 57 (metals and VOCs), and AOC A (metals, pesticides, PCBs, and explosives).

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Table 12-1
Summary of Human Health Site Screening
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Site	COPCs Identified*	Cumulative Risk Screening Surface Soil [A]		Cumulative Risk Screening Total Soil [A]		Lead and Iron Screening	SSL (DAF20) Comparison/Flags	SSL Exceedances of Refined SSLs or Background	COPC Metals Above Background **	Number of COPCs/TICs with No Available Risk Screening Values
		C	N	C	N					
SWMU 13	Sb, As, Cr, Fe, Pb, Mn, Tl, V, BaP, DNT Mix	Failed-R 1E-05 (As, BaP, DNT Mix)	Failed-R HI = 3	Failed-R 2E-05 (As, BaP, DNT Mix)	Failed-R HI = 3	Failed Lead Passed Iron	TCE, 1,3-Dinitrobenzene	TCE, 1,3-Dinitrobenzene	Pb	VOCs (1) SVOCs (30)
SWMU 37	As, Cr, Fe, Mn, V, Aroclor 1254, DNT Mix	Failed-R 1E-05 (As, Aroclor 1254, DNT Mix)	Failed-R HI = 2	Failed-R 1E-05 (As, Aroclor 1254, DNT Mix)	Failed-R HI = 2	Passed Lead Passed Iron	As, Dieldrin, TCE	TCE	Cr	VOCs (7) SVOCs (14)
SWMU 38	As, Cr, Fe, Mn, V, Aroclor 1254	Failed-R 1E-05 (As, Aroclor 1254)	Failed-R HI = 3	Passed	Failed-R HI = 3	Passed Lead Passed Iron	As	None	Cr	VOCs (4) SVOCs (15)
AOC Q	As, Fe, Mn, V	Passed	Failed-R HI = 2	Passed	Failed-R HI = 1	Passed Lead Passed Iron	As	None	None	VOCs (7) SVOCs (34)
SWMU 46	As, Cr, Fe, Mn, V	Passed	Failed-R HI = 3	Failed-R 1E-05 (As)	Failed-R HI = 3	Passed Lead Passed Iron	As, TCE	TCE[B]	None	VOCs (2) SVOCs (17)
SWMU 57	Sb, As, Cd, Cr, Fe, Mn, V, BaP	Failed-R 1E-05 (As, BaP)	Failed-R HI = 12	Failed-R 1E-05 (As, BaP)	Failed-R HI = 6	Passed Lead Failed Iron	As, Cr, Mn, Bromodichloromethane, Chloroform	Cr, Mn, Chloroform	Cd, Cr, Fe, Mn	VOCs (1) SVOCs (20)
SWMU 68	Sb, As, Cr, Cd, Fe, Mn, V, BaP	Passed	Failed-R HI = 4	Failed-R 1E-05 (As, BaP)	Failed-R HI = 4	Passed Lead Passed Iron	As	None	Fe	SVOCs (17)
SWMU 69	Sb, As, Cr, Cu, Fe, Mn, V, Aroclor 1254	Failed-R 1E-05 (As, Aroclor 1254)	Failed-R HI = 4	Failed-R 1E-05 (As, Aroclor 1254)	Failed-R HI = 4	Passed Lead Passed Iron	As, Cr, Mn, Methylene chloride	None	None	VOCs (1) SVOCs (14)
AOC A	As, Cr, Fe, Mn, V, DNT Mix, Aroclor 1254	Failed-R 9E-05 Failed-I 2E-05	Failed-R HI = 8	Failed-R 5E-05 Failed-I 1E-05	Failed-R HI = 6	Passed Lead Failed Iron	As, Cr, Mn, Dieldrin, Methylene Chloride	Methylene Chloride	As, Cr, Cu, Fe	SVOCs (15)
AOC F	As, Cr, Fe, Mn, V	Passed	Failed-R HI = 3	Passed	Failed-R HI = 3	Passed Lead Passed Iron	As, Cr, Mn, Dieldrin	Cr, Dieldrin[C]	Cr	VOCs (2) SVOCs (21)

Notes:
COPC = Chemical of Potential Concern
* for which RBCs are available
** no background estimates available for Sb and Cyanide
C = Carcinogenic
N = Noncarcinogenic
[A] = Sites passed carcinogenic and noncarcinogenic industrial scenarios with the exception of Area A
[B] = TCE and its byproducts were not detected in groundwater at the site
[C] = Chromium was detected at a concentration less than Chromium VI Adjusted T-RBC and Dieldrin was not detected in groundwater at the site
Failed-R (chemical) = Failed Residential Cumulative Risk Screening due to (chemical)
Failed-I (chemical) = Failed Industrial Cumulative Risk Screening due to (chemical)
HI = Hazard Index
Failed-R HI = (#) = Failed Residential Cumulative Risk Screening Due to HI of (#)
Passed = Passed Residential and Industrial Cumulative Risk Screenings
TCE = Trichloroethene
n/a = Not applicable
BaP = Benzo(a)pyrene
DNT Mix = Dinitrotoluene Mixture
SSL DAF20 = Soil Screening Levels at a Dilution Attenuation Factor of 20 EPA (SSL) values from the April 14, 2004, RBC Table
RBC = USEPA Region III Risk-Based Concentration (RBC) values from the April 14, 2004, RBC Table and April 14, 2004, Alternate RBC Table
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
TIC = Tentatively Identified Compound
= HI/Risk Attributable Concentrations Above Background

Table 12-2
Summary of Ecological Site Screening
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Exposure Assessment

Site	Size (acres)	Cover Type	Direct Contact COPECS*	Preliminary Risk Characterization COPECs	Refined Risk Characterization		Preliminary Direct Contact and Refined Wildlife COPEC Metals Above Background**	Path Forward
				NOAEL HQ >1	NOAEL HQ > 1	NOAEL and LOAEL HQs >1		
SWMU 13	2.5	Active industrial area; grassed with gravel substrate; transitional herbaceous species along area fringe	Inorganics, PAHs	Metals, Benz(ghi)perylene, Dioxin/Furans (soil) Metals (sediment) Metals (surface water)	Not refined	Not refined	Pb, Zn	Inv./SLERA Soil/Sediment/Surface Water
SWMU 37	0.62	Densely vegetated grass area	Al, Cr, Cu, Fe, Mn, Hg, Zn, Cyanide	Metals, Aroclor 1254	American Robin: Cd, Zn, Aroclor 1254 Short-tailed Shrew: As, Cu, Pb	American Robin: Cr, Pb Short-tailed Shrew: Hg, Aroclor 1254	Cr, Cu, Pb, Hg	Inv./SLERA Soil
SWMU 38	0.228	Densely vegetated grass area	Al, Cr, Cu, Fe, Mn, Hg, Cyanide, Aroclor 1254, Flouranthene	Metals, Aroclor 1254	American Robin: Cd, Pb, Zn Short-tailed Shrew: As, Hg	American Robin: Cr, Aroclor 1254 Short-tailed Shrew: Aroclor 1254	Cr, Cu, Hg	Inv./SLERA Soil
AOC Q	0.076	Densely wooded depression	Al, Cr, Fe, Mn, Cyanide	Metals. Aroclor 1254	American Robin: Cd, Cr, Pb, Zn, Aroclor 1254 Short-tailed Shrew: As, Aroclor 1254	None	None	Inv./SLERA Soil
SWMU 46	0.024	Grassed area	Al, Cr, Fe, Mn	Metals	None	None	None	NFA
SWMU 57	0.027	Grassed area	Al, Sb, Cr, Fe, Mn, Hg, V, Zn, Cyanide	Metals, Aroclor 1254	American Robin: Cd, Pb Short-tailed Shrew: As, Cd	American Robin: Cr, Zn	Cr, Fe, Mn, Hg, Zn	Inv./SLERA Soil
SWMU 68	0.023	Densely vegetated grass area	Al, Cr, Fe, Mn, Cyanide, Pyrene	Metals, Aroclor 1254	None	None	None	NFA
SWMU 69	0.012	Slightly depressed grass area	Al, Cr, Fe, Mn, Hg, V, Cyanide	Metals, Aroclor 1254	None	None	None	NFA
AOC A	0.045	Industrialized, paved, with concrete and grassed embankment	Al, Cr, Cu, Fe, Mn, Hg, Zn, Aroclor 1254, Cyanide, benzo(b)fluoranthene	Metals, Aroclor 1254	American Robin: Pb, Zn, Aroclor 1254 Short-tailed Shrew: As	Short-tailed Shrew: Aroclor 1254	Cr, Cu, Fe, Hg, Zn	Inv./SLERA Soil
AOC F	0.043	Grassed area	Al, Cr, Fe, Mn, Zn, Cyanide	Metals, Aroclor 1254	Short-tailed Shrew: Aroclor 1254	None	Zn	NFA

Notes:
COPEC = Chemical of Potential Ecological Concern
LOAEL = Lowest observable adverse effects level
NOAEL = No observable adverse effects level
* for which toxicity data is available
** no background estimates available for Sb and Cyanide
C = Carcinogenic
N = Noncarcinogenic
Failed-R (chemical) = Failed Residential Cumulative Risk Screening due to (chemical)
Passed = Passed Residential and Industrial Cumulative Risk Screenings
TCE = Trichloroethene, DNT = Dinitrotoluene
Inv. = Investigation
SLERA = Screening level ecological risk assessment
NFA = No further action

Table 12-3
Summary of Recommendations
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Site	Further Action			NFA	Chemicals of Potential Concern Potentially Subject to Further Action	
	Inv.	HHRA	SLERA			
SWMU 13	✓	✓	✓		*HHRA:* *SLERA:*	Metals Soil: lead Sediment: lead
SWMU 37	✓	✓	✓		*HHRA:* *SLERA:*	Metals, PCBs, Pesticides, VOCs Metals, PCBs, Pesticides
SWMU 38	✓	✓	✓		*HHRA:* *SLERA:*	Metals, PCBs, Pesticides, VOCs Metals, PCBs, Pesticides
SWMU 46				✓	*HHRA:* *SLERA:*	n/a n/a
SWMU 57	✓	✓	✓		*HHRA:* *SLERA:*	metals, VOCs metals
SWMU 68				✓	*HHRA:* *SLERA:*	n/a n/a
SWMU 69				✓	*HHRA:* *SLERA:*	n/a n/a
AOC A	✓	✓	✓		*HHRA:* *SLERA:*	Metals, SVOCs, Pesticides/Herbicides, PCBs, Explosives Metals, Pesticides, PCBs
AOC F				✓	*HHRA:* *SLERA:*	n/a n/a
AOC Q	✓	✓	✓		*HHRA:* *SLERA:*	Metals, PCBs, Pesticides, VOCs Metals, PCBs, Pesticides

Notes:
Inv. = Investigation
HHRA = Human health risk assessment
SLERA = Screening level ecological risk assessment
NFA = No further action
n/a = Not applicable

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SITE SCREENING PROCESS REPORT FOR SOLID WASTE MANAGEMENT UNITS 13, 37, 38, 46, 57, 68, 69, AND AREAS OF CONCERN A, F, Q

RADFORD ARMY AMMUNITION PLANT
RADFORD, VIRGINIA

FINAL
MAY 2007

URS

ARCHITECT-ENGINEER SERVICES
CONTRACT NO.
DACA31-00-D-0011
DELIVERY ORDER NO. 0046

SITE SCREENING PROCESS REPORT FOR SOLID WASTE MANAGEMENT UNITS 13, 37, 38, 46, 57, 68, 69, AND AREAS OF CONCERN A, F, Q

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APPENDIX A

DATA QUALITY OBJECTIVES

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A.0 QUALITY CONTROL EVALUATION

Data validation was conducted on 100% of the SSP data consistent with Section 2.7 of WPA 016 and Master Quality Assurance Plan (MQAP) Section 9.5 by URS' Quality Assurance Group in Linthicum, Maryland. Copies of the data validation reports are included in Appendix K; these reports include detailed discussions of the major and minor anomalies for each sample delivery group validated. Data qualifiers have been applied to the laboratory data sheets (Form I and II) for organic and inorganic results based on the results of the data validation. Copies of the laboratory data sheets are presented in Appendix K.

A.1.1 Project Quality Objectives

Project quality objectives for chemical data measurements as outlined in Section 3.2 of the MQAP include accuracy, precision, representativeness, completeness, comparability, and sensitivity. The following sections discuss these objectives as related to the data collected for the SSP Report.

A.1.1.1 Accuracy

The accuracy of chemical data was evaluated during data validation by calculating the percent recovery for matrix, laboratory control, surrogate spikes, and blanks. Specific anomalies and application of associated data qualifying flags are discussed in the data validation reports included in Appendix K. Based on the results of the data validation, project data quality objectives (DQOs) related to accuracy were met for this investigation.

Soil

Major anomalies were identified for 5 of 66 SVOC compounds in sample 37SB2A, which resulted in "R" flagging for these compounds. These anomalies were likely the result of matrix interference associated with the sludge matrix. DQO goals for this sampling location were considered met since (1) 92.4 % of the SVOC results for this sample were usable (not "R" flagged) for their intended purpose, and (2) samples collected at deeper depths at the same location did not have reported major anomalies.

No major anomalies were identified the field QA/QC samples.

Sediment

No major anomalies were identified for sediment samples and no sediment samples were R-flagged.

Surface Water

No major anomalies were identified for surface water samples and no surface water samples were R-flagged.

Groundwater

No major anomalies were identified for groundwater samples and no groundwater samples were R-flagged.

A.1.2 Precision

Sampling precision was evaluated by obtaining one duplicate sample for every 10 soil samples collected and by assessing the relative percent difference (RPD) between results as outlined in Section 3.2.2 of the MQAP. A 35% RPD control limit has been established in the MQAP for soil samples. Major anomalies related to precision were not identified during data validation. Based on the results of the data validation, project data quality objectives related to precision were met for this investigation. Specific minor anomalies and application of associated data qualifying flags are discussed in the data validation reports included in Appendix K.

A.1.2.1 Representativeness

Representativeness is a measure of the degree to which the measured results accurately reflect the medium being sampled. It is a qualitative parameter, which is addressed through the proper design of the sampling program in terms of sample location, number of samples, and actual material collected as a "sample" of the population.

The sampling plan was approved by USEPA and VDEQ as an appropriate program to collect representative data for soil, sediment (SWMU 13), and surface water (SWMU 13) at the SSP sites. Sampling protocols were developed in WPA 016 to ensure that samples collected were representative of the media. Field handling protocols (e.g., storage, handling in the field, and shipping) were also designed to protect the representatives of the collected samples. Proper field documentation and QC inspections consistent with the procedures outlined MWP, MQAP, and WPA 016 were followed to ensure that sample identification and integrity were maintained.

A.1.2.2 Completeness

Completeness is a measure of the amount of information that must be collected during field investigation to allow for successful achievement of investigation objectives. The completeness goal percentage of valid data is set at 90±2% for field activities at RFAAP and is quantitatively evaluated using Equation 3 in Section 3.2.4 of the MQAP.

Soil

The number of successful analyses (useful or valid data) consists of those results not flagged "R". Completion goals for the investigation were exceeded with 99.9% successful analyses (21,005 samples), with 99.9% completion for discrete samples and 100% completion for field QC samples.

Sediment

The number of successful analyses (useful or valid data) consists of those results not flagged "R". Completion goals for the investigation were exceeded with 100% successful analyses (528 samples), with 100% completion for discrete samples and 100% completion for field QC samples.

Surface Water

The number of successful analyses (useful or valid data) consists of those results not flagged "R". Completion goals for the investigation were exceeded with 100% successful analyses (602 samples), with 100% completion for discrete samples and 100% completion for field QC samples.

Groundwater

The number of successful analyses (useful or valid data) consists of those results not flagged "R". Completion goals for the investigation were exceeded with 100% successful analyses (8 samples), with 100% completion for discrete samples and 100% completion for field QC samples.

A.1.2.3 Comparability

Comparability is the confidence with which one data set can be compared to another. Comparability was controlled by using SOPs (included in the MWP and WPA 016) developed to standardize field activities. Field equipment was calibrated consistently and properly in the field, as described in the MQAP, to assist in the comparability of measurements. Field documentation and QA audits were used to establish that protocols for sampling and measurements followed appropriate SOPs.

A.1.2.4 Sensitivity

Method sensitivity to risk screening benchmarks (RBCs, TSVs, etc.) is a primary data quality objective for this investigation. Laboratory-specific method detection limits (MDLs) and reporting limits (RLs) were presented in WPA 016 in Tables 2-5 through 2-12 with the goal of meeting these benchmarks.

Based on the review of the results, MDLs/RLs, and screening benchmarks, project data objectives for method sensitivity were met. Minor anomalies related to risk screening were identified for samples 37SB1A and 38SB1A, where required dilutions due to sludge matrix resulted in MDLs/RLs above their adjusted R-RBCs for herbicides MCPA and MCPP.

A.1.2.5 Sampling and Analysis Artifacts

Major anomalies related to sampling and analysis artifacts were not identified during data validation, which would affect the usability of data for the residual risk screening or hazardous waste characteristic evaluation. Specific minor anomalies and application of associated data qualifying flags are discussed in the data validation reports included in Appendix K.

A.1.3 Summary

The results of the data validation indicated that project DQOs (as outlined in WPA 016) were achieved for the SSP sites. Based on the data validation results, the data collected for this investigation were suitable for the intended purpose of site screening.

Table A.1
Summary of Analytes Detected in Field Quality Control Samples
SSP Report
Radford Army Ammuniton Plant, Radford, Virginia

Sample ID	EQB1		EQB2		EQB3		EQB4		EQB5		EQB6		EQBK-1	
Sample Date	10/2/2003		10/3/2003		10/7/2003		10/9/2003		10/10/2003		10/10/2003		4/19/2006	
	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r
TAL Metals (µg/L)														
Antimony	<0.552	U	<0.552	U	<0.552	U	--		<0.552	U	<0.552	U	2.3	JB,B,p
Beryllium	0.3	J	<0.295	U	<0.295	U	--		0.3	J,B,p	<0.295	U	<0.5	U
Chromium	<0.554	U	<0.554	U	<0.554	U	--		4.5		0.9	J,B,p	<5.5	U
Copper	<5.36	U	<5.36	U	<5.36	U	--		<5.36	U	<5.36	U	0.37	J
Iron	<2.95	U	25	J,B,p	4.8	J,B,p	--		21	J,B,p	7.6	J,B,p	5.1	J
Lead	0.3	J	<0.281	U	0.3	J	--		<0.281	U	<0.281	U	<0.22	U
Manganese	<3.16	U	<3.16	U	<3.16	U	--		<3.16	U	<3.16	U	1.5	J
Sodium	220	J,B,p	180	J,B,p	160	J,B,p	--		280	J,B,p	180	J,B,p	<59	U
Thallium	<0.208	U	<0.208	U	<0.208	U	--		0.5	J	0.4	J	<0.14	U
Zinc	<4.55	U	5.7	J	<4.55	U	--		<4.55	U	4.6	J	8.8	JB,B,p
TCL Method 8260 VOCs (µg/L)														
Acetone	2.9	J,B,z	2.2	J,B,z	2.3	J,B,z	--		1.6	J,J,c	1.4	J,J,c	2.7	JB,B,z
Methylene chloride	0.6	J,B,z	0.57	J,B,z	0.67	J,B,z	--		0.6	J,B,z	0.68	J,B,z	0.74	JB,B,z
Toluene	<0.214	U	<0.214	U	<0.214	U	--		<0.214	U	<0.214	U	<0.26	U
TCL Method 8270 SVOCs (µg/L)														
4-Chloro-3-Methylphenol	<0.018	U	<0.018	U	0.14	J	--		<0.018	U	<0.018	U	<0.024	U
Bis(2-ethylhexyl)phthalate	1	J,B,z	1.1	J,B,z	1.4	J,B,z	--		0.35	J,B,z	0.29	J,B,z	2.8	J
Butylbenzylphthalate	0.96	J	0.96	J	1	J,B,z	--		0.06	J,B,z	0.05	J,B,z	0.77	J
Diethylphthalate	0.1	J,B,z	0.12	J,B,z	0.11	J	--		<0.074	U	<0.074	U	0.41	J
TCL Method 8270 SVOCs TICs (µg/L)														
(Z)-9-Octadecenamide	7.08	E,NJ,t	6.54	E,NJ,t	--		--		--		--		--	
1-HEXACOSANOL	--		--		--		--		0.64	E,NJ,t	0.65	E,NJ,t	--	
1,2-Benzenedicarboxylicacid, bis(2-methy	0.6	E,NJ,t	0.61	E,NJ,t	1.24	E,NJ,t	--		0.57	E,NJ,t	--		--	
2,4,6-Triallyloxy-1,3,5-triazine	1.34	E,NJ,t	--		--		--		1.22	E,NJ,t	0.75	E,NJ,t	--	
Eicosane	0.8	E,NJ,t	0.74	E,NJ,t	--		--		--		--		--	
Erucylamide	--		--		26.3	E,NJ,t	--		9.63	E,NJ,t	6.94	E,NJ,t	--	
Heneicosane	0.59	E,NJ,t	--		--		--		--		--		--	
Nonacosane	0.86	E,NJ,t	--		--		--		--		--		--	
Pentadecane, 8-heptyl-	0.53	E,NJ,t	--		--		--		--		--		--	
Stearic Acid	--		0.52	E,NJ,t	--		--		--		--		--	
Tetratriacontane	0.64	E,NJ,t	--		--		--		--		--		--	
TCL Method 8290 Dioxin/Furans (ng/L)														
Total TCDFs	--		--		--		0.00768	J	--		--		--	

Table A.1 (Continued)
Summary of Analytes Detected in Field Quality Control Samples
SSP Report
Radford Army Ammuniton Plant, Radford, Virginia

Sample ID	Trip Blank		Trip Blank		Trip Blank		Trip Blank		Trip blank		Trip Blank	
Sample Date	10/2/2003		10/3/2003		10/7/2003		10/10/2003		4/19/2006		11/29/2006	
	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r
TAL Metals (µg/L)												
Antimony	--		--		--		--		--		--	
Beryllium	--		--		--		--		--		--	
Chromium	--		--		--		--		--		--	
Copper	--		--		--		--		--		--	
Iron	--		--		--		--		--		--	
Lead	--		--		--		--		--		--	
Manganese	--		--		--		--		--		--	
Sodium	--		--		--		--		--		--	
Thallium	--		--		--		--		--		--	
Zinc	--		--		--		--		--		--	
TCL Method 8260 VOCs (µg/L)												
Acetone	<1.07	U	<1.07	U	<1.07	U	<1.07	U,UJ,c	1.9	JB,B,z	--	
Methylene chloride	1	J,B,z	1.1	J,B,z	0.91	J,B,z	0.96	J,B,z	0.65	JB,B,z	--	
Toluene	0.27	J	--		--		0.24	J	<0.26	U	--	
TCL Method 8270 SVOCs (µg/L)												
4-Chloro-3-Methylphenol	--		--		--		--		--		--	
Bis(2-ethylhexyl)phthalate	--		--		--		--		--		--	
Butylbenzylphthalate	--		--		--		--		--		--	
Diethylphthalate	--		--		--		--		--		--	
TCL Method 8270 SVOCs TICs (µg/L)												
(Z)-9-Octadecenamide	NI		NI		NI		NI		NI		NI	
1-HEXACOSANOL	NI		NI		NI		NI		NI		NI	
1,2-Benzenedicarboxylicacid, bis(2-methy	NI		NI		NI		NI		NI		NI	
2,4,6-Triallyloxy-1,3,5-triazine	NI		NI		NI		NI		NI		NI	
Eicosane	NI		NI		NI		NI		NI		NI	
Erucylamide	NI		NI		NI		NI		NI		NI	
Heneicosane	NI		NI		NI		NI		NI		NI	
Nonacosane	NI		NI		NI		NI		NI		NI	
Pentadecane, 8-heptyl-	NI		NI		NI		NI		NI		NI	
Stearic Acid	NI		NI		NI		NI		NI		NI	
Tetratriacontane	NI		NI		NI		NI		NI		NI	
TCL Method 8290 Dioxin/Furans (ng/L)												
Total TCDFs	NT		NT		NT		NT		NT		NT	

Notes:

EQB = Equipment Blank
µg/L = Microgram Per Liter
ng/L = Nanogram per Liter
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
TIC = Tentatively Identified Compound
LQ = Laboratory Qualifier (See Table A.3)
VQ = Validation Qualifier (See Table A.2)
r = Reason Code (See Table A.4)
NI = Not Identified
NT = Not Tested

Table A.2
USEPA Region III
Data Validation Qualifiers
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Codes Relating to Identification (Confidence Concerning Presence or Absence of Compounds)

Qualifier	Description
U	Not detected. The associated number indicates the approximate sample concentration necessary to be detected.
B	Not detected substantially above the level reported in laboratory or field blanks.
R	Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.
N	Tentative Identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.

Codes Relating to Quantitation (can be used for both positive results and sample quantitation limits)

B	Not detected substantially above the level reported in laboratory or field blanks.
N	Tentative Identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.
J	Analyte present. Reported value may not be accurate or precise.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
UL	Not detected, quantitation limit is probably higher.

Other Codes

Q	No analytical result.

Notes:

1. Source of Data Qualifier Codes: United States Environmental Protection Agency (USEPA) Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses, April 1993.
2. Source of Data Qualifier Codes: United States Environmental Protection Agency (USEPA) Region III Modifications to National Functional Guidelines for Organic Data Review Multimedia, Multi-Concentration (OLMO1.0-OLMO1.9), September 1994.

Table A.3
Laboratory Data Qualifiers
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Organic Compounds

Qualifier	Description
U	The compound was analyzed for but not detected. The reporting limit will be adjusted to reflect any dilution, and for soil, the percent moisture.
J	Estimated value. The flag is used as detailed below:
	1) When estimating a concentration for tentatively identified compounds (TICs) where a response factor of 1.0 is assumed for the TIC analyte.
	2) When the mass spectral and retention time data indicate the presence of a compound that meet the volatile and semi-volatile gas chromotography/mass spectra (GC/MS) identification criteria, and the result is less than the reporting limit but greater than zero
	3) When the retention time data indicate the presence of a compound that meets the pesticide/Arochlor or other GC or High Performance Liquid Chromotography (HPLC) identification criteria, and the result is less than the reporting limit but greater than zero.
N	Presumptive evidence of a compound.
P	Greater than 40% difference for detected concentrations between the two GC or HPLC columns.
C	GC or HPLC identification has been confirmed by GC/MS.
B	Analyte found in associated blank as well as in the sample.
E	Concentration exceeded the upper level of the calibration range of the instrument for that specific analysis.
D	Diluted sample.

Inorganic Compounds

Concentration Qualifier	Description
U	The compound was analyzed for but not detected. This reported value was obtained from a reading that was less than the instrument detection limit (IDL). The IDL will be adjusted to reflect any dilution, and for soil, the percent moisture.
B	Analyte was analyzed for and the reported value was obtained from a reading that was less than the reporting limit but greater than or equal to the IDL.
Q Qualifier on Form I	Description
E	Estimated value when the serial dilution results are not within 10%.
N	Sample spike recovery is outside of control limits.
*	Sample and associated duplicate are not within control limits.

Table A.4
Data Validation Reason Codes
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

GC/MS Organics		GC and HPLC Organics		Inorganics and Conventionals	
Code	Interpretation	Code	Interpretation	Code	Interpretation
a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence
c	Calibration failure; poor (RRF) or unstable (%D) response	b	Instrument performance failure or poor chromatography	c	Calibration failure
d	MS/MSD or LCS/LCSD RPD imprecision	c	Calibration failure; poor or unstable (%D) response	d	MS/MSD or LCS/LCSD RPD imprecision
e	Sample preservation or cooler temperature failure	d	MS/MSD or LCS/LCSD RPD imprecision	e	Sample preservation or cooler temperature failure
f	Field duplicate imprecision	e	Sample preservation or cooler temperature failure	f	Field duplicate imprecision
h	Holding time violation	f	Field duplicate imprecision	h	Holding time violation
I	Tuning Failure or poor mass spectrometer performance	g	Dual column confirmation imprecision	k	Laboratory duplicate imprecision
j	LCS recovery failure	h	Holding time violation	l	LCS recovery failure
l	MS/MSD recovery failure	I	LCS recovery failure	m	MS/MSD recovery failure
m	Internal standard failure	l	MS/MSD recovery failure	n	ICP interference check sample failure
p	Air bubble (> 6 mm or ¼ inch) in VOC vials	m	Air bubble (> 6 mm or ¼ inch) in VOC vials	o	Calibration blank contamination
q	Concentration exceeded the linear range	p	Concentration exceeded the linear range	p	Preparation blank contamination
r	linearity (%RSD or r) failure in initial calibration	q	linearity (%RSD or r) failure in initial calibration	q	Concentration exceeded the linear range
s	Surrogate failure	r	Surrogate failure	r	Linearity failure (Darren) in calibration or MSA
t	Tentatively identified Compound	s	No confirmation column	s	Serial dilution failure
w	Identification criteria failure	u	Identification criteria failure	v	Post-digestion spike failure
x	Field and/or equipment blank contamination	w	Field and/or equipment blank contamination	x	CRDL standard recovery failure
y	Trip blank contamination	x	Trip blank contamination	z	Field and/or equipment blank contamination
z	Method blank and/or storage blank contamination	z	Method blank and/or storage blank contamination	w	Laboratory storage blank contamination

Notes:

The reason code indicates the type of quality control anomaly that led to the application of the data validation flag.

APPENDIX B

SSP GUIDANCE DOCUMENT

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1.0 INTRODUCTION

The Radford Army Ammunition Plant (RFAAP) is an active military installation located in the mountains of southwest Virginia, and covers approximately 4,080 acres in Montgomery and Pulaski County, Virginia.

The United States Environmental Protection Agency (USEPA) issued a RCRA Corrective Action Permit to Alliant Ammunition and Powder Company (Alliant) and the U.S. Department of the Army (Army) on October 31, 2000. Within the RCRA Corrective Action permit is a listing of 31 identified Site Screening Areas (SSAs) which are to be investigated in accordance with this EPA approved Site Screening Process (SSP). Should additional SSAs be identified at RFAAP, a site screening will need to be completed in accordance with this SSP.

This SSP has been developed as the central document describing how site screening will be applied to the RFAAP. Overall, the SSP is devised to expedite investigations of SSAs at RFAAP to determine what level of evaluation is appropriate for these identified areas. The SSP will help determine whether there have been releases of hazardous substances, pollutants, contaminants, hazardous wastes, or hazardous constituents to the environment from an SSA, and determine whether an SSA should proceed further through the RFI process, be the subject of an interim removal action or be considered for no further action.

Once a SSA is identified, the following five distinct tasks will be undertaken:

- Performance of a Desktop Audit and site visit to determine the scope of the SSP site-specific Work Plan(s);
- Development of an SSP site-specific Work Plan outlining a Sampling and Analysis Plan as well as a risk screening plan (human health and ecological, as appropriate) for EPA approval;
- Performance of SSP field work in accordance with the approved SSP Work Plan;
- Evaluation of SSP data and completion of pre-remedial risk screening; and
- Determination of the need for further investigation of the SSA, an interim removal action at the SSA or preparation of a No Further Action Decision Document, per the RCRA Corrective Action permit, based on results of the SSP and risk screening.

The following sections detail these SSP tasks.

2.0 SITE VISIT AND DESKTOP AUDIT

The purpose of the Desktop Audit is to evaluate and document, through review of existing information, if operations at the SSA(s) have resulted in the release of hazardous substances, pollutants, contaminants, hazardous wastes or hazardous constituents to the environment. The Desktop Audit process includes a search of all documents related to operations at the SSA as well as interviews with personnel knowledgeable about the site. Available information for each SSA, including location and a site map, description of past and current land uses, and a description of releases and associated cleanups, will form the basis for the Desktop Audit. Other information sources will include the administrative record and other local, state and federal documentation containing information pertinent to the site.

Typical existing information that will be examined during the Desktop Audit will include site use, ownership and operational history, groundwater and surface water use and characteristics, soil exposure characteristics, and air exposure pathways. This information can be obtained from maps, publications by the United States Geological Survey (USGS) and state geological surveys, regional databases and geographic information systems, and aerial photography. On the basis of information collected during the Desktop Audit, a list of chemicals potentially stored, handled, released, or disposed at each SSA will be compiled.

In addition to the Desktop Audit, a site visit will be conducted at each SSA. The site visit will include a visual inspection of the SSA to aid in site characterization, including identifying potential contaminant sources; chemical migration pathways; potential human and ecological receptors; and receptor exposure pathways. Additionally, potential media to be sampled and sampling locations will be identified for the SSP.

Results of the Desktop Audit and site visit will be presented in a summary report. Included in the report will be an SSA-specific Conceptual Site Model (CSM) depicting potential contaminant sources, environmental and exposure pathways of concern, and potential human and ecological receptors. The CSM will maximize the usability of analytical data derived from site characterization efforts for subsequent risk assessments, and will form the basis for any additional data collection to support the human health and ecological risk screening. These results will be used in formulating the SSP Work Plan, including the need for human health and ecological risk screening.

3.0 DEVELOPMENT OF SITE SCREENING INSPECTION SAMPLING AND ANALYSIS STRATEGY

A site-specific Work Plan will be developed for each SSA investigated under the SSP. The Work Plans will reference the Desktop Audit Summary, providing a detailed description of historical information, SSA conditions, results of previous investigative work and results of the site visit. The Work Plans will also present a Sampling and Analysis Plan (SAP) that describes the number, types and locations of samples to be collected, sample analyses, and the rationale for the sampling plan. The purpose of sample collection and analysis will be to assess the presence or absence of hazardous substances, contaminants, hazardous wastes, or hazardous constituents, and to provide data for performing human health and ecological risk screening in order to evaluate if there is a potential threat to human health or the environment at the SSA.

Media sampled during the SSP will be identified based upon Desktop Audit and site visit findings, and approval of the USEPA Region III.

Potential media of interest in the SSP may include surface soil (0 to 1 feet below ground surface [bgs] 0-6 inches for constituents other than VOCs, 6-12 inches for VOCs), subsurface soil, groundwater, surface water, sediment, and animal and plant tissue (e.g., fish). Where appropriate, geophysical techniques will be used to aid in placement of groundwater and soil sample locations and to confirm and delineate suspected buried waste material identified during the Desktop Audit and site visit. Field screening for explosives using immunoassay-type sampling kits can be performed at SSAs (a complete list of all explosive compounds and respective detection limits using this method will be included in the Work Plan). However, immunoassay-type analytical data cannot be used for risk screening, unless it can be shown through confirmation sampling and analysis that the results of the field test kits are of equivalent precision and accuracy to standard methods of analysis.

Groundwater samples collected during SSP investigations may be obtained via direct push techniques (DPT) or from groundwater monitoring wells, depending on site conditions and data needs. For groundwater samples collected from monitoring wells, only unfiltered organic and metals results will be considered in the assessments (except in circumstances where monitoring wells do not produce samples with sufficiently low solids for a reasonable risk screening to be performed). For DPT groundwater samples, only the filtered metals and unfiltered organic results will be considered in the assessment. Groundwater parameters measured during field activities should include pH, Eh, dissolved oxygen, specific conductance, temperature, salinity, and turbidity, as appropriate, depending on the medium- and SSA-specific conditions.

All environmental media samples collected during the SSP will be analyzed for the full suite of Contract Laboratory Procedure (CLP) constituents and other constituents based on the findings of the Desktop Audit including additional analytes requested by EPA. The analytical target list will include Target Compound List (TCL) volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), pesticides, polychlorinated biphenyls (PCBs) and dioxins, and Target Analyte List (TAL) inorganic chemicals, including cyanide. Based on past uses of specific SSAs for explosives treatment, and the results of field screening immunoassay methods, it may be necessary to analyze specific samples for nitramine/nitroaromatic compounds. Depending on the history of the SSA and other available information, it may be necessary to analyze specific

samples for perchlorates. Soil samples should be analyzed for physical properties (e.g., bulk density, grain size, specific gravity, percent moisture, and total organic carbon [TOC]), as necessary.

Analytical methods used in the SSP will generally be USEPA CLP/Standard Methods and/or SW-846 Methods. Polynuclear aromatic hydrocarbons (PAHs) and pesticides/PCBs may be analyzed using low detection methods. For example, the National Oceanographic and Atmospheric Administration (NOAA) Status and Trends Methods (USEPA Method No. 1668 [GC/MS, congener standards]; USEPA, 1995d) will be used to meet PCB method detection limits (MDLs) required for the human health and ecological risk screening. An analysis of risk-based concentrations (RBCs) and Biological Technical Assistance Group (BTAG) screening levels relative to analytical reporting limits (RLs) will be conducted as part of Work Plan preparation to ensure that RLs do not exceed screening concentrations (to the greatest extent practicable).

CLP laboratory analytical data will be subjected to data validation in accordance with the Innovative Approaches for Validation of Organic and Inorganic Data, as amended by USEPA Region III (USEPA, 1995a). Section 5 describes the data validation and data evaluation process that will be used in the SSP.

4.0 PERFORMANCE OF FIELD WORK

All SSP field work at SSAs will be performed in accordance with the Master Project Plans for RFAAP and the SSA-specific SSP Work Plan described in Section 3.0 above. The Master Project Plan, including a Field Sampling Plan, Quality Assurance Project Plan, and Health and Safety Plan, addresses the full range of potentially applicable activities that could be required throughout the SSP.

5.0 DATA VERIFICATION, VALIDATION AND USABILITY ASSESSMENT

5.1 Data Verification

Data will be verified in accordance with USEPA Region III Innovative Approaches for Data Validation (USEPA, 1995). Verification for organic data will be performed at Manual Level M2 and the verification for inorganic data will be performed at Manual Level IM1 (if a determination is made that an SSA does require a RFI and formal baseline risk assessment, the existing SSP data will be re-validated at the M3 and IM2 level, respectively). Particular emphasis will be placed on holding time compliance, equipment calibration, spike recoveries, and blank results, although all required elements of the verification process will be considered. The analytical results for nonCLP parameters will be verified based on the Region III Modifications to the National Functional Guidelines further modified to reflect the acceptance specifications of the referenced method to the extent that those specifications differ from those in the Region III Modifications to the National Functional Guidelines. Data qualifiers will be assigned based on the results of verification findings. Laboratory deliverable packages will be equivalent to USEPA CLP deliverable packages, containing complete quality control (QC) summary reports, quality assurance (QA) documentation, and raw data.

Data qualifiers provide information pertaining to the degree of confidence to be considered relative to the presence (or absence) of reported chemicals, and also identify numerical results considered to be less accurate and/or precise than is normal for the method. A list of the data qualifiers that may be applied during the verification effort and their definitions are presented below.

Data Qualifier Codes	
J	The analyte was positively identified. The associated result is the approximate concentration of the analyte in the sample.
K	The analyte was detected. Reported value may be biased high.
R	Serious analytical problems were encountered and quality control criteria were not met. The data point is rejected. The analyte may or may not be present in the sample.
N	Tentative identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts
L	The analyte was detected. Reported value may be biased low.
U	The analyte was analyzed for, but not detected above the reported quantitation limit.
UL	The analyte was not detected. The reported quantitation limit is approximate and may be lower.
UJ	The analyte was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
B	The analyte was analyzed for, but was not detected substantially above the level reported in the laboratory or field blanks.

Data tables must report non-detects with the following format: < xx, where xx is the sample reporting limit (but not the method detection limit, the instrument detection limit, the contract detection limit, etc.). Thus, all data tables will have either a blank to show that a constituent was not analyzed, a number to show the numeric value of the detected constituent, or a less than symbol followed by the sample reporting limit. The usual data qualifiers will be added as necessary. A data validation report with hand annotated Form 1s will be prepared to present data validation findings.

5.2 Data Validation and Usability Assessment

Data that are compliant with the minimum specifications of the subject analytical methods, still may not provide sufficient qualitative and/or quantitative quality to make decisions at the requisite statistical confidence. To assess risks associated with chemicals of potential concern (COPCs) at a SSA, data of known quality must be used (USEPA, 1992a). An understanding of analytical data quality is necessary for evaluation of uncertainties related to the data, and consideration of these uncertainties in the decision-making process for the SSAs. To facilitate this goal, data from the SSPs will be evaluated for quality and usability prior to its use in the human health and ecological risk screening.

Guidance such as Guidance for the Data Quality Objective Process (EPA QA/G-4, 1994), Guidance for the Data Quality Assessment Process (EPA QA/G-9, 2000), Risk Assessment Guidance for Superfund, Volume I (USEPA, 1989), and Guidance for Data Usability in Risk Assessment (USEPA, 1992a) will be used to evaluate data for usability in the human health and ecological risk screening. Data will be evaluated for quality based on information in the data verification report. Specifically, data will be evaluated for appropriateness of analytical methods and qualifiers, significant blank contamination, and tentatively identified compounds (TICs). Further, and perhaps more importantly, biases and variability inherent in the data will be assessed in relation to the relative interval between the risk screening level and the reported concentration. Additionally, given that a statistical relationship can be defined between variability, the number of samples in a given data set, and the statistical confidence with which a given conclusion may be drawn, the sampling plan and reported results will be evaluated in relationship to the DQOs established during the planning process.

All validated data that is not qualified and data that is qualified with J, L, K, U, UL, UJ, and B will be used to identify COPCs in the risk screening process, unless the inherent limitations of the analytical method and/or matrix effects obviate this use. Data qualified as rejected (i.e., R) will not be used in COPC identification.

Analytical results for the essential nutrients, calcium, sodium, potassium, and magnesium, in both solid and aqueous media, will not be considered in the assessments. All other metals, including iron, and all organic chemicals, including laboratory contaminants not disqualified in the data verification and validation processes, will be considered in the COPC identification process if detected at least once in environmental samples at an SSA.

5.3 Tentatively Identified Compounds

Chemical analysis to identify and quantify organic compounds is performed with gas chromatography-mass spectrometry (GC-MS) methods. The GC-MS instrument is calibrated for a series of target analytes using chemical standards of known concentration and purity. Quantification of these target analytes is performed against specific internal standards as identified in the respective method. Identification of these target analytes is based on a comparison of the unknown analyte to the chemical standards used during calibration based on the analyte's retention time and mass spectra.

Chromatographic peaks in volatile/semivolatile fractions analyses that are not target analytes, surrogates, or internal standards are potential Tentatively Identified Compounds (TICs). TICs must be qualitatively identified by a National Institute of Standards and Technology (NIST) mass spectral library search and the identification assessed by the data reviewer. For each sample, the laboratory conducts a mass spectral search of the NIST library and report the possible identity for the 10 VOC and/or 20 SVOC largest fraction peaks that are not surrogates, internal standards, or target compounds, but that have an area or height greater than 10 percent of the area or height of the nearest internal standard. TIC results are reported for each sample on the Organic Analyses Data Sheet (Form I - VOC-TIC or SVOC -TIC)

TICs will be reported and included in the COPC identification based upon the degree of match, evidence of similar pattern, analyst professional judgment, availability of toxicity data (e.g., IRIS, HEAST, or NCEA reference doses and/or slope factors), and consultation with EPA Region III (see Section 6.1.1.1). The top 20 TICs will be reported by name and CAS Registry number and may be quantified. Quantification of TICs will be based on input from EPA staff. Positive identification and quantification of TICs will be accomplished by acquiring the appropriate standards and calibrating the GC-MS for the tentatively identified compounds. TICs that lack toxicity data will be discussed in the uncertainty section of the screening risk assessment results.

6.0 SCREENING PROCEDURES

Human health and ecological screening procedures will be performed as a part of the SSP. Section 6.1 presents the methodology for the human health screening procedures and Section 6.2 presents the methodology for the ecological risk screening .

6.1 Human Health Screening Procedures

Human health screening procedures will be conducted in accordance with the USEPA Risk Assessment Guidance for Superfund (RAGS) (USEPA, 1989 and 1991b) and USEPA Region III guidance (USEPA, 1991c, 1993a, and 1998a) with modifications. The purpose of the screening step is to evaluate site data with respect to conservative criteria so that sites requiring no further action can be eliminated from further consideration. This process will also be used to identify sites requiring further evaluation to proceed through additional steps. The conceptual site model (CSM) developed in Section 2.0 will be used to identify those media that are associated with identified exposure pathways. If potential current and future exposure pathways associated with a particular medium are determined to be incomplete, then it may not be necessary to carry that medium through the screening process, given approval by EPA.

The screening procedure will involve the following steps:

1. Identification of COPCs and Cumulative Risk Screening

2. Chemical-Specific Screening for Lead and Iron

3. Comparison to Soil Screening Levels (SSLs)

4. Comparison to ARARs

5. Background Comparisons

These steps are described in the following sections.

6.1.1 Identification of COPCs and Cumulative Risk Screening

6.1.1.1 Identification of COPCs for Human Health Cumulative Risk Screening

As stated previously, chemicals detected at least once in environmental samples at an SSA will be evaluated in the COPC identification stage of the human health screening. The essential nutrients calcium, sodium, potassium, and magnesium; chemicals disqualified in the validation process; and TICs not positively identified, will be eliminated as COPCs.

COPCs will be identified by comparing maximum detected concentrations (MDCs) in a specific medium with chemical-specific risk-based screening criteria, unless the data display the statistical properties required to calculate a valid 95% upper confidence limit (UCL). If this is the case, then the 95% UCL will be employed. Chemicals with MDCs exceeding risk-based

criteria will be identified as COPCs and will be carried through to the cumulative risk screening step of the assessment.

Soil and Sediment. COPCs in surface and subsurface soil and sediment will be identified by comparing MDCs (or a 95% UCL if appropriate) in these media to Risk-Based Concentrations (RBCs) in the most recent version of the USEPA Region III Risk-Based Concentration Table for soil ingestion using the residential and industrial scenarios (USEPA 2000).

For soils and sediments that are exposed a significant portion of the year (i.e., > 6 months/year), screening levels shall correspond, or be adjusted to correspond, to an increased cancer risk of 1 x 10-6 and a noncancer Hazard Quotient (HQ) of 0.1. COPCs can be identified if the MDCs (or a 95% UCL if appropriate) are greater than the screening values for the ingestion and/or inhalation pathways. For sediments that are not exposed, comparisons to adjusted soil screening levels may be used to decide on the need for further evaluation (e.g., quantitative risk assessment), further investigation or response action.

Groundwater and Surface Water. COPCs in groundwater and surface water will be identified by comparing MDCs (or a 95% UCL if appropriate) of chemicals in these media to RBCs in the most recent version of the USEPA Region III Risk-Based Concentration Table for tap water (USEPA 2000), and to federal and state Maximum Contaminant Levels (MCLs) for groundwater and surface water used as a source of drinking water.

For groundwater, as well as surface water that may be a source of drinking water, RBC screening levels shall correspond, or be adjusted to correspond, to an increased cancer risk of 1 x 10-6 and a noncancer Hazard Quotient (HQ) of 0.1. For other surface water, comparisons to adjusted groundwater screening levels may be used to decide on the need for further evaluation (e.g., quantitative risk assessment), further investigation, or response action. Note that all ground water is considered a source of drinking water unless deemed non-potable (i.e., Class III).

Fish. COPCs in fish will be identified by comparing MDCs (or a 95% UCL if appropriate) of chemicals in fish tissue samples to screening level RBCs for fish in the USEPA Region III Risk-Based Concentration Table (USEPA, 2000). Screening levels shall correspond, or be adjusted to correspond, to an increased cancer risk of 1 x 10-6 and a noncancer Hazard Quotient (HQ) of 0.1.

Chemicals Lacking RBCs

For chemicals lacking Region III published RBCs, but having available associated toxicity data that are peer-reviewed, risk assessors will obtain information from the following sources, which are listed in order of preference: USEPA's Integrated Risk Information System (IRIS), Health Effects Assessment Summary Tables (HEAST), and provisional values from the National Center for Environmental Assessment (NCEA). From these sources, the Army will make a good faith effort to propose alternative screening values, for EPA concurrence.

Summary. In summary, a detected chemical will be retained as a COPC for a specific medium if the MDC (or a 95% UCL if appropriate) is greater than the corresponding screening criteria described above.

6.1.1.2 Cumulative Risk Screening

The cumulative risk screening process will consist of calculating ratios between the maximum exposure point concentrations (EPCs) of COPCs in an environmental medium and the corresponding USEPA Region III residential and industrial RBCs. COPCs are those chemicals brought forward from the COPC identification step (see Section 6.1.1.1). Carcinogenic and noncarcinogenic effects will be evaluated for exposure to chemicals in each environmental medium sampled.

6.1.1.2.1 Estimation of Exposure Point Concentrations

For purposes of this screening process, maximum detected concentrations (MDCs) (or a 95% UCL if appropriate) will be considered in the cumulative risk screening as representative exposure point concentrations (EPCs) for the SSA as a conservative measure. The selection of the MDC for the exposure point concentration in most cases is motivated by the recognition that in many cases when the number of samples is small, the alternative approach reverts to the maximum detected concentration because the calculated 95% UCL exceeds the MDC.

6.1.1.2.2 Human Health Effects - Carcinogens

The potential for carcinogenic risk will be evaluated by estimating excess cancer risk for each COPC. Using the maximum EPC and the respective screening level RBC value, excess residential and industrial cancer risk can be estimated using the following formula:

$$Excess\,Cancer\,Risk = TR\frac{Max.EPC_i}{RBC_i}$$

Where:

TR	=	The target lifetime cancer risk of 1x10-6
EPCi	=	EPC of COPCi detected in soils and fish (mg/kg) or water (g/L)
RBCi	=	RBC for COPCi in soils and fish (mg/kg) or water (g/L) based on carcinogenic effects at the TR stated above

Finally, the cumulative residential and industrial excess cancer risk is estimated for each SSA. The cumulative excess cancer risk for exposure to multiple COPCs is estimated using the following equation:

$$Cumulative\ Excess\ Cancer\ Risk = \sum \left[TR\ x \frac{Max.EPC_i}{RBC_i} \right]$$

In accordance with 40 Code of Federal Regulations (C.F.R.) 300.430, carcinogenic risk within the benchmark range of 1x10-4 (1 cancer case in 10,000) to 1x10-6 (1 cancer case in 1,000,000) is generally considered acceptable. The following statement is from 40 C.F.R. 300.430 (2000): "For known or suspected carcinogens, acceptable exposure levels are generally concentration levels that represent an excess upper bound lifetime cancer risk to an individual of between 10-4 to 10-6 using information on the relationship between dose and response. The 10-6 risk level shall be used as the point of departure for determining remediation goals for alternatives when ARARs are not available or are not sufficiently protective because of the presence of multiple contaminants at a site or multiple pathways of exposure."

Multiplying the EPC/RBC ratio by USEPA's point of departure risk level, 10-6, results in an excess cancer risk estimate for the COPC. Excess cancer risk estimates for all COPCs will be summed to account for potential carcinogenic effects associated with multiple chemical exposures (USEPA, 1989) for each medium. The results of cumulative risk screening will be evaluated as follows:

- If the calculated cumulative excess cancer risk is greater than or equal to 1 x 10^{-5} for any of the medium, then a quantitative risk assessment would be performed for the SSA, or

- If the calculated cumulative excess cancer risk is: 1) below 1 x 10^{-5} for all media; and 2) no other screening criteria, as defined by this document, have been exceeded, then no further action (NFA) would be recommended for the SSA.

6.1.1.2.3 Human Health Effects - Noncarcinogens

The potential for adverse noncarcinogenic health effects will be evaluated by calculating a residential and industrial HQ for each COPC. Using the maximum EPC and a respective noncarcinogenic RBC, a residential or industrial HQ can be estimated with the following formula:

$$HQ = THQ \frac{Max.EPC_i}{RBC_i}$$

Where: THQ = The target HQ of 0.1
EPCi = EPC of COPCi detected in soils and fish (mg/kg) or groundwater (g/L)
RBCi = RBC for COPCi in soils and fish (mg/kg) or Groundwater (g/L) based on noncarcinogenic effects at the THQ stated above.

Finally, the cumulative residential and industrial non-carcinogenic hazard index (HI) for exposure to multiple COPCs is estimated as follows:

$$Cumulative\ Noncarcinogenic\ HI = \sum \left[THQ\, x \frac{Max.EPC_i}{RBC_i} \right]$$

Per USEPA guidance for a Baseline Risk Assessment, when the HI exceeds 1, there is a potential for adverse noncarcinogenic health effects (USEPA, 1989). Generally, the more the HI exceeds unity, the greater the potential for adverse health effects. Additionally, when the HI exceeds 1, and multiple chemicals contribute to the exceedance, the HI is segregated on the basis of toxic effects and target organs (i.e., hepatic, renal, respiratory, cardiovascular, gastrointestinal, hematological, musculoskeletal, dermal, ocular effects, neurological, reproductive, developmental, and immune system).

For the cumulative risk screening procedure, HI segregation will involve obtaining the most recent and reliable noncarcinogenic health effects data for COPCs, such as data in the Integrated Risk Information System database (EPA) and databases developed by the Agency for Toxic Substances and Disease Registry (ATSDR). Health effects will be considered for only chronic exposure to COPCs. For COPCs with multiple target organs, the organ that the chemical primarily targets will be considered in hazard segregation.

The results of the cumulative hazard screening will be evaluated as follows:

- In accordance with Region III guidance for risk screening, if the cumulative noncarcinogenic HI for a SSA, computed by this method, is greater or equal than 0.5 for any target organ, then a quantitative risk assessment would be performed for the SSA, or

- If the cumulative noncarcinogenic HI for an SSA, computed by this method, is: 1) less than 0.5 for all target organs; and 2) no other screening criteria, as defined by this document, have been exceeded, then NFA would be recommended for the SSA.

6.1.1.3 Uncertainty Analysis

Uncertainties associated with the cumulative risk screening will be qualitatively evaluated to determine the accuracy of the approach. Factors that may contribute to uncertainty include the use of RBC age-adjusted ingestion and inhalation rates, the use of toxicity information provided by NCEA when RBCs are not available, and the level of uncertainty due to a lack of dermal risk estimates. Uncertainty in the assessment could also arise if health-based RBCs are less than analytical method detection limits.

Uncertainty is associated with the use of RBCs and SSLs because they do not consider dermal uptake. The Site Screening Process is geared towards a risk-based identification of COPCs and preliminary assessment of human and ecological risks that is objective and quantitative. As such, it hinges on the availability of appropriate, risk-based screening levels. No such levels have been identified for dermal exposures to soil, sediment, water or air. Given the conservative nature of the screening process (e.g., use of MDC for exposure point concentrations, use of residential

screening level RBCs for soil and groundwater), it is considered very unlikely that omission of dermal exposures in the risk screening process will result in failure to identify a SSA that would require further investigation or response. To guard against this possibility, contaminant concentrations at all SSAs that pass the risk screening will be scrutinized for the occurrence of contaminants that are known to be easily absorbed through the skin, and if necessary, dermal risks for selected contaminants will be calculated in accordance with USEPA's Dermal Exposure Guidance (USEPA, 1992c, 1997a). These dermal risks may be added to the Cumulative Excess Cancer Risk or Cumulative Noncarcinogenic HI computed above.

6.1.2 Chemical-Specific Screening for Lead and Iron

6.1.2.1 Lead

If lead concentrations in soil are greater than 400 mg/kg (USEPA, 1994a), or lead concentrations in groundwater or surface water are greater than 15 g/L (USEPA 1996b), then potential risk associated with lead will be evaluated using the IEUBK model (USEPA, 1994b). The model will be run using site-specific input parameters based on SSP findings and consultation with USEPA Region III. If the percentage of children expected to have blood lead levels of 10 micrograms per deciliter (µg/dL) or greater exceeds 5%, then further investigation or response action will be required for the SSA.

6.1.2.2 Iron

If iron concentrations in soil or water result in an HQ of 0.5 or greater, then a "margin of exposure" evaluation will be performed. Risks from exposure to iron will be characterized by comparing estimated iron intake to the recommended dietary allowance (RDA) and concentrations known to cause adverse effects in children (NCEA, 1996).

6.1.3 Comparison to Soil Screening Levels (SSLs)

USEPA's Soil Screening Guidance (USEPA, 1996a) will be used as the source of information for three types of SSLs, which address:

- Chemical migration of VOCs from subsurface soil to air;
- Chemical migration of contaminants from soil to air via fugitive dust; and
- Chemical migration of contaminants from soil to groundwater.

MDCs (or a 95% UCL if appropriate) of chemicals found in soil and sediment will be compared to screening levels for leaching of contaminants to groundwater, i.e., soil-to-groundwater screening levels (USEPA, 1996a). Many soil-to-groundwater screening values can be found in the USEPA Region III RBC Tables. A dilution attenuation factor (DAF) of 20 may be used unless groundwater is considered to be shallow. In this case, a site-specific DAF should be calculated. Chemicals found at concentrations exceeding soil-to-groundwater screening levels will be evaluated in a qualitative manner to assess the need for further assessment, investigation,

or response action. Geotechnical information such as Total Organic Carbon (TOC), pH, groundwater characteristics, etc., will be an integral part of the qualitative evaluation. In particular, the SSL comparison will be evaluated with respect to its application to site conditions, such as the karst environment which is present throughout RFAAP. Based on the qualitative evaluation, and other relevant information, a recommendation will be made as to whether further evaluation, investigation, or response action should take place for the SSA.

6.1.4 Comparison to ARARs

MDCs (or a 95% UCL if appropriate) of chemicals found at each SSA will be compared to Applicable or Relevant and Appropriate Requirements (ARARs), including, but not limited to: federal and Virginia Maximum Contaminant Levels (MCLs) under the Safe Drinking Water Act, federal Ambient Water Quality Standards under the Clean Water Act, Virginia Water Quality Criteria, Virginia AST/UST TPH guidance level for soil (100 mg/kg) and Virginia AST/UST TPH guidance level for groundwater (1 mg/L) (VDEQ, 1995). Chemicals which are found at concentrations greater than ARARs will be identified. If an MDC (or a 95% UCL if appropriate) is greater than one or more ARARs, a recommendation will be made as to whether further evaluation, investigation, or response action should take place for the SSA. EPA may decide that further evaluation, investigation or response action is required at a SSA, based upon consultation with the Commonwealth if State ARARs are involved.

6.1.5 Background Comparison

As a final step in the human health screening process, MDCs of chemicals identified as COPCs will be compared to the EPA-approved site-specific background concentrations shown in the following table. This table includes inorganic chemicals whose 95% upper tolerance limit (UTL) are greater than residential RBC values and are based on the inorganic background data collected at RFAAP.

Facility-Wide Point Estimates for Soil

[Units in mg/kg]

Chemical	Minimum Concentration	Maximum Concentration	95% UTL of the Mean
Aluminum	3,620	47,900	40,041
Arsenic	1.2	35.9	15.8
Chromium	6.3	75.8	65.3
Iron	7,250	67,700	50,962
Manganese	16.7	2,040	2,543
Thallium	1.3	5	2.11
Vanadium	12.2	114	108

Based on the background comparison, and other relevant information, a recommendation will be made as to whether further investigation or response action is warranted at each SSA.

6.1.6 Summary of Human Health Risk Screening Procedures

The results of each screen will be summarized. If COPCs have been identified, in a particular medium, the SSA will be subject to further evaluation, such as a quantitative risk assessment. The results of the SSP will also be used to further refine the CSM.

6.2 Ecological Risk Screening Procedures

The USEPA Risk Assessment Forum (1992) recommended a general framework for conducting ecological risk assessments (ERAs). The Forum framework is presented in Figure 6-1. USEPA has since refined the framework and prepared ERA guidance (USEPA 1997). The approach taken for the SSA ecological screening at RFAAP follows the ERA eight-step approach in the USEPA guidance. Other guidance documents which may be consulted during the ecological risk screening process include the USEPA Region III BTAG ERA guidelines (USEPA 1995b), and the Tri-Service Procedural Guidelines for ERAs, Volume 1 (Wentsel et al, 1996).

The eight-step process is summarized in Figure 6-2. Since this is an ecological risk screen, the process focuses on Steps 1 and 2. These steps are intended to provide a foundation of information pertaining to ecological resources and potential interactions with site-related contamination in order that risk managers can make conservative decisions regarding ecological risks at individual SSAs.

The following steps will be followed for the ecological risk screening :

Site Reconnaissance

Problem Formulation

Exposure Assessment

Ecological Effects Assessment

Risk Characterization

Figure 6-1 Ecological Risk Assessment Framework (USEPA, 1997)

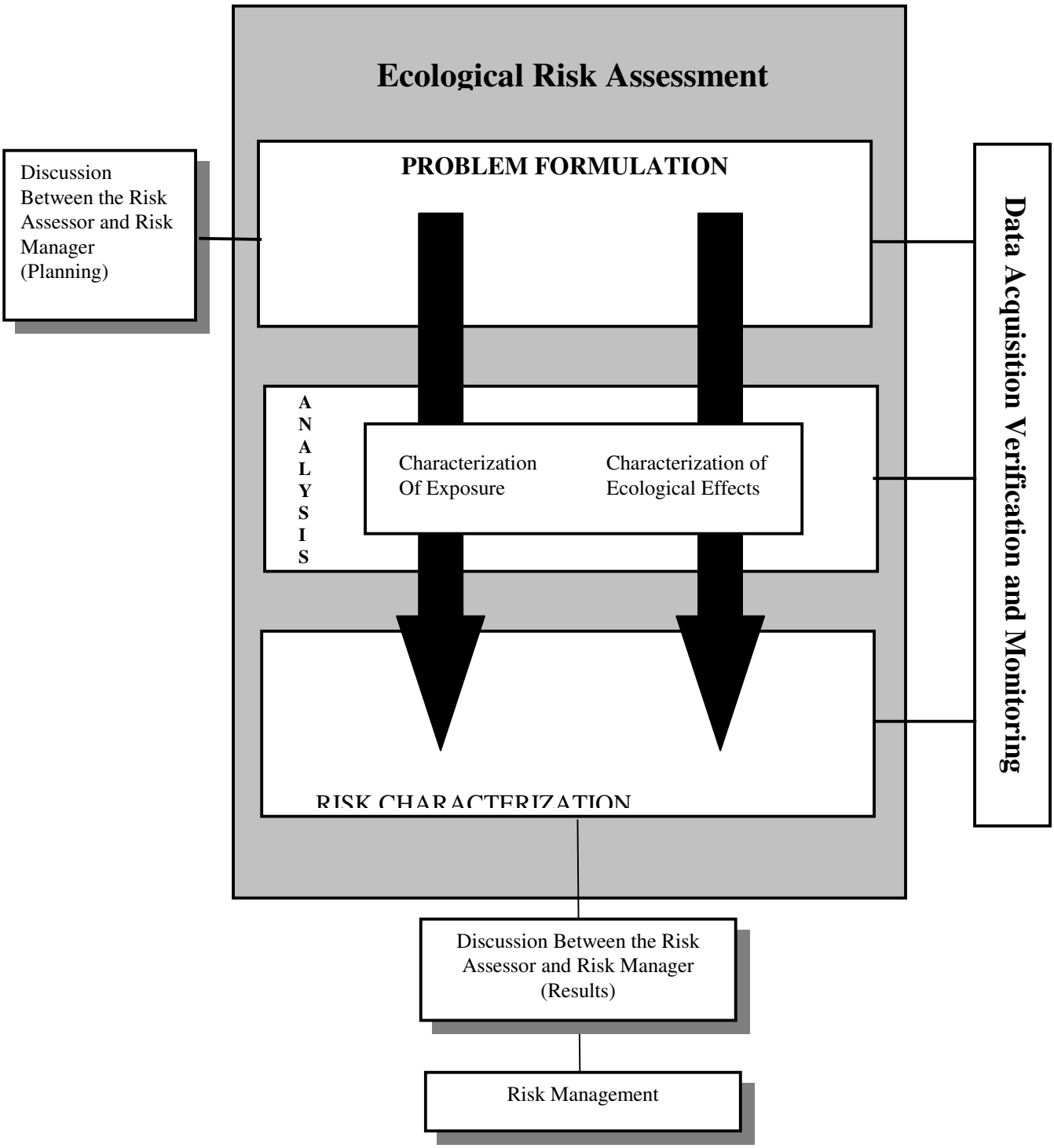
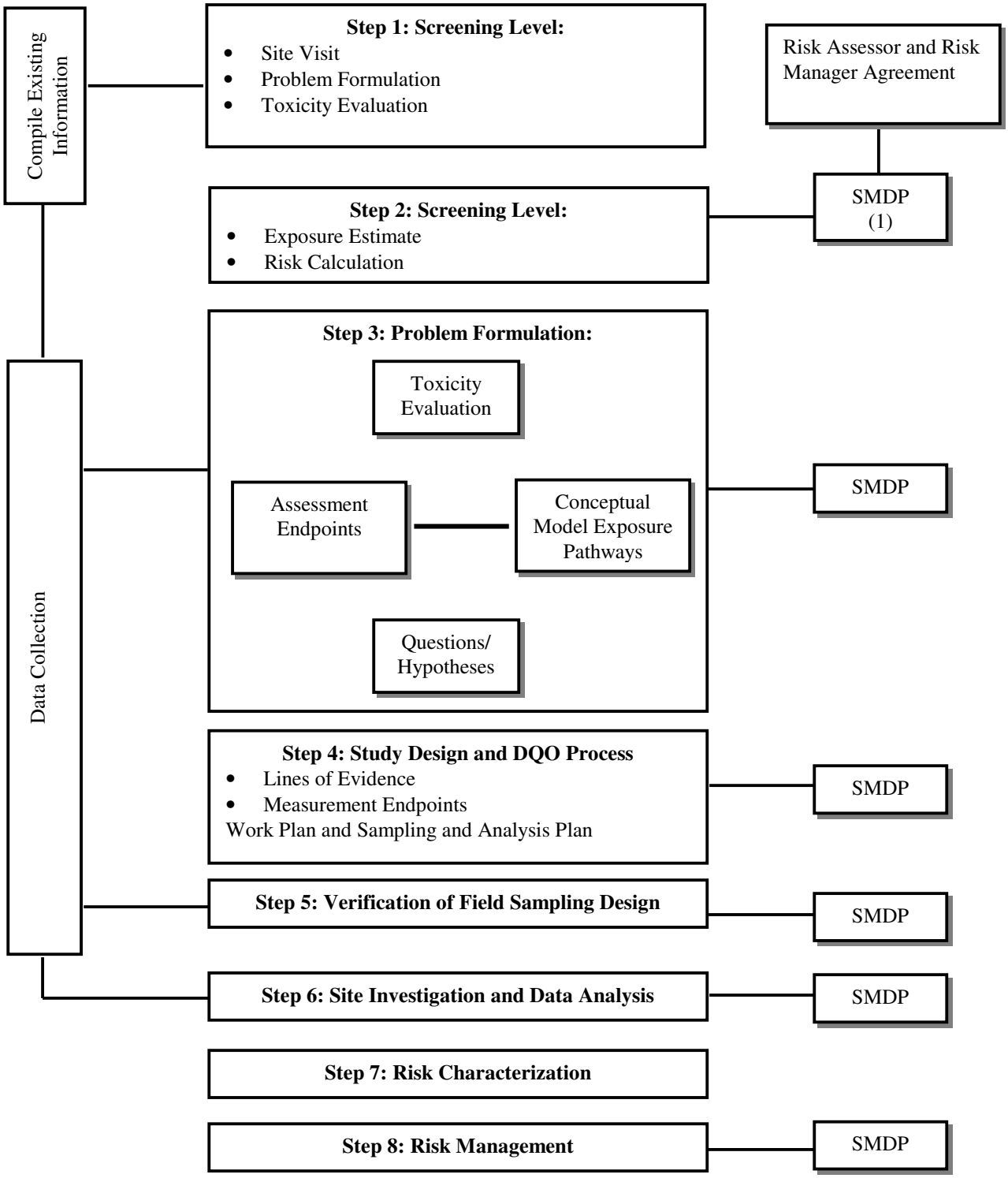


Figure 6-2 Eight-Step Ecological Risk Assessment Process for Superfund (USEPA, 1997)



The ecological risk screening will provide conclusions and recommendations regarding ecological risk at the site. The Army will use these data to make ecological risk management recommendations for each SSA. The scientific/management decision point reached from the ecological risk screening will include one of the following:

- There is adequate information to conclude that ecological risks are negligible and therefore there is no need for further action at the SSA on the basis of ecological risk;

- The information is not adequate to make a decision at this point and further refinement of data is needed to augment the ecological risk screening; or

- The information collected and presented indicates that a more thorough assessment is warranted.

6.2.1 Problem Formulation

Problem formulation is the first phase of a ecological risk screening and discusses the goals, breadth, and focus of the screening. It involves the collection and analysis of existing data to the greatest extent possible. Problem formulation includes general descriptions of RFAAP SSAs, with emphasis on size of the SSAs, proximity to operational areas and/or sensitive habitats, and the habitats and ecological receptors present. This phase also involves characterization of site contaminants, contaminant sources, migration routes, and an evaluation of complete routes of contaminant exposure to important ecological receptors. Assessment and measurement endpoints that will be evaluated are also selected. Finally, a conceptual model is developed that describes how contaminants associated with the sites in question may come into contact with ecological receptors. Much of this step will have been completed during the site reconnaissance, the review of historical information, and the development of the work plan, as discussed in Sections 2.0 and 3.0, respectively.

The following sections provide more detailed descriptions of the steps involved in the development of the problem formulation component of the ecological risk screening.

6.2.1.1 Site Characterization

The objectives of this step are to initially identify and characterize the site(s) ecological resources, and to preliminarily describe the nature and extent of chemical contamination at the site(s) in question. Information pertaining to site land-use (past, current and future), size, proximity to operable areas and/or sensitive habitats, and habitats and ecological resources will be developed during the site characterization. The SSP is a screening level process that will be used to determine if a site should proceed further through the RFI stage. As such, detailed field sampling and quantitative analysis of biota will not be performed during the SSP. If contamination is identified which may impact ecological receptors, a recommendation in the SSP report would include biota sampling.

This step will actually begin with the site visit discussed in Section 2.0. Information about local ecological resources (including threatened and endangered species) will also be obtained from

maps of the study area, available scientific literature, and federal and state agencies (e.g., U.S. Fish and Wildlife Service, Virginia Department of Game and Inland Fisheries, Department of Natural Heritage database, etc.). The site characterization will also describe likely contaminant sources, release mechanisms, complete migration pathways, the fate of chemicals resulting from site-related activities, as well as important ecological resources that could be adversely affected by these chemicals.

6.2.1.2 Identification of Chemicals of Potential Ecological Concern

COPCs will be identified by comparison of maximum site concentrations to approved Region III BTAG screening values and/or by simple food-web modeling. Initial screening of analytical data will be conducted using general screening values considered protective of all wildlife. Chemicals with MDCs (or a 95% UCL if appropriate) exceeding screening values and/or chemicals for which no screening values are available will be initially identified as COPCs to be carried through to the risk characterization step of the ecological risk screening. Values may be derived from sources such as, Federal and state standard Ambient Water Quality Criteria, Ontario Ministry of the Environment LEL values for freshwater habitats (Ontario Ministry of Environment and Energy, 1993), Great Lakes Research TEL values (Smith et al., 1996) for freshwater habitats, and EPA and ORNL surface soil screening levels (USEPA, 2000b and Will and Suter, 1995a).

6.2.1.3 Identification of Exposure Pathways and Potential Receptors for Analysis

The pathways by which ecological receptors may be exposed to COPCs at the site(s) will be identified along with the receptor groups that could be adversely affected by these chemicals. Several potential exposure pathways may exist at the site(s). For example, terrestrial vegetation may be exposed to contaminants via direct aerial deposition and root translocation, although aerial deposition is highly variable and difficult to quantify. Terrestrial animals may be exposed to soil contaminants through ingestion of contaminated food items and by incidentally ingesting soil while grooming fur, preening feathers, digging, grazing close to the soil, or feeding on items to which soil has adhered (such as roots and tubers). Terrestrial animal receptors may also come into contact with contaminants in surface water by using surface water for drinking water, although this exposure route represents a negligible portion of total exposure for most receptors.

Aquatic and semi-aquatic organisms at the RFAAP may be exposed to contaminants via direct contact with surface water and sediments, incidental ingestion of surface water and sediments, and consumption of contaminated food items. Aquatic and semi-aquatic organisms may also be exposed to constituents from contaminated groundwater that flows into surface water.

For purpose of the SSA ecological risk screening, exposure pathways representing important and likely meaningful routes of contaminate uptake will be assessed for appropriate receptor groups. If sufficient information exists to examine more obscure exposure routes (e.g. aerial deposition or inhalation) or if the assessment of an exposure route will substantially contribute to the risk understanding (e.g. drinking water) it will be examined to assess whether it warrants the evaluation.

Based on the identification of site-specific habitats, food webs, COPCs, and exposure pathways, recommendations will be made for species or species groups to be selected for evaluation in the risk screening. These may include the following receptor groups:

- For terrestrial systems: terrestrial plants, terrestrial invertebrates, reptiles and amphibians, invertebrate-eating birds (e.g., robin), invertebrate-eating mammals (e.g., shrew), carnivorous mammals (e.g. red fox), and carnivorous birds (e.g., red-tailed hawk) may be included. In addition, plant-eating mammals (e.g., rabbit), and omnivorous mammals (e.g. raccoon) may be included.

- For aquatic systems: aquatic plants, benthic invertebrates, fish, reptiles and amphibians, fish-eating birds (e.g. great blue heron), and fish-eating mammals (e.g. mink) may be included.

6.2.1.4 Identification of Assessment and Measurement Endpoints

One of the major tasks in screening problem formulation is the selection of assessment and measurement endpoints. An assessment endpoint is defined as "an explicit expression of actual environmental values that are to be protected" (USEPA, 1992d). Measurement endpoints are "measurable ecological characteristics that are related to the valued characteristic chosen as the assessment endpoint" (USEPA 1992d). Measurement endpoints serve as tools for ranking and evaluating environmental values that are to be protected. While declines in populations and shifts in community structure can be quantified, studies of this nature are generally time-consuming and difficult to interpret. However, measurement endpoints indicative of observed effects on individuals are relatively easy to measure in laboratory toxicity studies and can be related to the site specific assessment endpoint.

Toxicity data and assessment endpoints shall be discussed with BTAG, and agreed upon, in accordance with the USEPA Guidance (USEPA 1997). This step also includes the development of a conceptual site model (CSM) and identification of the specific objectives and scope of the ecological risk screening. The CSM is designed to diagrammatically identify potentially exposed receptor populations and applicable exposure pathways, based on the physical nature of the site and the potential contaminant source areas. Generally, a separate CSM will be developed for each SSA because the contaminant source, migration pathways, assessment and measurement endpoint, and exposure pathways are site-specific. However, in appropriate cases, more than one SSA can be included in a single CSM if, for example, there are common exposure and/or migration pathways.

6.2.2 Exposure Assessment

This section of the ecological risk screening includes identification of contaminant concentration data used to represent ecological exposure in various media. For each exposure pathway selected for quantitative evaluation, conservative exposure point concentrations (EPCs) will be used and the receptor specific exposure will be quantified. EPCs will be estimated using environmental sampling data either alone or in conjunction with simple environmental fate and transport models.

The food chain modeling will be performed in accordance with current USEPA CERCLA guidance for ecological risk assessment, and use conservative exposure parameter values (maximum ingestion rate, minimum body weight, 100% bioavailability) (USEPA, 1993b). The ecological exposure assessment will consist of two phases. The first, most conservative, phase will be based on conservative exposure assumptions such as:

Maximum analytical results for each medium of concern used as EPCs; and

Site use factor equals 1

The second phase will be based on conservative yet more realistic exposure assumptions such as:

- Site use factor determined based on the size of the SSA, proximity to operational areas and/or sensitive habitats, the quality of habitat present, and behavior of important ecological receptors; and

- Use of average body weight and average intake for selected wildlife receptors.

6.2.3 Ecological Effects Assessment

This step in the ecological risk screening develops toxic reference values (TRVs) for ecological receptors, to be used in the risk characterization. Acknowledging that data pertaining to ecological risk characterization is continually being updated, the Army shall consult with EPA on the most-up-to-date and appropriate data sources, when reaching this stage in the screening process. The toxicity of COPCs to terrestrial and aquatic organisms will be summarized using relevant toxicity data for the selected receptor species. The TRVs to be used in the evaluation of potential adverse effects to terrestrial and aquatic species will be derived from the literature, where possible.

In food web modeling, calculated doses will be compared to toxicological thresholds (no observed adverse effect levels [NOAELs] and lowest observed adverse effect levels [LOAELs]). The Army shall develop TRVs for wildlife receptors derived from NOAELs and LOAELs taken from various literature sources. BTAG will review these values and may provide technical assistance in selecting wildlife derived NOAELs and LOAELs. Only EPA and BTAG approved TRVs will be used in identifying COPCs at SSAs.

6.2.4 Risk Characterization

This step compares exposure point contaminant concentrations with benchmark concentrations protective of ecological receptors. The ratio of the maximum contaminant concentration to the benchmark value is called the HQ or Ecological Effects Quotient (EEQ), and is defined as follows:

$$EEQ = Emax/TRV$$

Where: EEQ = Ecological Effects Quotient for contaminant (unitless)

Emax = Maximum Concentration for contaminant (mg/L or mg/kg)

TRV = Toxicity Reference Value for contaminant (mg/L or mg/kg)

When the ratio of the maximum concentration to its respective benchmark value exceeds 1.0, further assessment may be needed. The EEQ value should not be construed as being probabilistic; rather, it is a numerical indicator of the extent to which a maximum concentration exceeds or is less than a benchmark. When EEQ values exceed 1.0, it is an indication that ecological receptors are potentially at risk based on conservative exposure assumptions.

The preliminary risk characterization will be based on the conservative preliminary exposure assumptions. A major part of the risk characterization is the interpretation of the preliminary estimates of risk in light of the conservative assumptions and uncertainties (see Section 6.2.5).

Additional evaluation of site-specific data may be necessary to confirm with greater certainty whether ecological receptors are actually at risk at the site, especially since most benchmarks are based on conservative exposure assumptions. A refined estimate of EEQs will be made using the refined exposure factors (Section 6.2.2). The results of the conservative and refined risk estimates will be evaluated in light of the uncertainties of the risk assessment process (Section 6.2.5). Furthermore, other factors, such as low frequency of detection, may mitigate potential risks for a COPC with an elevated EEQ value.

6.2.5 Uncertainty Analysis

When the above steps are completed, the results are interpreted and the uncertainties associated with the ecological risk screening are addressed. General uncertainties associated with the ecological risk screening will be qualitatively evaluated to determine the conservatism of the approach. For example, uncertainty in this site screening could arise if ecological based criteria are less than analytical method detection limits. In addition, background screening will be performed at this stage to aid in risk management decisions. Maximum detected concentrations of inorganic constituents may be compared to background values (see Section 6.1.4) to assist in assessing whether or not potential ecological risk is associated with site-related conditions.

7.0 SITE SCREENING PROCESS REPORT

Results of the desktop audit, nature and extent determination (if available), and the human health and ecological screening procedures will be presented in an SSP Report for each SSA with a recommendation for future action. The EPA will review the SSP Report for each SSA and based on results of the screening procedures, a decision will be made as to whether each SSA should be recommended for no further action, or for further action. A need for further action will be based on but not limited to the following: historical use of the SSA, history of documented release (if any), analytical data from the SSA, and the overall weight of the evidence. In general, further action at an SSA may be required under the following circumstances:

- Cumulative Excess Cancer Risk (CECR) greater than 1x10-5
- HI greater than 0.5 per target organ
- Maximum Detected Concentration > SSL for chemical migration from soil to ground water or other screening values (e.g., Virginia AST/UST TPH guidance level for soil; Virginia State and Federal MCLs, Virginia AST/UST TPH guidance level for ground water; or Federal and State Ambient Water Quality Criteria for surface water)
- Ecological risk considerations per Section 6.2

If none of the above circumstances occur, EPA may recommend no further action and memorialize this recommendation in a Decision Document.

If any of the above circumstances occur, further action may be required. Further action may consist of one or more of the following:

- Interim Removal Action, followed by sampling to confirm that risks have been reduced to acceptable levels
- Focused RFI (including additional sampling)
- RFI/CMS

8.0 DISPUTE RESOLUTION

Disputes arising during the course of the SSP shall be resolved using the dispute resolution procedures of the RCRA Corrective Action Permit, Part I, C.

9.0 REFERENCES

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APPENDIX C

STANDARD OPERATING PROCEDURES

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Standard Operating Procedures

SOP SERIES	TITLE
10.0	**DOCUMENTATION**
10.1	Field Logbook
10.2	Surface Water, Groundwater, and Soil/Sediment Field Logbooks
10.3	Boring Logs
10.4	Chain-of-Custody Forms
20.0	**SUBSURFACE INVESTIGATION**
20.1	Monitoring Well Installation
20.2	Monitoring Well Development
20.11	Drilling Methods and Procedures
30.0	**SAMPLING**
30.1	Soil Sampling
30.2	Groundwater Sampling
30.3	Surface Water Sampling
30.4	Sediment Sampling with Scoop or Tube Sampler
30.6	Containerized Material
30.7	Sampling Strategies
30.9	Collection of Soil Samples By USEPA SW-846 Method 5035 Using Disposable Samplers
50.0	**SAMPLE MANAGEMENT**
50.1	Sample Labels
50.2	Sample Packaging
70.0	**INVESTIGATION-DERIVED MATERIAL**
70.1	Investigation-Derived Material
80.0	**DECONTAMINATION**
80.1	Decontamination
90.0	**AIR MONITORING EQUIPMENT**
90.1	Photoionization Detector (HNu Model PI-101 and HW-101)

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STANDARD OPERATING PROCEDURE 10.1
FIELD LOGBOOK

1.0 SCOPE AND APPLICATION

The purpose of this standard operating procedure (SOP) is to delineate protocols for recording daily site investigation activities.

Records should contain sufficient information so that anyone can reconstruct the sampling activity without relying on the collector's memory.

2.0 MATERIALS

- Field Logbook;
- Indelible ink pen; and
- Clear tape.

3.0 PROCEDURE

Information pertinent to site investigations will be recorded in a bound logbook. Each page/form will be consecutively numbered, dated, and signed. All entries will be made in indelible ink, and all corrections will consist of line out deletions that are initialed and dated. If only part of a page is used, the remainder of the page should have an "X" drawn across it. At a minimum, entries in the logbook will include but not be limited to the following:

- Project name (cover);
- Name and affiliation of personnel on site;
- Weather conditions;
- General description of the field activity;
- Sample location;
- Sample identification number;
- Time and date of sample collection;
- Specific sample attributes (e.g., sample collection depth flow conditions or matrix);
- Sampling methodology (grab or composite sample);
- Sample preservation, as applicable;
- Analytical request/methods;

- Associated quality assurance/quality control (QA/QC) samples;
- Field measurements/observations, as applicable; and
- Signature and date of personnel responsible for documentation.

4.0 MAINTENANCE

Not applicable.

5.0 PRECAUTIONS

None.

6.0 REFERENCES

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STANDARD OPERATING PROCEDURE 10.2
SURFACE WATER, GROUNDWATER, AND SOIL/SEDIMENT FIELD LOGBOOKS

1.0 SCOPE AND APPLICATION

The purpose of this standard operating procedure (SOP) is to delineate protocols for recording surface water, groundwater, and soil/sediment sampling information, as well as instrument calibration data in field logbooks.

2.0 MATERIAL

- Applicable field logbook (see attached forms); and
- Indelible ink pen.

3.0 PROCEDURE

All information pertinent to surface water, groundwater, or soil/sediment sampling will be recorded in the appropriate logbook. Each page/form of the logbook will be consecutively numbered. All entries will be made with an indelible ink pen. All corrections will consist of line out deletions that are initialed and dated.

3.1 SOIL/SEDIMENT

3.1.1 Field Parameters/Logbook (Form 10.2-a)

1. HIGH CONCENTRATION EXPECTED?: Answer "Yes" or "No.";
2. HIGH HAZARD?: Answer "Yes" or "No.";
3. INSTALLATION/SITE: Record the complete name of the installation or site;
4. AREA: Record the area designation of the sample site;
5. INST. NAME: Record the two-letter installation name for Radford Army Ammunition Plant – "RD";
6. SAMPLE MATRIX CODE: Record the appropriate sample matrix code. Common codes are "SD" for solid - sediment, "SI" for soil - gas, "SL for solid sludge, "SO" for surface other, "SS" for solid – soil, "SW" for surface wipe, "WD" for water – potable, "WG" for water – ground, "WS" water – surface, "WT" – water treated and "WW" water -waste;
7. SITE ID: Record a code up to 20 characters or numbers that is unique to the site;
8. ENV. FIELD SAMPLE IDENTIFIER: Record a code up to 20 characters specific for the sample;
9. DATE: Enter the date the sample was taken;
10. TIME: Enter the time (12-hour or 24-hour clock acceptable as long as internally consistent) the sample was taken;

11. AM PM: Circle “AM” or “PM” to designate morning or afternoon (12-hour clock);
12. SAMPLE PROG: Record “RFI” (RCRA Facility Investigation) or other appropriate sample program;
13. DEPTH (TOP): Record the total depth sampled;
14. DEPTH INTERVAL: Record the intervals at which the plug will be sampled;
15. UNITS: Record the units of depth (feet, meters);
16. SAMPLE MEASUREMENTS: Check the appropriate sampling method;
17. CHK: Check off each container released to a laboratory;
18. ANALYSIS: Record the type of analysis to be performed on each sample container;
19. SAMPLE CONTAINER: Record the sample container type and size;
20. NO.: Record the number of containers;
21. REMARKS: Record any remarks about the sample;
22. TOTAL NUMBER OF CONTAINERS FOR SAMPLE: Record the total number of containers;
23. SITE DESCRIPTION: Describe the location where the sample was collected;
24. SAMPLE FORM: Record the form of the sample (i.e., clay, loam, etc.) using The Unified Soil Classification System (USCS);
25. COLOR: Record the color of the sample as determined from standard Munsell Color Charts;
26. ODOR: Record the odor of the sample or “none”;
27. PID: Record the measured PID values or other similar measurement instrument value;
28. UNUSUAL FEATURES: Record anything unusual about the site or sample;
29. WEATHER/TEMPERATURE: Record the weather and temperature; and
30. SAMPLER: Record your name.

3.1.2 Map File Form (refer to form 10.2-c)

1. SITE ID: Record the Site ID from the field parameter form;
2. POINTER: Record the field sample number for the sample being pointed to;
3. DESCRIPTION/MEASUREMENTS: Describe the location where the sample was taken, along with distances to landmarks;
4. SKETCH/DIMENSIONS: Diagram the surroundings and record the distances to landmarks;
5. MAP REFERENCE: Record which U.S.G.S. Quad Map references the site;
6. COORDINATE DEFINITION: Write the compass directions and the X- and Y-coordinates of the map run;
7. COORDINATE SYSTEM: Write “UTM” (Universal Transverse Mercator);
8. SOURCE: Record the 1-digit code representing the Map Reference;
9. ACCURACY: Give units (e.g., write “1-M” for 1 meter);
10. X-COORDINATE: Record the X-coordinate of the sample site location;

11. Y-COORDINATE: Record the Y-coordinate of the sample site location;
12. UNITS: Record the units used to measure the map sections;
13. ELEVATION REFERENCE: Record whether topography was determined from a map or a topographical survey;
14. ELEVATION SOURCE: Record the 1-digit code representing the elevation reference;
15. ACCURACY: Record the accuracy of the map or survey providing the topographical information;
16. ELEVATION: Record the elevation of the sampling site;
17. UNITS: Write the units in which the elevation is recorded; and
18. SAMPLER: Write your name.

3.2 SURFACE WATER

3.2.1 Field Parameter Logbook (Forms 10.2-b and 10.2-c)

1. CAL REF: Record the calibration reference for the pH meter;
2. pH: Record the pH of the sample;
3. TEMP: Record the temperature of the sample in degrees Celsius;
4. COND: Record the conductivity of the water;
5. Description of site and sample conditions (refer to 10.2-b);
6. Map File Form (refer to Section 3.1.2).

3.3 GROUNDWATER (FORMS 10.2- D)

3.3.1 Field Parameter Logbook (Form 10.2.b)

Refer to Section 3.2.1.

3.3.2 Map File and Purging Forms

1. WELL NO. OR ID: Record the abbreviation appropriate for where the sample was taken. Correct abbreviations can be found on pages 18-21 of the IRDMIS User's Guide for chemical data entry;
2. SAMPLE NO.: Record the reference number of the sample;
3. WELL/SITE DESCRIPTION: Describe the location where the sample was taken, along with distances to landmarks;
4. X-COORD AND Y-COORD: Record the survey coordinates for the sampling site;
5. ELEV: Record the elevation where the sample was taken;
6. UNITS: Record the units the elevation was recorded in;
7. DATE: Record the date in the form MM/DD/YY;
8. TIME: Record the time, including a designation of AM or PM;
9. AIR TEMP.: Record the air temperature, including a designation of C or F (Celsius or Fahrenheit);
10. WELL DEPTH: Record the depth of the well in feet and inches;

11. CASING HEIGHT: Record the height of the casing in feet and inches;
12. WATER DEPTH: Record the depth (underground) of the water in feet and inches;
13. WELL DIAMETER: Record the diameter of the well in inches;
14. WATER COLUMN HEIGHT: Record the height of the water column in feet and inches;
15. SANDPACK DIAM.: Record the diameter of the sandpack. Generally, this will be the same as the bore diameter;
16. EQUIVALENT VOLUME OF STANDING WATER: Use one of the following equations to determine one equivalent volume (EV);

    1 EV = volume in casing + volume in saturated sandpack. Or:

    $1\ EV = [\pi R_w^2 h_w + 0.30p(R_s^2 - R_w^2)h_s] * (0.0043)$

Where:

R_s = radius of sandpack in inches
R_w = radius of well casing in inches
h_s = height of sandpack in inches
h_w = water depth in inches

$0.0043 = gal/in^3$

and filter pack porosity is assumed as 30%, or

Volume in casing =
$(0.0043\ gal/in^3)(p)(12\ in/ft)(R_c^2)(W_h)$

Where:

R_c = radius of casing in inches, and
W_h = water column height in feet

Vol. in sandpack =
(0.0043 gal/in3)(p)(12 in/ft)(Rb2 - Rc2)(Wh)(0.30)

(if Wh is less than the length of the sandpack), or

Vol. in sandpack =
(0.0043 gal/in3)(p)(12 in/ft)(Rb2 - Rc2)(Sh)(0.30)

(if Wh is greater than the length of the sandpack).

where:

Rb = radius of the borehole, and
Sh = length of the sandpack.

Show this calculation in the comments section.

1. PUMP RATE: Record pump rate;
2. TOTAL PUMP TIME: Record total purge time and volume;
3. WELL WENT DRY? Write "YES" or "NO";
4. PUMP TIME: Record pump time that made the well go dry;
5. VOLUME REMOVED: Record the volume of water (gal) removed before the well went dry;
6. RECOVERY TIME: Record the time required for the well to refill;
7. PURGE AGAIN?: Answer "YES" or "NO";
8. TOTAL VOL. REMOVED: Record the total volume of water (in gallons) removed from the well;
9. CAL REF.: Record the calibration reference for the pH meter;
10. TIME: Record time started (INITIAL T(0)), 2 times DURING the sampling and the time sampling ended (FINAL);
11. pH: Record the pH at start of sampling (INITIAL), twice DURING the sampling, and at the end of sampling (FINAL);
12. TEMP: Record the water temperature (Celsius) at the start of sampling, twice DURING the sampling, and at the end of sampling (FINAL);
13. COND: Record the conductivity of the water at the start of sampling, twice DURING the sampling, and at the end of sampling (FINAL);
14. D.O.: Record the dissolved oxygen level in the water at the start of sampling, twice DURING the sampling, and at the end of sampling (FINAL);
15. TURBIDITY: Record the readings from the turbidity meter (nephelometer) and units at the start of sampling, twice DURING the sampling, and at the end of sampling (FINAL);
16. ORD: Record the oxidation/reduction (RedOx) potential of the water sample at the start of sampling, twice DURING the sampling, and at the end of sampling (FINAL);
17. HEAD SPACE: Record any positive readings from organic vapor meter reading taken in well headspace before sampling;
18. NAPL: Record the presence and thickness of any non-aqueous phase liquids (LNAPL and DNAPL)
19. COMMENTS: Record any pertinent information not already covered in the form; and
20. SIGNATURE: Sign the form.

3.4 FIELD CALIBRATION FORMS (REFER TO FORM 10.2-E)

1. Record time and date of calibration;
2. Record calibration standard reference number;
3. Record meter ID number;
4. Record initial instrument reading, recalibration reading (if necessary), and final calibration reading on appropriate line;
5. Record value of reference standard (as required);
6. COMMENTS: Record any pertinent information not already covered on form; and

7. SIGNATURE: Sign form.

4.0 MAINTENANCE

Not applicable.

5.0 PRECAUTIONS

None.

6.0 REFERENCE

USEPA. 1991. *User's Guide to the Contract Laboratory Program.* EPA/540/O-91/002, Directive 9240.0-01D, Office of Emergency and Remedial Response, January.

FIELD PARAMETER/LOGBOOK FORM 10.2-a
SOIL AND SEDIMENT SAMPLES

HIGH CONCENTRATION EXPECTED? _____ HIGH HAZARD?

INSTALLATION/SITE _____ AREA _____

INST NAME _____ FILE NAME _____

SAMPLE MATRIX CODE _____ SITE ID _____
ENV. FIELD SAMPLE IDENTIFIER _____

DATE (MM/DD/YY) __/__/__ TIME _____ AM PM SAMPLE PROGRAM

DEPTH (TOP) _____ DEPTH INTERVAL _____ UNIT _____

SAMPLING METHOD:

SPLIT SPOON ___ AUGER ___ SHELBY TUBE ___ SCOOP ___ OTHER

CHK	ANALYSIS	SAMPLE CONTAINER	NO.	REMARKS

TOTAL NUMBER OF CONTAINERS FOR SAMPLE_____

DESCRIPTION OF SITE AND SAMPLE CONDITIONS

SITE DESCRIPTION:_____

_____

_____

SAMPLE FORM _____ COLOR _____ ODOR _____

PID (HNu)_____ UNUSUAL FEATURES_____

_____

WEATHER/TEMPERATURE

SAMPLER _____

FIELD PARAMETER/LOGBOOK FORM 10.2-b
GROUNDWATER AND SURFACE WATER SAMPLES

HIGH CONCENTRATION EXPECTED? _____ HIGH HAZARD?

INSTALLATION/SITE _____ AREA

INST CODE _____ FILE NAME _____ SITE TYPE

SITE ID _____ FIELD SAMPLE NUMBER

DATE (MM/DD/YY) __/__/__ TIME _____ AM PM SAMPLE PROG.

DEPTH (TOP) _____ DEPTH INTERVAL _____ UNITS

SAMPLING MEASUREMENTS

CAL REF. _____ pH _____ TEMPERATURE °C _____ CONDUCTIVITY _____ REDOX _____

DISSOLVED OXYGEN ____ TURBIDITY _____ OTHER

CHK	ANALYSIS	SAMPLE CONTAINER	NO.	REMARKS

TOTAL NUMBER OF CONTAINERS FOR SAMPLE_____

DESCRIPTION OF SITE AND SAMPLE CONDITIONS

SITE DESCRIPTION_____

SAMPLING METHOD_____

SAMPLE FORM _____ COLOR _____ ODOR _____

PID (HNu)_____

UNUSUAL FEATURES_____

WEATHER/TEMPERATURE_____ SAMPLER _____

EXAMPLE MAP FILE LOGBOOK FORM 10.2-c
SURFACE WATER, SOIL, AND SEDIMENT SAMPLES

SITE ID_____ POINTER_____

DESCRIPTION/MEASUREMENTS_____

SKETCH/DIMENSIONS :

MAP REFERENCE_____

COORDINATE DEFINITION (X is _____ Y is _____)

COORDINATE SYSTEM _____ SOURCE _____ ACCURACY_____

X-COORDINATE _____ Y-COORDINATE _____ UNITS_____

ELEVATION REFERENCE_____

ELEVATION SOURCE _____ ACCURACY _____ELEVATION_____

UNITS_____

SAMPLER_____

EXAMPLE MAP FILE AND PURGING LOGBOOK FORM 10.2-d
GROUNDWATER SAMPLES

WELL COORD. OR ID _____ SAMPLE NO._____

WELL/SITE DESCRIPTION_____

_____

X-COORD. _____ Y-COORD. _____ ELEV. _____ UNITS

DATE ____/____/____ TIME _____ AIR TEMP.

WELL DEPTH _____ FT. _____ IN. CASING HT. _____ FT. _____ IN.

WATER DEPTH _____ FT. _____ IN. WELL DIAMETER _____ IN.

WATER COLUMN HEIGHT _____ FT. _____ IN. SANDPACK DIAM. _____ IN.

EQUIVALENT VOLUME OF STANDING WATER _____ (GAL) (L)

VOLUME OF BAILER _____ (GAL) (L) or PUMP RATE _____ (GPM) (LPM)

TOTAL NO. OF BAILERS (5 EV) _____ or PUMP TIME _____ MIN.

WELL WENT DRY? [Yes] [No] NUM. OF BAILERS _____ or PUMP TIME

VOL. REMOVED _____ (GAL) (L) RECOVERY TIME

PURGE AGAIN? [Yes] [No] TOTAL VOL. REMOVED _____ (GAL) (L)

DATE & TIME	QUANTITY REMOVED	TIME REQ'D	pH	Cond	Temp	ORD	Turb	DO	Character of water (color / clarity / odor / partic.)
(before)									
(during)									
(during)									
(during									
(after)									

COMMENTS_____

SIGNATURE_____

EXAMPLE FIELD CALIBRATION FORM 10.2-e
FOR pH, CONDUCTIVITY, TEMPERATURE, TURBIDITY,
ORD, AND DISSOLVED OXYGEN METERS

INITIAL CALIBRATION	FINAL CALIBRATION
DATE:	**DATE:**
TIME:	**TIME:**

pH METER CALIBRATION

CALIBRATION STANDARD REFERENCE NO:_____

METER ID_____

pH STANDARD	INITIAL READING	RECALIB. READING	FINAL READING
7.0			
10.0			
4.0			

CONDUCTIVITY METER CALIBRATION

CALIBRATION STANDARD REFERENCE NO:_____

METER ID_____

COND. STANDARD	INITIAL READING	RECALIB. READING	FINAL READING

TEMPERATURE METER CALIBRATION

METER ID_____

TEMP. STANDARD	INITIAL READING	RECALIB. READING	FINAL READING
ICE WATER			
BOILING WATER			
OTHER _____			

EXAMPLE FIELD CALIBRATION FORM 10.2-e
FOR pH, CONDUCTIVITY, TEMPERATURE, TURBIDITY,
ORD, AND DISSOLVED OXYGEN METERS

TURBIDITY METER CALIBRATION

CALIBRATION STANDARD REFERENCE NO:_____

METER ID_____

STANDARD	INITIAL READING	RECALIB. READING	FINAL READING

ORD METER CALIBRATION

CALIBRATION STANDARD REFERENCE NO:_____

METER ID_____

STANDARD	INITIAL READING	RECALIB. READING	FINAL READING

DISSOLVED OXYGEN METER CALIBRATION

CALIBRATION STANDARD REFERENCE NO:_____

METER ID_____

STANDARD	INITIAL READING	RECALIB. READING	FINAL READING

COMMENTS_____

SIGNATURE_____

STANDARD OPERATING PROCEDURE 10.3
BORING LOGS

1.0 INTRODUCTION

The purpose of this standard operating procedure (SOP) is to describe the methods to be followed for classifying soil and rock, as well as preparing borehole logs and other types of soil reports.

2.0 MATERIALS

The following equipment is required for borehole logging:

- HTRW ENG Form 5056-R and 5056A-R boring log forms;
- Daily inspection report forms;
- Chain-of-custody forms;
- Request for analysis forms;
- ASTM D 2488 classification flow chart;
- Soil and/or Rock color chart (i.e., Munsell®);
- Grain size and roundness chart;
- Graph paper;
- Engineer's scale;
- Previous reports and boring logs;
- Pocketknife or putty knife;
- Hand lens;
- Dilute hydrochloric acid (10% volume);
- Gloves;
- Personal protective clothing and equipment, as described in work plan addenda health and safety plan;
- Photoionization detector or other appropriate monitoring equipment per site-specific health and safety plan; and
- Decontamination supplies (SOP 80.1).

3.0 PROCEDURE

Each boring log should fully describe the subsurface environment and the procedures used to obtain this description.

Boring logs should be prepared in the field on USACE Engineer Form 5056-R and 5056-R. Logs should be recorded in the field directly on the boring log form and not transcribed from a field book.

A "site geologist" should conduct borehole logging and soil/rock identification and description or other professional trained in the identification and description of soil/rock.

3.1 BORING LOG INFORMATION

As appropriate, the following information should be recorded on the boring log during the course of drilling and sampling activities:

- Project information including name, location, and project number;
- Each boring and well should be uniquely numbered and located on a sketch map as part of the log;
- Type of exploration;
- Weather conditions including events that could affect subsurface conditions;
- Dates and times for the start and completion of borings, with notations by depth for crew shifts and individual days;
- Depths/heights in feet and in decimal fractions of feet;
- Descriptions of the drilling equipment including rod size, bit type, pump type, rig manufacturer and model, and drilling personnel;
- Drilling sequence and descriptions of casing and method of installation;
- Description and identification of soils in accordance with ASTM Standard D 2488;
- Descriptions of each intact soil sample for the parameters identified in Section 3.2;
- Descriptions and classification of each non-intact sample (e.g., wash samples, cuttings, auger flight samples) to the extent practicable;
- Description and identification of rock;
- Description of rock (core(s)) for the parameters identified in Section 3.7;
- Scaled graphic sketch of the rock core (included or attached to log) according to the requirements identified in Section 3.7;
- Lithologic boundaries, with notations for estimated boundaries;
- Depth of water first encountered in drilling, with the method of first determination (any distinct water level(s) below the first zone will also be noted);
- Interval by depth for each sample taken, classified, and/or retained, with length of sample recovery and sample type and size (diameter and length);
- Blow counts, hammer weight, and length of fall for driven samplers;

- Rate of rock coring and associated rock quality designation (RQD) for intervals cored;
- Drilling fluid pressures, with driller's comments;
- Total depth of drilling and sampling;
- Drilling fluid losses and gains should be recorded;
- Significant color changes in the drilling fluid returned;
- Soil gas or vapor readings with the interval sampled, with information on instrument used and calibration;
- Depth and description of any in-situ test performed; and
- Description of other field tests conducted on soil and rock samples.

3.2 SOIL PARAMETERS FOR LOGGING

In general, the following soil parameters should be included on the boring log when appropriate:

- Identification per ASTM D 2488 with group symbol;
- Secondary components with estimated percentages per ASTM D 2488;
- Color;
- Plasticity per ASTM D 2488;
- Density of non-cohesive soil or consistency of cohesive soil;
- Moisture condition per ASTM D 2488 (dry, moist, or wet);
- Presence of organic material;
- Cementation and HCL reaction testing per ASTM D 2488;
- Coarse-grained particle description per ASTM D 2488 including angularity, shapes, and color;
- Structure per ASTM D 2488 and orientation;
- Odor; and
- Depositional environment and formation, if known.

ASTM D 2488 categorizes soils into 13 basic groups with distinct geologic and engineering properties based on visual-manual identification procedures. The following steps are required to classify a soil sample:

1. Observe basic properties and characteristics of the soil. These include grain size grading and distribution, and influence of moisture on fine-grained soil.
2. Assign the soil an ASTM D 2488 classification and denote it by the standard group name and symbol.
3. Provide a written description to differentiate between soils in the same group if necessary.

Many soils have characteristics that are not clearly associated with a specific soil group. These soils might be near the borderline between groups, based on particle distribution or plasticity characteristics. In such a

case, assigning dual group names and symbols (e.g., GW/GC or ML/CL) might be an appropriate method of describing the soil. The two general types of soils, for which classification is performed, coarse- and fine-grained soils, are discussed in the following sections.

3.3 COURSE-GRAINED SOIL IDENTIFICATION

For soils in the coarse-grained soils group, more than half of the material in the soil matrix will be retained by a No. 200 sieve (75-µm).

1. Coarse-grained soils are identified on the basis of the following:
   a) Grain size and distribution;
   b) Quantity of fine-grained material (i.e., silt and clay as a percentage); and
   c) Character of fine-grained material.
2. The following symbols are used for classification:

Basic Symbols	Modifying Symbols
G = gravel	W = well graded
S = sand	P = poorly graded
	M = with silty fines
	C = with clayey fines

3. The following basic facts apply to coarse-grained soil classification.

- The basic symbol G is used if the estimated percentage of gravel is greater than that for sand. In contrast, the symbol S is used when the estimated percentage of sand is greater than the percentage of gravel.
- Gravel ranges in size from 3-inch to 1/4-inch (No. 4 sieve) diameter. Sand ranges in size from the No. 4 sieve to No. 200 sieve. The Grain Size Scale used by Engineers (ASTM Standards D 422-63 and D 643-78) is the appropriate method to further classify grain size as specified by ASTM D 2488.
- Modifying symbol W indicates good representation of all particle sizes.
- Modifying symbol P indicates that there is an excess or absence of particular sizes.
- The symbol W or P is used only when there are less than 15% fines in a sample.
- Modifying symbol M is used if fines have little or no plasticity (silty).
- Modifying symbol C is used if fines have low to high plasticity (clayey).

Figure 10.03a is a flowchart for identifying coarse-grained soils by ASTM D 2488.

3.4 FINED-GRAINED SOIL IDENTIFICATON

If one-half or more of the material will pass a No. 200 sieve (75 µm), the soil is identified as fine-grained.

1. Fine-grained soils are classified based on dry strength, dilatancy, toughness, and plasticity.
2. Classification of fine-grained soils uses the following symbols:

Basic Symbols			Modifying Symbols		
M	=	silt (non plastic)	L	=	low liquid limit (lean)
C	=	clay (plastic)	H	=	high liquid limit (fat)
O	=	organic			
Pt	=	peat			

3. The following basic facts apply to fine-grained soil classification:
   - The basic symbol M is used if the soil is mostly silt, while the symbol C applies if it consists mostly of clay.
4. Use of symbol O (group name OL/OH) indicates that organic matter is present in an amount sufficient to influence soil properties. The symbol Pt indicates soil that consists mostly of organic material.

- Modifying symbols (L and H) are based on the following hand tests conducted on a soil sample:
  - — Dry strength (crushing resistance).
  - — Dilatancy (reaction to shaking).
  - — Toughness (consistency near plastic limit).
- Soil designated ML has little or no plasticity and can be recognized by slight dry strength, quick dilatency, and slight toughness.
- CL indicates soil with slight to medium plasticity, which can be recognized by medium to high dry strength, very slow dilatancy, and medium toughness.

Criteria for describing dry strength per ASTM D 2488 are as follows:

Description	Criteria
None	Dry sample crumbles into powder with pressure of handling
Low	Dry specimen crumbles into powder with some finger pressure
Medium	Dry specimen breaks into pieces or crumbles with considerable finger pressure
High	Dry specimen cannot be broken with finger pressure but will break into pieces between thumb and a hard surface
Very high	Dry specimen cannot be broken between the thumb and a hard surface stiffness

Criteria for describing dilatancy per ASTM D 2488 are as follows:

None	No visible change in the sample
Slow	Water appears slow on the surface of the sample during shaking and does not disappear or disappears slowly upon squeezing
Rapid	Water appears quickly on the surface of the sample during shaking and disappears quickly upon squeezing

Criteria for describing toughness per ASTM D 2488 are as follows:

Description	Criteria
Low	Only slight pressure is required to roll the thread near the plastic limit and the thread and lump are weak and soft
Medium	Medium pressure is required to roll the thread to near the plastic limit and the thread and lump have medium stiffness
High	Considerable pressure is required to roll the thread to near the plastic limit and the thread and lump have very high stiffness

Figure 10.03b is a flowchart for identifying fine-grained soils by ASTM D 2488.

3.5 DENSITY AND CONSISTENCY

Relative density for coarse-grained soils and consistency for fine-grained soils can be estimated using standard penetration test blow count data (ASTM D 1586). The number of blows required for each 6 inches of penetration or fraction thereof is recorded. If the sampler is driven less than 18 inches, the number of blows per each complete 6-inch interval and per partial interval is recorded.

For partial increments, the depth of penetration should be recorded to the nearest 1 inch. If the sampler advances below the bottom of the boring under the weight of rods (static) and/or hammer, then this information should be recorded on the log.

The following are some "rule-of-thumb" guidelines for describing the relative density of coarse-grained soils:

Blow Count	Relative Density for Sand
0–4	Very loose
4–10	Loose
10–30	Medium dense
30–50	Dense
>50	Very Dense

The following are some "rule-of-thumb" guidelines for describing the consistency of fine-grained soils:

Blow Count	Consistency for Clays	Description
0–2	Very Soft	Sample sags or slumps under its own weight
2–4	Soft	Sample can be pinched in two between the thumb and forefinger
4–8	Medium Stiff	Sample can be easily imprinted with fingers
8–16	Stiff	Sample can be imprinted only with considerable pressure of fingers
16–32	Very Stiff	Sample can be imprinted very slightly with fingers
>32	Hard	Sample cannot be imprinted with fingers; can be pierced with pencil

3.6 OTHER DESCRIPTIVE INFORMATION

The approximate percentage of gravel, sand, and fines (use a percentage estimation chart) should be recorded per ASTM D 2488 as follows:

Modifiers	Descriptions
Trace	Less than 5%
Few	5%–10%
Little	15%–25%
Some	30%–45%
Mostly	50%–100%

Color/discoloration should be recorded and described using a soil color chart, such as the Munsell® Soil Color Charts. A narrative and numerical description should be given from the color chart, such as Brown 10 YR, 5/3 (Munsell®). Odor should be described if organic or unusual.

Plasticity should be described as follows:

Description	Criteria
Non-plastic	A 1/8-inch thread cannot be rolled at any water content
Low	Thread can barely be rolled and lump cannot be formed when drier than plastic limit.
Medium	Thread is easy to roll; plastic limit can be reached with little effort and lump crumbles when drier than plastic limit.
High	Considerable time is required to reach the plastic limit and lump can be formed without crumbling when drier than plastic limit

Moisture condition should be recorded as dry (absence of moisture), moist (damp but no visible water) or wet (visible free water).

Cementation should be recorded (carbonates or silicates) along with the results of HCL reaction testing. The reaction with HCL should be described as none (no visible reaction), weak (some reaction with slowly forming bubbles) or strong (violent reaction with bubbles forming immediately).

Particle description information for coarse-grained soil should be recorded where appropriate per ASTM D 2488 including maximum particle size, angularity (angular, subangular, subrounded, or rounded), shape (flat, elongated or flat and elongated), and color.

Structure (along with orientation) should be reported using the following ASTM D 2488 descriptions:

Description	Criteria
Stratified	Alternating layers of varying material or color with layers greater than 6 millimeters thick
Laminated	Alternating layers of varying material or color with layers less than 6 millimeters thick
Fissured	Breaks along definite planes of fracture with little resistance
Slickensided	Fracture planes that appear polished or glossy, can be striated
Blocky	Inclusion of small pockets of different soils
Homogeneous	Same color and appearance throughout

3.7 ROCK CORE PARAMETERS FOR LOGGING

In general, the following parameters should be included on the boring log when rock coring is conducted:

- Rock type;
- Formation;
- Modifier denoting variety;
- Bedding/banding characteristics;
- Color;
- Hardness;
- Degree of cementation;
- Texture;
- Structure and orientation;
- Degree of weathering;
- Solution or void conditions;
- Primary and secondary permeability including estimates and rationale; and
- Lost core interval and reason for loss.

A scaled graphic sketch of the core should provided on or attached to the log, denoting by depth, location, orientation, and nature (natural, coring-induced, or for fitting into core box) of all core breaks. Where fractures are too numerous to be shown individually, their location may be drawn as a zone.

The RQD values for each core interval (run) should be calculated and included on the boring log. The method of calculating the RQD is as follows per ASTM D 6032:

RQD = [Σ length of intact core pieces > 100 mm (4-inches)] x 100%/total core length.

3.8 PROCEDURES FOR ROCK CLASSIFICATION

For rock classification record mineralogy, texture, and structural features (e.g., biotite and quartz fine grains, foliated parallel to relict bedding oriented 15 to 20 degrees to core axis, joints coated with iron oxide). Describe the physical characteristics of the rock that are important for engineering considerations such as fracturing (including minimum, maximum, and most common and degree of spacing), hardness, and weathering.

1. The following is to be used as a guide for assessing fracturing:

AEG Fracturing	Spacing
Crushed	up to 0.1 foot
Intense	0.1–0.5 foot
Moderate	0.5 foot–10 feet
Slight	1.0 foot–3.0 feet
Massive	>3.0 feet

2. Record hardness using the following guidelines:

Hardness	Criteria
Soft	Reserved for plastic material
Friable	Easily crumbled by finger pressure
Low	Deeply gouged or carved with pocketknife
Moderate	Readily scratched with knife; scratch leaves heavy trace of dust
Hard	Difficult to scratch with knife; scratch produces little powder and is often faintly visible
Very Hard	Cannot be scratched with knife

3. Describe weathering using the following guidelines:

Weathering	**Decomposition**	**Discoloration**	**Fracture Condition**
Deep	Moderate to complete alteration of minerals feldspars altered to clay, etc.	Deep and thorough	All fractures extensively coated with oxides, carbonates, or clay
Moderate	Slight alteration of minerals, cleavage surface lusterless and stained	Moderate or localized and intense	Thin coatings or stains
Weak	No megascopic alteration of minerals	Slight and intermittent and localized	Few strains on fracture surfaces
Fresh	Unaltered, cleavage, surface glistening		

3.9 PROCEDURE FOR LOGGING REFUSE

The following procedure applies to the logging of subsurface samples composed of various materials in addition to soil as may be collected from a landfill or other waste disposal site.

1. Observe refuse as it is brought up by the hollow stem auger, bucket auger, or backhoe.

2. If necessary, place the refuse in a plastic bag to examine the sample.

3. Record observations according to the following criteria:

- Composition (by relative volume), e.g., paper, wood, plastic, cloth, cement, or construction debris. Use such terms as “mostly” or “at least half.” Do not use percentages;
- Moisture condition: dry, moist, or wet;
- State of decomposition: highly decomposed, moderately decomposed, slightly decomposed, etc.;
- Color: obvious mottling and/or degree of mottling;
- Texture: spongy, plastic (cohesive), friable;
- Odor;

- Combustible gas readings (measure down hole and at surface); and
- Miscellaneous: dates of periodicals and newspapers, ability to read printed materials, degree of drilling effort (easy, difficult, and very difficult).

3.10 SUBMITTAL REQUIREMENTS

Each original boring log should be submitted to the Contracting Officer Representative (CRO) after completion of the boring. When a monitoring well will be installed in a boring, the boring log and well installation diagram should be submitted together.

4.0 MAINTENANCE

Not applicable.

5.0 PRECAUTIONS

Not applicable.

6.0 REFERENCES

ASTM Standard D 1586–84 (1992). 1992. *Standard Test Method for Penetration Test and Split-Barrel Sampling of Soils.*

ASTM Standard D 2488-93. 1993. *Standard Practice for Description and Identification of Soils Visual-Manual Procedure).*

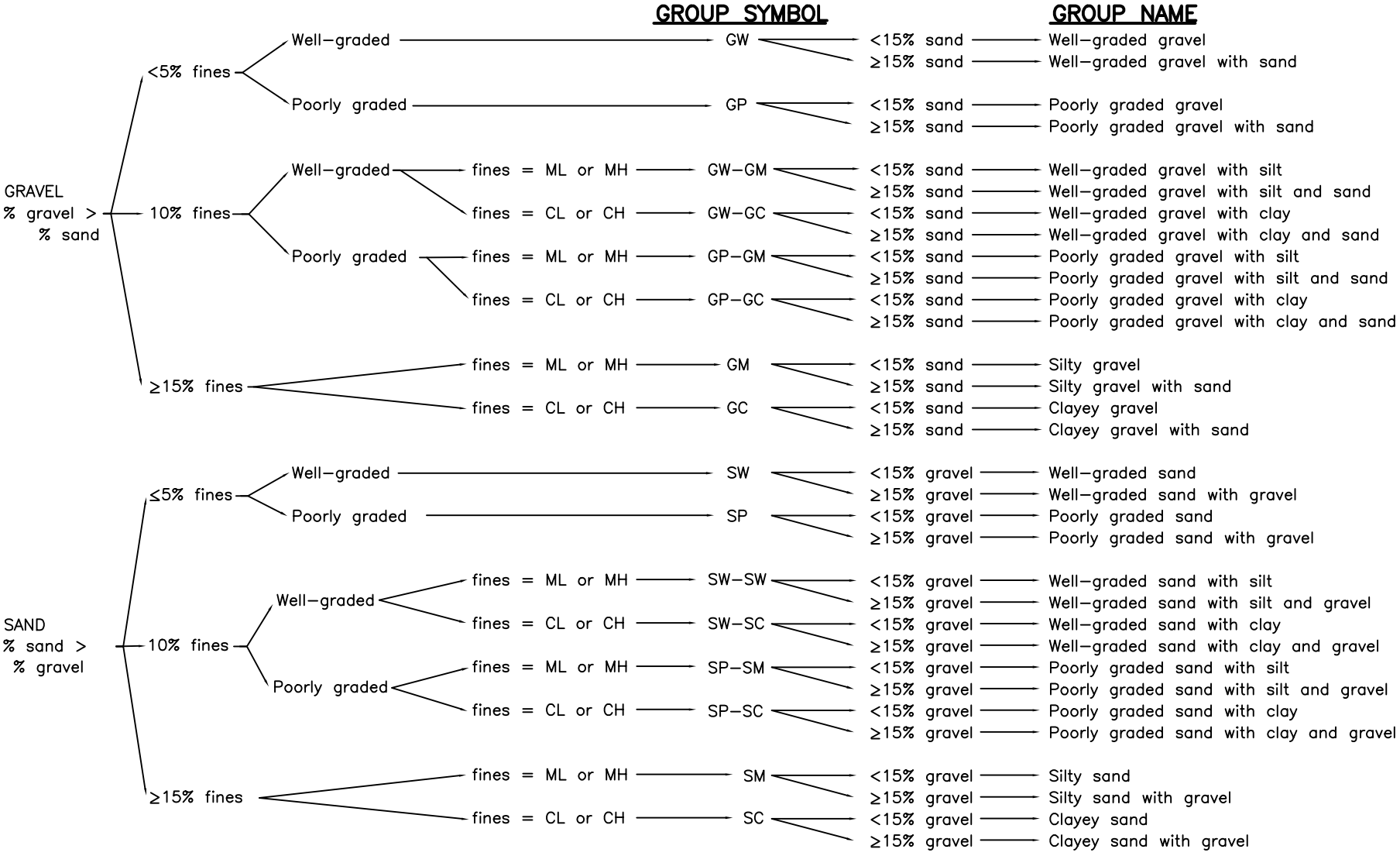
ASTM Standard D 5434-93. 1993. *Guide for Field Logging of Subsurface Explorations of Soil and Rock.*

ASTM Standard D 6032-96. 1996. *Standard Test Method for Determining Rock Quality Designation (RQD) of Rock Core.*

Compton, R. R. 1962. *Manual of Field Geology.* John Wiley & Sons, Inc., New York.

USACE. 1998. *Monitoring Well Design, Installation, and Documentation at Hazardous, Toxic, and Radioactive Waste Sites.* EM 1110-1-4000, 1, November.

U.S. Department of the Interior. 1989. *Earth Manual.* Water and Power Resources Service, Washington, DC.



NOTE: PERCENTAGES ARE BASED ON ESTIMATING AMOUNTS OF FINES, SAND, AND GRAVEL TO THE NEAREST 5%.

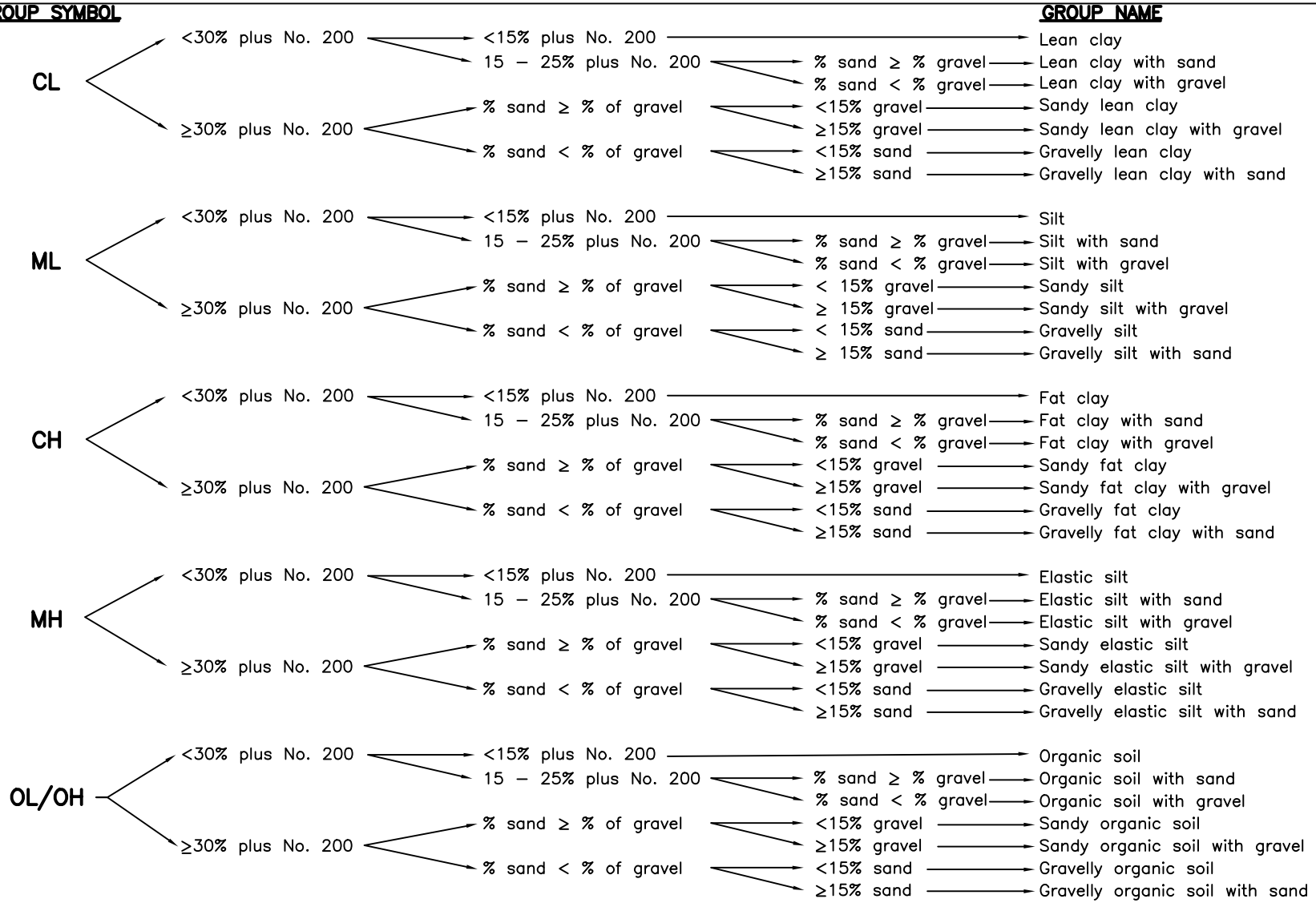
SOURCE: ASTM D 2488

RFAAP
SSP REPORT

Date: *06/13/01*	**Prepared By:** *URS Corp./DRT*
Scale: *NO SCALE*	**File Name:** *P:\...\Figure XXX.x..*

FIGURE 10.03a

FLOW CHART FOR IDENTIFYING COARSE-GRAINED SOILS



NOTE: PERCENTAGES ARE BASED ON ESTIMATING AMOUNTS OF FINES, SAND, AND GRAVEL TO THE NEAREST 5%.

SOURCE: ASTM D 2488

RFAAP
SSP REPORT

Date: *06/13/01*	**Prepared By:** *URS Corp./DRT*
Scale: *NO SCALE*	**File Name:** *P:\...\Figure XXX.x..*

FIGURE 10.03b

FLOW CHART FOR IDENTIFYING FINE-GRAINED SOILS

STANDARD OPERATING PROCEDURE 10.4
CHAIN-OF-CUSTODY FORM

1.0 SCOPE AND APPLICATION

The purpose of this standard operating procedure (SOP) is to delineate protocols for use of the chain-of-custody form. An example is provided as part of this SOP. Other formats with similar levels of detail are acceptable.

2.0 MATERIALS

- Chain-of-custody form; and
- Indelible ink pen.

3.0 PROCEDURE

1. Record the project name and number.
2. Record the project contact's name and phone number.
3. Print sampler's names in "Samplers" block.
4. Enter the Field Sample No.
5. Record the sampling dates for all samples.
6. List the sampling times (military format) for all samples.
7. Indicate, "grab" or "composite" sample with an "X."
8. Record matrix (e.g., aqueous, soil).
9. List the analyses/container volume across top.
10. Enter the total number of containers per Field Sample No. in the "Subtotal" column.
11. Enter total number of containers submitted per analysis requested.
12. State the carrier service and airbill number, analytical laboratory, and custody seal numbers.
13. List any comments or special requests in the "Remarks" section.
14. Sign, date, and time the "Relinquished By" section when the cooler is relinquished to the next party.
15. Upon completion of the form, retain the shipper copy and place the forms and the other copies in a zip seal bag to protect from moisture. Affix the zip seal bag to the inside lid of the sample cooler to be sent to the designated laboratory.

4.0 MAINTENANCE

Not applicable.

5.0 PRECAUTIONS

None.

6.0 REFERENCES

USEPA. 1990. *Sampler's Guide to the Contract Laboratory Program.* EPA/540/P-90/006, Directive 9240.0-06, Office of Emergency and Remedial Response, Washington, DC, December 1990.

USEPA. 1991. *User's Guide to the Contract Laboratory Program..* EPA/540/O-91/002, Directive 9240.0-01D, Office of Emergency and Remedial Response, January 1991.

USEPA. 1998. *EPA Requirements for Quality Assurance Project Plans.* EPA/600/R-98/018, QA/R5, Final, Office of Research and Development, Washington, D.C.

FIGURE 10.4-a
EXAMPLE CHAIN-OF-CUSTODY FORM

Project Number	Project Name				Matrix	A N A L Y S E S									LAB :
Project Contact (Name and Phone Number)															AIRBILL No:
Samplers:															Courier:
Field Sample No.	Date (MM-DD-YY)	Time	Comp	Grab										Subtotal	REMARKS
					TOTAL										

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
Relinquished by:	Date/time	Received by: (for lab)	Date/Time	Remarks	

STANDARD OPERATING PROCEDURE 20.1
MONITORING WELL INSTALLATION

1.0 SCOPE AND APPLICATION

The installation of monitoring wells is contingent upon the existing conditions at the project site. The purpose of this standard operating procedure (SOP) is to delineate the quality control measures required to ensure the accurate installation of monitoring wells. For a particular site investigation, the associated work plan addenda should be consulted for specific installation instructions. The term "monitoring wells", as used herein is defined to denote any environmental sampling well.

2.0 MATERIALS

2.1 DRILLING EQUIPMENT

- Appropriately sized drill rig adequately equipped with augers, bits, drill stem, etc;
- Steam cleaner and approved source water for decontamination of drilling equipment, etc.;
- Source of approved water;
- Photoionization detector or other appropriate monitoring instrument per the site-specific Health and Safety plan;
- Water level indicator (electrical);
- Weighted steel tape measure;
- Steel drums and other appropriate containers for investigation-derived materials (drill cuttings, contaminated PPE, decontamination solutions, etc.);
- Absorbent pads and/or logs;
- Personal protective equipment and clothing (PPE) per site-specific health and safety plan; and
- Decontamination supplies, pad with heavy plastic sheeting (SOP 80.1).

2.2 WELL INSTALLATION MATERIALS

Technical information on all installed materials (screens, riser pipe, filter pack, bentonite, cement, etc.) and representative samples of the proposed filter pack will be supplied to the Contracting Officer's Representative (COR) before initiating well installation.

Well screen slot size and filter pack gradation will be determined based on existing site geology before initiating site-specific investigations.

- Well screen :

  Polyvinyl Chloride (PVC): JOHNSON (or equivalent); PVC commercially slotted continuous slot, wire wrapped screen; 4-in. diameter.; SCH 40; SCH 80; flush-threaded (leak-proof) joints; PVC should conform to National Sanitation Foundation (NSF) Standard 14 for potable water usage or ASTM Standard Specification F 480 and bear the appropriate rating logo. PVC should be free of ink markings, cleaned, and prepackaged by manufacturer;

Stainless Steel: JOHNSON (or equivalent); stainless steel Vee-Wire continuous slot, wire wrapped screen; 304 stainless steel (unless the sum concentration of Cl^-, F^-, and Br^- is <1000 ppm, case type 316 should be used); ASTM F 480 flush threads; cleaned, wrapped, and heat-sealed by manufacturer;

- Riser pipe:
  - PVC: JOHNSON (or equivalent); STD. PVC; 4-in. diameter.; SCH 40; SCH 80; flush-threaded (leak-proof) joints; PVC should conform to NSF Standard 14 or F 480; free of ink markings; cleaned and prepackaged by manufacturer;
  - Stainless Steel: JOHNSON (or equivalent); SCH 5; 304 stainless steel; ASTM type A312 material; 4-in. diameter.; cleaned, wrapped and heat-sealed by manufacturer;
- Plugs/Caps: JOHNSON (or equivalent); standard PVC or stainless steel;
- Filter pack: MORIE, clean sorted gravel (or equivalent);
- Bentonite seal: BAROID, bentonite pellets (3/8-in. diameter.);
- Cement: Type II Portland Cement; if sulfate concentrations are higher than 1500 ppm, Type IV Portland Cement will be used;
- Bentonite powder: BAROID, Aquagel Gold Seal;
- Steel Protective Casing: BRAINARD-KILMAN (or equivalent) zinc-plated steel, lockable, painted;
- Containers for purged water, as required;
- Submersible pump or bailer of appropriate capacity, and surge block sized to fit well;
- Hach DREL 2000 portable laboratory (or equivalent);
- Multiprobe Electronic Water Quality Recorder (Hydrolab);
- Electric well sounder and measuring tape;
- Portland Type II cement (see footnote); and
- Steel Posts (pickets), painted (see footnote).

2.3 DOCUMENTATION

- Copy of work plans and health and safety plan;
- Copy of USACE EM 110-1-4000 Monitoring Well Requirements.;
- Copies of permits (area entry, hot work, well, and utility clearance);
- Boring log forms;
- Well completion diagram form; and
- Field logbook.

2.4 GEOLOGIST'S PERSONAL EQUIPMENT

- Boring log materials per SOP 10.3; and
- Personal protective equipment and clothing (PPE) as required by the site-specific health and safety plan.

3.0 PROCEDURE

3.1 MATERIALS APPROVAL

3.1.1 Source Water

Water sources for drilling, grouting, sealing, filter pack placement, well installation, and equipment decontamination must be approved by the COR before arrival of the drilling equipment. Information required for the water source includes:

- Water source;
- Manufacturer/owner and their address and telephone number;
- Type of treatment and filtration prior to tap;
- Time of access;
- Cost per gallon (if applicable); and
- Dates and results associated with all available chemical analyses over the past 2 years, and the name and address of the analytical laboratory (if applicable).

3.1.2 Bentonite

Pure sodium bentonite with no additives (bentonite) will be the only drilling fluid additive allowed, and its use must be approved by the COR before the arrival of the drilling equipment. The information required for evaluation includes brand name, manufacturer, manufacturer's address and telephone number, product description, and intended use for the product, and potential effects on chemical analysis of water samples.

3.1.3 Granular Filter Pack

Granular filter pack material must be approved by the COR before drilling. A one-pint representative sample must be supplied to the COR. Information required includes lithology, grain size distribution, brand name, source, processing method, and size of intended screen.

3.1.4 Cement

Portland Type II cement will be used for grout (or Type IV, as noted in Section 2.2).

3.2 DRILLING

The objective of the selected drilling technique used at given site is to ensure that the drilling method provides representative data while minimizing subsurface contamination, cross contamination, and drilling costs.

Drilling methods that are appropriate for boring or monitoring well installation will depend on the subsurface geology most likely to be encountered in the boring. The geology for each site should be determined by reviewing previous investigation data (boring data, geophysics, etc.) from the site or nearby areas. Specific drilling methods that will be used to support site activities will be incorporated into work plan addenda.

Section 5.2.2 of the Master Work Plan discusses the different drilling methods that may be appropriate for installation of monitoring wells at the Radford Army Ammunition Plant (RFAAP) based on the different types of conditions encountered. The different drilling methods discussed in this section of the Master Work Plan including:

- Hollow Stem Auger (for soil);
- Air Rotary (soil and rock);
- Water Rotary and wire-line casing advancement (soil and rock);
- Drill-Through-Casing Driver (soil and rock); and
- Sonic (soil and rock).

3.2.1 Responsibilities of the Site Geologist

A Site Geologist will be present during all well drilling and installation activities and will fully characterize all tasks performed in support of these activities in the monitoring well logbook. The Site Geologist will be responsible for the logging samples, monitoring drilling operations, recording water losses/gains and groundwater data, preparing the boring logs and well diagrams, and recording the well installation procedures for one operating rig. The Site Geologist will have sufficient equipment in operable condition on-site to perform efficiently his/her duties.

3.2.2 Additives

No lubricants will be used on down hole drilling equipment. Additives containing either lead or copper will not be allowed. In addition, polychlorinated biphenyls will not be permitted in hydraulic fluids or other fluids used in the drilling rig, pumps, or other field equipment and vehicles.

Surface runoff or other fluids will not be allowed to enter any boring or well during or after drilling/construction.

Antifreeze used to keep equipment from freezing will not contain rust inhibitors and sealants. Antifreeze is prohibited in any areas in contact with drilling fluid. Absorbent pillows will be placed to catch any obvious leaks from the drill rig.

3.2.3 Boring Logs and Field Notes

Borings for monitoring wells will be logged by a geologist as described in SOP 10.3. Logs will be recorded on USACE HTRW ENG Form 5056-R and 5056A-R boring log forms.

Daily investigation activities at the site related to drilling should be recorded in field logbooks as described in SOPs 10.1 and 10.2.

3.3 WELL CONSTRUCTION AND INSTALLATION

Specifications for monitoring well construction and installation for a given site being investigated are to be included in work plan addenda. In case the previously defined criteria have not been met before the depth range for a given hole is reached, the geologist will stop the drilling and confer with the supervisor. The current boring conditions (depth, nature of the stratigraphic unit, and water-table depth) will be compared to those of other wells nearby to decide whether to continue drilling or to terminate and complete the well.

3.3.1 Overburden Wells

Overburden wells at the RFAAP are typically designed as a 4-inch diameter, single cased well (see Figure 20-1a) installed into a surficial aquifer, which is present above bedrock. For this type of well, the well boring would be terminated before penetrating any underlying confining unit and/or bedrock.

Section 5.2.2 of the Master Work Plan discusses the different drilling methods that may be appropriate for installation of overburden wells.

If dense, non-aqueous liquid (DNAPL) is encountered during drilling, the well boring will be terminated and completed at the base of the overburden aquifer being monitored.

3.3.2 Bedrock Wells

Multi-cased wells or wells with an outer casing installed into competent bedrock should be specified for wells that are designed to monitor groundwater within bedrock (see Figure 20-1c). The installation of a multi-cased well or outer casing will isolate the zone(s) monitored from overburden and will minimize the potential for cross-contamination during and after drilling.

The general procedure to be followed for installation of a multi-cased well is as follows. This procedure assumes the installation of a 4-inch diameter monitoring well. Specific procedures, drilling techniques and design of monitoring wells will be presented in work plan addenda for site-specific investigations.

1. If soil sampling is required within overburden, use appropriate drilling techniques to advance the boring and collect the soil samples.

2. A minimum 10-inch drill bit should be advanced from the surface into competent bedrock a distance not less than 2 feet. A drilling technique appropriate for penetrating overburden and bedrock should be used such as air rotary.

3. After the borehole has been advanced to the target depth within competent bedrock, a 6-inch diameter steel or Schedule 80 PVC outer casing should be lowered to the bottom of the boring.

4. Once the outer casing has been lowered to the bottom of the boring, the casing should be grouted in-place using a decontaminated tremie pipe equipped with a side discharge. The annulus between the outer casing and borehole wall will be injected with grout until undiluted grout reaches the surface.

5. The grouting mixture, specification, and placement should be consistent with the requirements identified in Section 3.3.8.

6. The grout should be allowed to cure a minimum of 24 hours before further drilling.

7. After adequate curing time for outer casing, drilling with a 5-5/8-inch bit until the desired total depth is reached should complete the well boring.

8. Once the well boring is completed, an appropriate bedrock well will be constructed based on site-specific conditions. The types of wells that may be installed may include a constructed well with screen, casing, filter pack, seal, and grout; an open-bedrock well; or a lined open bedrock well (see Section 3.3.3).

3.3.3 Well Screen Usage

Well screen usage for a given site should be specified in work plan addenda based on expected site conditions.

In general, wells installed within overburden will be installed with a screen as per Figure 20.01-a or 20.01-b. Bedrock wells may be installed with or without a screen depending on site specific conditions such as the depth of water bearing zones, stability of bedrock, occurrence of karst zones, and construction of existing wells at the site being investigated.

In general, bedrock wells installed within karst zones will be completed as open-hole construction (see Figure 20.01c). If evidence of potential or severe borehole collapse (unstable bedrock) is indicated during drilling, casing and screen will be installed in the borehole as a removable lining. If desired, multiple flow zones may be monitored in an open bedrock well by installing a multiport well, which has monitoring/sampling intervals sealed off from the rest of the boring and from each other by packers.

3.3.4 Beginning Well Installation

Schedule

Monitoring well installation should begin within 12 hours of boring completion for holes that are uncased or partially cased with temporary drill casing. In the case where a partially cased hole into bedrock is to be partially developed prior to well insertion, the well installation should begin within 12 hours of this initial development. For holes that are fully cased, installation should begin within 48 hours. Once begun, well installation should not be interrupted.

Placement of Materials

Temporary casing and hollow stem augers may be removed from the boring prior to well installation if the potential for cross contamination is low and if the borehole will remain stable during the time required for installation.

Where borehole conditions are unstable, some or all of the well materials may need to be installed prior to removal of the temporary casing or hollow stem augers. The casing or hollow stem augers should have an inside diameter sufficient to allow the installation of the screen and casing plus annular space for a pipe through which to place filter pack and grout.

Any materials blocking the bottom of the drill casing or hollow stem auger should be dislodged and removed from the casing prior to well insertion.

3.3.5 Screens, Casing, and Fittings

Borehole Specifications

The borehole for each well should be of sufficient diameter to provide for at least 2 inches of annular space between the borehole wall and all sides of the casing.

Well Screens

Material specifications for well screens, casings, and fittings are discussed in Section 2.2.
Screen bottoms should be securely fitted with a threaded cap or plug of the same composition as the screen. The cap/plug should be within 0.5 feet of the open portion of the screen. A sediment trap/sump will not be used.

Screen slot size will be appropriately sized to retain 90%–100% of the filter pack material, the size of which will be determined by sieve analysis of formation material.

Well screen lengths should be specified in work plan addenda and will be based on various site-specific factors such as environmental setting, subsurface conditions, analytes of concern, regulatory considerations, etc.

Assembly and Placement of Well Screen and Casing

Personnel should take precautions to assure that grease, oil, or other contaminants do not contact any portion of the well screen and casing assembly. Clean latex or nitrile gloves should be worn when handling the screen and casing assembly. Flush, threaded joints usually can be tightened by hand. If necessary, steam cleaned wrenches may be used to tighten joints.

In general, each section of the well assembly is lowered into the borehole, one section at a time, screwing each section securely into the section below it. No grease, lubricant, polytetrafluoroethylene (PTFE) tape, or glue may be used in joining the sections of screen and casing.

The assembly should be lowered to its predetermined level and held in position for placement of the filter pack. It is essential that the assembly be installed straight (with centralizers as appropriate) to allow for appropriate sampling. Buoyant forces associated with fluids in the borehole may require that the assembly be installed with the aid of hydraulic rams of the drill rig. When the well assembly is placed to predetermined level, a temporary cap should be place on the well to prevent foreign material from entering the well.

The bottoms of well screens should be placed no more than 3 feet above the bottom of the drilled borehole. If significant overdrilling is required, a pilot boring should be used. Sufficient filter pack should be placed at the bottom of the borehole

The well casing should be pre-cut (square) to extend 2 to 2.5 feet above the ground surface. Before placement of the last piece of well casing, a notch or other permanent reference point will be cut, filed, or scribed into the top edge of the casing.

The tops of all well casing will be capped with covers composed of materials compatible with the products used in the well installation. Caps will be loose fitting, constructed to preclude binding to the well casing caused by tightness of fit, unclean surfaces, or weather conditions. In either case, it should be secure enough to preclude the introduction of foreign material into the well, yet allow pressure equalization between the well and the atmosphere.

The top of each well casing should be level so that the maximum difference in elevation between the highest and lowest points of the casing is less than or equal to 0.02 ft.

3.3.6 Filter Pack

The volume of filter pack that is required to fill the annular between the well screen/casing and borehole should be computed, measured, and recorded.
Granular filter packs will be chemically and texturally clean, inert, and siliceous. The gradation of filter packs will be selected based on the screen size used and will be specified in the work plan addenda for the site being investigated.

Primary Filter Pack

Filter pack material should be placed in the borehole using a decontaminated tremie pipe. An appropriate amount of primary filter pack should be placed in the borehole prior to final positioning of the well screen to provide an appropriate barrier between the bottom of the borehole and the bottom of the screen. Once the

initial filter pack has been placed and the well assembly is appropriately positioned and centered in the borehole, the remaining primary filter pack should be placed in increments (and tamped) as the tremie pipe is gradually raised.

As the primary filter pack is placed, approved source water may need to be added to help move the filter pack. A weighted tape should be used to measure the top of the filter pack as it is being placed. If bridging of the filter pack occurs, then this bridging should be broken mechanically prior to adding additional filter pack.

When temporary casing or hollow stem augers are used, the casing or augers should be removed in increments such that lifting of the well assembly is minimal. After removal of each increment, it should be confirmed by direct measurement that the primary filter pack has not been displaced during the removal.
The primary filter pack should extend from the bottom of the borehole to 3 to 5 ft above the top of the screen.

Secondary Filter Pack

The primary filter pack may be capped with 1 to 2 feet of feet of secondary filter pack to prevent the intrusion of the bentonite seal into the primary filter pack. The need for this filter pack (and specifications) should be addressed in work plan addenda for the site being investigated. Such factors as the gradation of the primary filter pack, the potential for grout extrusion, and site hydrogeology should be considered when evaluating the need for this filter pack.

3.3.7 Bentonite Seal

A bentonite seal, consisting of hydrated 3/8-inch diameter. bentonite pellets, will be installed immediately above the filter pack. The seal may be installed with a tremie pipe, which is lowered to the top of the filter pack and slowly raised as the pellets fill the annular space. In deep wells, the pellets may bridge and block the tremie pipe; in this case, pellets may be placed by free fall into the borehole. A weighted tape should be used to measure the top of seal as it is installed.

When cement grout is to be used above the bentonite seal, a minimum of 3 to 4 hours should be allowed for hydration of the pellets.

When installing a seal above the water table, water should be added to the bentonite for proper hydration. In this case, the seal should be placed in lifts of 0.5 to 1 foot with each lift hydrated for a period of 30 minutes.
If the bentonite seal is to be installed far below the water table, a bentonite slurry seal will be installed. Cement-bentonite grout will not be used below the water table. The slurry will be mechanically blended aboveground to ensure a lump-free mixture. The slurry will consist of bentonite powder and approved water mixed to a minimum 20 percent solids by weight of pumpable slurry with a density of 9.4 pounds per gallon or greater. The slurry will be pumped into place through a tremie pipe and measured as installed.
Bentonite seals should be 3 to 5 ft thick as measured immediately after placement. The final depth to the top of the bentonite seal will be measured and recorded before grouting.

3.3.8 Grout

Cement grout used in construction will be composed of the following:

- Type II Portland Cement (or Type IV as noted in Section 2.2);
- Bentonite (2 to 5% dry bentonite per 94-lb sack of dry cement); and
- A maximum of 6 to 7-gallons of approved water per 94-lb sack of cement

Neither additives nor borehole cuttings will be mixed with the grout. Bentonite will be added after the required amount of cement is mixed with the water.

All grout material will be combined in an aboveground container and mechanically blended to produce a thick, lump-free mixture. The mixed grout will be recirculated through the grout pump before placement. Grout placement should be performed as follows:

1. Grout should be placed from a rigid tremie pipe located just over the top of the bentonite seal. The tremie pipe should be decontaminated prior to use.
2. The tremie pipe should be kept full of grout from start to finish with the discharge end of the pipe completely submerged as it is slowly and continuously lifted.
3. The annulus between the drill casing and well casing should be filled with sufficient grout to allow for the planned drill casing removal. Grout should not penetrate the well screen or filter pack.

- For incremental removal of drill casing, grout should be pumped to maintain at least 10 ft of grout in the drill casing remaining in the borehole after removing the selected length of casing. After each section of casing is removed, the tremie pipe may be reinserted to the base of the casing not yet removed.
- In the case where drill casing will be removed all at once, grout should be pumped from the tremie pipe until undiluted grout flows from the annulus at the ground surface.

4. If the un-grouted portion of a borehole is less than 15 feet and without fluids after drill casing removal, then the un-grouted portion may be filled by pouring grout from the surface.
5. If drill casing was not used for well installation, grouting should proceed to the surface in one continuous operation.
6. For grout placement in a dry and open hole less than 15 ft deep, grout may be manually mixed and poured in from the surface providing that integrity of the bentonite seal is maintained.
7. Protective casing should be installed immediately after completion of grouting.
8. Grout settlement should be checked within 24 hours of the initial grout placement. Additional grout should be added grout should be added to fill any observed depressions.

The following will be noted in the boring logs: (1) exact amounts of cement, bentonite, and water used in mixing grout and (2) actual volume of grout placed in the hole.

3.3.9 Well Protection

The major elements of well protection will include:

- A protective casing;
- Protective concrete pad around the well; and
- Protective steel posts set around the well outside of the concrete pad.

Well Protective Casing

Well protective casings will be installed around all monitoring wells immediately after grouting. The protective casing should consist of a minimum 5-ft long, steel pipe (protective casing) installed over the well casing and into the grout. The protective casing should be installed to a depth of approximately 2.5-feet below ground surface (extending approximately 2.5 feet above ground surface). The internal well casing (riser) and protective casing will not be separated by more than 0.2 feet of height.

An internal mortar collar will be placed within the protective steel casing and outside the well casing to a height of 0.5 above ground surface.

After placement and curing of the mortar collar, an internal drainage hole will be drilled through the protective casing, which is centered no more 1/8 inch above the grout filled annulus between the well riser and the protective casing.

Any annulus formed between the outside of the protective casing and the borehole will be filled to ground surface with cement.

Concrete Pad

After the grout has thoroughly set and the well protective casing has been installed, a protective concrete pad will be installed around the well. This pad will be at least 4 inches thick and 4 feet square and sloped away from the well to provide for adequate drainage.

Protective Posts

Additional protection will be provided at each well location by the installation of four steel posts outside of each corner of the concrete pad. The installation of protective posts should occur before the well is sampled. The posts should have a minimum diameter of 3 inches, be placed 2 to 3 feet below ground surface, and extend at least 3 feet above ground surface. Posts should be painted orange using a brush.

Posts should be set in post holes, which are backfilled with concrete. For additional protection, the posts can be filled with concrete.

3.3.10 Well Construction Diagram and Field Notes

The construction of each well will be depicted as built in a well construction diagram (see Figure 20.1a). The diagram will be attached to the boring log and the following will be graphically denoted:

- Bottom of boring;
- Screen location, length, and size;
- Coupling locations;
- Granular filter pack;
- Seal;
- Grout;
- Cave-in;
- Centralizers;
- Height of riser;
- Protective casing detail;
- Water level 24 hours after completion with date and time of measurement;
- Quantity and composition of materials used; and
- Material between bottom of boring and bottom of screen.

Daily activities at the site related to monitoring well installation should be recorded in the field logbooks as described in SOPs 10.1 and 10.2.

3.4 GENERAL SEQUENCE OF MONITORING WELL COMPLETION

The following is a general sequence of monitoring well completion with reference to the specific details included in Section 3.3.

1. Completion of borehole;
2. Assembly and placement of well assembly as described in Section 3.3.5;
3. Placement of the appropriate filter pack(s) as discussed in Section 3.3.6;
4. Installation of an appropriate bentonite seal as discussed in Section 3.3.7;
5. Grouting the remaining annular space of the borehole as discussed in Section 3.3.8;
6. Set the protective casing for the well as discussed in Section 3.3.9;
7. Complete the protective concrete pad as discussed in Section 3.3.9; and
8. Install the protective posts as discussed in Section 3.3.9.

3.5 INVESTIGATION-DERIVED MATERIAL

Investigation-derived material will be managed in accordance with procedures defined in the work plan addenda for the site being investigated and SOP 70.1.

4.0 MAINTENANCE

Not applicable.

5.0 PRECAUTIONS

Refer to the site-specific health and safety plan.

6.0 REFERENCES

ASTM Standard D 5092-90. 1990. *Standard Practice for Design and Installation of Ground Water Monitoring Wells in Aquifers.*

ASTM Standard D 5717-95. 1995. *Standard Guide for Design of Ground-Water Monitoring Systems in Karst and Fractured Rock Aquifers.*

USACE. 1998. *Monitoring Well Design, Installation, and Documentation at Hazardous, Toxic, and Radioactive Waste Sites.* EM 1110-1-4000, 1, November.

EXAMPLE WELL DEVELOPMENT FORM

WELL DESIGNATION:_____ DATE(S) OF INSTALLATION:_____/_____/_____

SITE GEOLOGIST:_____ DEVELOPMENT DATE(S):_____/_____/_____

STATIC WATER LEVELS BEFORE AND AFTER DEVELOPMENT * :

BEFORE _____ DATE _____ 24 HR. AFTER _____ DATE_____

DEPTH TO SEDIMENT BEFORE AND AFTER DEVELOPMENT * :

BEFORE _____ DATE _____ 24 HR. AFTER _____ DATE_____

DEPTH TO WELL BOTTOM *: _____ SCREEN LENGTH _____

HEIGHT OF WELL CASING ABOVE GROUND SURFACE: _____

QUANTITY OF MUD/WATER:

LOST DURING DRILLING	(+)_____gallons
REMOVED PRIOR TO WELL INSERTION	(-)_____gallons
LOST DURING THICK FLUID DISPLACEMENT	(+)_____gallons
ADDED DURING FILTER PACK PLACEMENT	(+)_____gallons
TOTAL LOSSES	_____gallons

(a) Water column ht. (ft.) _____ (b) Well radius (in.)_____

(c) Screen length (ft.) _____ (d) Borehole radius (in.)_____

(e) QUANTITY OF FLUID STANDING IN WELL

Install Equation Editor and double-click here to view equation.

1 _____ gallons
(Show Calculation)

(f) QUANTITY OF FLUID IN ANNULUS Install Equation Editor and double-click here to view equation. 1_____gallons
(Show Calculation)

DEVELOPMENT VOLUME = (5 * TOTAL LOSSES) + [5 * (e + f)] = _____ gallons
(Show Calculation)

* **ALL DEPTHS MEASURED FROM TOP OF WELL CASING**

EXAMPLE WELL DEVELOPMENT RECORD

WELL DESIGNATION _____ DATE(S) OF DEVELOPMENT: _____/_____/_____

TYPE AND SIZE OF PUMP:_____

TYPE AND SIZE OF BAILER:_____

DESCRIPTION OF SURGE TECHNIQUE:_____

RECORD OF DEVELOPMENT

DATE & TIME	QUANTITY REMOVED	TIME REQ'D	pH	Cond	Temp	ORD	Turb	DO	Character of water (color/clarity/ odor/partic.)
(before)									
(during)									
(during)									
(during									
(after)									

TYPICAL PUMPING RATE_____ GAL./HR. EST. RECHARGE RATE_____

TOTAL QUANTITY OF WATER REMOVED_____ TIME REQUIRED_____

REMARKS_____

SIGNATURE OF SITE GEOLOGIST_____

STANDARD OPERATING PROCEDURE 20.2
MONITORING WELL DEVELOPMENT

1.0 SCOPE AND APPLICATION

Well development is the process by which drilling fluids, solids, and other mobile particulates within the vicinity of the newly installed monitoring well are removed, while ensuring proper hydraulic connection to the aquifer. Development stabilizes the formation and filter pack sands around the well screen to ensure aquifer water moves freely to the well.

Well development will be initiated not less than 48 consecutive hours but no longer than 7 calendar days following grouting and/or placement of surface protection.

2.0 MATERIALS

- Work Plans;
- Well Development Form;
- Field Logbook;
- Boring Log and Well Completion Diagram for the well;
- Submersible pump, control box, associated equipment, etc;
- Photoionization detector or other appropriate monitoring instrument as specified in site-specific health and safety plan;
- Personal protective equipment and clothing (PPE) as specified in site-specific health and safety plan;
- Flow-through-cell and probes measuring specific conductance, pH, temperature, oxidation/reduction potential, dissolved oxygen, and turbidity;
- Decontamination supplies (SOP 80.1);
- Electric well level indicator and measuring tape;
- Appropriate containers for purged water and other investigation-derived material, as required; and
- Drilling tools for reverse-air circulation development, as appropriate.

3.0 PROCEDURE

3.1 SELECTING METHOD OF DEVELOPMENT

The type of subsurface conditions encountered should determine the method of well development used at a particular site at the Radford Army Ammunition Plant (RFAAP).

When monitoring wells are installed within overburden material, fractured bedrock or karst aquifers producing little sediment, a combination of mechanical surging and pumping (over pumping) or bailing is generally appropriate for well development. In general, over-pumping is the method of pumping the well at a rate

higher than recharge occurs. Moving a tight-fitting surge block along the inside of the well screen to create a vacuum completes surging.

When monitoring wells are installed with solution features containing excessive amounts of sediment, reverse-circulation airlifting should be used as the initial step of development. Because reverse-circulation tools airlift methods avoid forcibly exposing the annular space to air, reverse-circulation tools can be run throughout the entire water column in the wells being developed.

After the excessive sediment has been removed by reverse-circulation airlifting, conventional pumping techniques may be used as appropriate to complete the well development.

3.2 DEVELOPMENT AND SAMPLING TIMING

Final development of monitoring wells should not be initiated any sooner than 48 hours after or more than 7 days beyond the final grouting of the well. Pre-development or preliminary development may be initiated before this 48-hour minimum period. Preliminary development may be conducted for open wells or for screened wells after installation of the well screen, casing, and filter pack but before installation of the annular seal. Pre-development is recommended when the natural formation will be used as a filter pack.
Well development should be completed at least 14 days prior to sampling.

3.3 SUMMARY OF PROCEDURES

In general, the following procedure should be followed when developing a well using the pump and surge technique:

1. Prepare the work area outside the well by placing plastic sheeting on the ground to avoid cross-contamination.
2. Calibrate water quality meters (refer to SOP 40.1).
3. Determine the depth to water and total depth of well (refer to SOP 40.2).
4. Calculate the equivalent volume (EV) of water in well to be developed (refer to SOP 30.2).
5. Pump or bail the well to ensure that water flows into it and to remove some of the fine materials from the well. Removal of a minimum of one EV is recommended at this point. The rate of removal should be high enough to stress the well by lowering the water level to approximately one-half its original level.
6. Remove pump or bailer, slowly lower a close-fitting surge block into the well until it rests below the static water level but above the screened interval. (NOTE: The latter is not required in the case of an LNAPL well.)
7. Begin a gentle surging motion along top on-third length of the screen, which will allow any material blocking the screen to break up, go into suspension, and move into the well. Note that development should always begin above or at the top of the screen and move progressively downward to prevent the surge block from becoming sand locked in the well casing. Continue surging for 5-10 minutes, remove surge block, and pump or bail the well, rapidly removing at least one EV.
8. Repeat previous step at successively lower levels within the well screen, until the bottom of the well is reached. As development progresses, successive surging can be more vigorous and of longer duration as long as the amount of sediment in the screen is kept to a minimum.
9. Development should continue until the well development criteria listed in Section 3.1.3 have been achieved.
10. All water removed must be managed as directed by the site investigation plan.

3.3.1 Well Development Criteria

In general, well development should proceed until the following criteria are met:

1. At a minimum, removal of three EV of water from the well.
2. Removal of three times of the amount of fluid (mud and/or water) lost during drilling.
3. Removal of three times the fluid used for well installation.
4. The following indicator parameters should be stabilized as indicated by three successive readings within:
    - ± 0.2 for pH;
    - ±3% for specific conductance;
    - ±10 mV for oxidation/reduction potential;
    - ± 1 degree Celsius for temperature; and
    - ±10% for turbidity and dissolved oxygen (except for wells installed in karst aquifers).
5. Well water is clear to the unaided eye (except for wells installed in karst aquifers).
6. The sediment thickness remaining within the well is less than one percent of the screen length or less than 0.1 ft for screens equal to or less than 10 feet.
7. Site specific factors should be evaluated to determine appropriate well development criteria have been if:
    - Well recharge is so slow that the required volume of water cannot be removed during 48 consecutive hours of development;
    - Water discoloration persists after the required volumetric development; and
    - Excessive sediment remains after the required volumetric development.

3.4 WELL DEVELOPMENT RECORD

Record all data as required on a Well Development Record Form (see example), which becomes a part of the complete Well Record. These data include the following:

- Project name, location;
- Well designation, location;
- Date(s) and time(s) of well installation;
- Static water level from top of well casing before and 24 hours after development;
- Depths and dimensions of the well, the casing, and the screen, obtained from the Well Diagram;
- Water losses and uses during drilling, obtained from the boring log for the well;
- Water contained in the well, obtained from calculations using the depth of the water column and the well radius, plus the radius and height of the filter pack and an assumed 30% porosity;
- Measurements of the following indicator parameters: pH, conductivity, oxidation/reduction potential, temperature, and turbidity before and after development and once during each EV;
- Notes on characteristics of the development water;
- Data on the equipment and technique used for development; and
- Estimated recharge rate and rate/quantity of water removal during development.

Well development records shall be submitted to the COR after the development has been completed.

3.5 INVESTIGATION-DERIVED MATERIAL

Investigation-derived material will be managed in accordance with procedures defined in the work plan addendum for the site being investigated and SOP 70.1.

4.0 MAINTENANCE

Not applicable.

5.0 PRECAUTIONS

Refer to the site-specific health and safety plan.

6.0 REFERENCES

Aller, Linda, et al. 1989. *Handbook of Suggested Practices for the Design and Installation of Ground-Water Monitoring Wells.* National Water Well Association.

EPA Groundwater Handbook. 1989.

Nielsen, David M. 1993. *Correct Well Design Improves Monitoring,* in "Environmental Protection," Vol. 4, No.7, July, 1993.

USACE. 1998. *Monitoring Well Design, Installation, and Documentation at Hazardous, Toxic, and Radioactive Waste Sites.* EM 1110-1-4000, 1 November.

ASTM Standard D 5092-90. 1990. *Standard Practice for Design and Installation of Ground Water Monitoring Wells in Aquifers*.

ASTM Standard D 5717-95. 1995. *Standard Guide for Design of Ground-Water Monitoring Systems in Karst and Fractured Rock Aquifers*.

EXAMPLE WELL DEVELOPMENT FORM

WELL DESIGNATION:_____ DATE(S) OF INSTALLATION:_____/_____/_____

SITE GEOLOGIST:_____ DEVELOPMENT DATE(S):_____/_____/_____

STATIC WATER LEVELS BEFORE AND AFTER DEVELOPMENT :

BEFORE _____ DATE _____ 24 HR. AFTER _____ DATE_____

DEPTH TO SEDIMENT BEFORE AND AFTER DEVELOPMENT * :

BEFORE _____ DATE _____ 24 HR. AFTER _____ DATE_____

DEPTH TO WELL BOTTOM *: _____ SCREEN LENGTH _____

HEIGHT OF WELL CASING ABOVE GROUND SURFACE: _____

QUANTITY OF MUD/WATER:

LOST DURING DRILLING	(+)_____	gallons
REMOVED PRIOR TO WELL INSERTION	(-)_____	gallons
LOST DURING THICK FLUID DISPLACEMENT	(+)_____	gallons
ADDED DURING FILTER PACK PLACEMENT	(+)_____	gallons
TOTAL LOSSES	_____	gallons

(a) Water column ht. (ft.) _____ (b) Well radius (in.)_____

(c) Screen length (ft.) _____ (d) Borehole radius (in.)_____

(e) QUANTITY OF FLUID STANDING IN WELL

Install Equation Editor and double-click here to view equation. 1 _____ gallons
(Show Calculation)

(f) QUANTITY OF FLUID IN ANNULUS Install Equation Editor and double-click here to view equation. 1_____gallons
(Show Calculation)

DEVELOPMENT VOLUME = (3 * TOTAL LOSSES) + [5 * (e + f)] = _____ gallons
(Show Calculation)

* **ALL DEPTHS MEASURED FROM TOP OF WELL CASING**

EXAMPLE WELL DEVELOPMENT RECORD

WELL DESIGNATION _____ DATE(S) OF DEVELOPMENT: _____/_____/_____

TYPE AND SIZE OF PUMP:_____

TYPE AND SIZE OF BAILER:_____

DESCRIPTION OF SURGE TECHNIQUE:_____

RECORD OF DEVELOPMENT

DATE & TIME	QUANTITY REMOVED	TIME REQ'D	pH	Cond	Temp	ORD	Turb	DO	Character of water (color/clarity/ odor/partic.)
(before)									
(during)									
(during)									
(during									
(after)									

TYPICAL PUMPING RATE_____ GAL./HR. EST. RECHARGE RATE_____

TOTAL QUANTITY OF WATER REMOVED_____ TIME REQUIRED_____

REMARKS_____

SIGNATURE OF SITE GEOLOGIST_____

STANDARD OPERATING PROCEDURE 20.11
DRILLING METHODS AND PROCEDURES

1.0 SCOPE AND APPLICATION

The use of an appropriate drilling procedure is contingent upon the existing conditions at the project site. The purpose of this standard operating procedure (SOP) is to outline procedures for the various methods of soil and rock drilling identified in the Master Work Plan. In addition it provides procedures for using sampling devices commonly used during soil and rock drilling such as split-barrel sampling, thin walled tube sampling, direct push samplers, and rock coring. For a particular site investigation, the associated work plan addendum will identify the appropriate drilling method and method of sampling, along with proposed sampling depths and intervals and any special procedures or methods.

2.0 MATERIALS

The following types of materials are generally appropriate for drilling:

2.1 SPLIT-BARREL SAMPLING

- Split barrel sampler;
- Borehole logging materials per SOP 10.3 and sampling equipment and materials, as appropriate per SOP 30.1;
- Containers to manage investigation-derived material per SOP 70.1; and
- Decontamination supplies and equipment per SOP 80.1.

2.2 THIN WALLED TUBE SAMPLING

- Thin walled tubes;
- Sealing materials for sample such as sealing wax, metal disks, wood disks, tape, cheesecloth, caps, etc;
- Borehole logging materials per SOP 10.3 and sampling equipment and materials, as appropriate per SOP 30.1;
- Containers to manage investigation-derived material per SOP 70.1; and
- Decontamination supplies and equipment per SOP 80.1.

2.3 DIRECT PUSH SAMPLING

- Direct push unit with hydraulic ram, hammer, etc;
- Sample collection devices, associated equipment and expendable supplies such as sample liners, sample retainers, appropriate lubricants, etc;
- Hollow extension rods;
- Auxiliary tools for handling, assembling, and disassembling tools and samplers;

- Borehole logging materials per SOP 10.3 and sampling equipment and materials, as appropriate per SOP 30.1;
- Containers to manage investigation-derived material per SOP 70.1; and
- Decontamination supplies and equipment per SOP 80.1.

2.4 HOLLOW-STEM AUGER DRILLING

- Drill rig and associated equipment;
- Hollow stem auger assemblies for drilling to appropriate depth including auger heads, drive assembly, pilot assembly, and hollow-stem auger sections;
- Auxiliary devices such as wrenches, auger forks, hoisting hooks, swivels, and adaptors;
- Borehole logging materials per SOP 10.3 and sampling equipment and materials, as appropriate per SOP 30.1;
- Containers to manage investigation-derived material per SOP 70.1; and
- Decontamination supplies and equipment per SOP 80.1.

2.5 DIRECT AIR ROTARY DRILLING

- Drill rig with rotary table and Kelly or top-head drive unit;
- Drill rods, bits, and core barrels (as appropriate);
- Casing;
- Sampling devices and equipment, as appropriate;
- Air compressor and filters, pressure lines, discharge hose, swivel, dust collector, and air-cleaning device (cyclone separator);
- Auxiliary tools for handling, assembling, and disassembling tools and samplers;
- Borehole logging materials per SOP 10.3 and sampling equipment and materials, as appropriate per SOP 30.1;
- Containers to manage investigation-derived material per SOP 70.1; and
- Decontamination supplies and equipment per SOP 80.1.

2.6 DRILL-THROUGH CASING DRIVER

- Drill rig equipped with a mast-mounted, percussion driver;
- Casing, drill rods, and drill bits or hammers;
- Air compressor and filters, pressure lines, discharge hose, swivel, dust collector, and air-cleaning device (cyclone separator);
- Sampling devices and equipment, as appropriate;
- Auxiliary tools for handling, assembling, and disassembling tools and samplers;
- Welding equipment and materials for installation of casing;

- Borehole logging materials per SOP 10.3 and sampling equipment and materials, as appropriate per SOP 30.1;
- Containers to manage investigation-derived material per SOP 70.1; and
- Decontamination supplies and equipment per SOP 80.1.

2.7 DIRECT WATER-BASED ROTARY DRILLING

- Drill rig with derrick, rotary table and Kelly or top-head drive unit;
- Drill rods, bits, and core barrels (as appropriate);
- Casing;
- Water based drilling fluid, with approved additives as appropriate;
- Mud tub, suction hose, cyclone de-sander(s), drilling fluid circulation pump, pressure hose, and swivel;
- Auxiliary tools for handling, assembling, and disassembling tools and samplers;
- Borehole logging materials per SOP 10.3 and sampling equipment and materials, as appropriate per SOP 30.1;
- Containers to manage investigation-derived material per SOP 70.1.
- Decontamination supplies and equipment per SOP 80.1.

2.8 DIRECT ROTARY WIRELINE-CASING ADVANCEMENT DRILLING

- Drill rig with either hollow spindle or top-head drive;
- Drill rods, coring or casing bits, overshot assembly, pilot bit, and core barrel;
- Water based drilling fluid, with approved additives as appropriate;
- Mud tub, suction hose, drilling fluid circulation pump, pressure hose, and swivel;
- Auxiliary tools for handling, assembling, and disassembling tools and samplers;
- Borehole logging materials per SOP 10.3 and sampling equipment and materials, as appropriate per SOP 30.1;
- Containers to manage investigation-derived material per SOP 70.1; and
- Decontamination supplies and equipment per SOP 80.1.

2.9 DIAMOND CORE DRILLING

- Direct rotary drill rig and associated equipment (see Sections 2.4, 2.5 or 2.6);
- Core barrels and core bits;
- Core lifters;
- Core boxes, engineers scale, permanent marking pen, and camera for photographing cores;
- Auxiliary tools for handling, assembling, and disassembling tools and samplers;
- Borehole logging materials per SOP 10.3 and sampling equipment and materials, as appropriate per SOP 30.1;

- Containers to manage investigation-derived material per SOP 70.1; and
- Decontamination supplies and equipment per SOP 80.1.

3.0 PROCEDURES

3.1 PENETRATION TEST AND SPLIT-BARREL SAMPLING OF SOILS

The following general procedure may be followed as outlined in ASTM Standard Test Method D 1586-84.

1. Advance the boring to the desired sampling depth using an appropriate drilling method (see sections below) and remove excessive cuttings from the borehole.
2. Attach the split-barrel sampler to the sampling rods and lower into the borehole. Do not allow the sampler to drop onto the soil to be sampled.
3. Position the hammer above and attach the anvil to the top of the drilling rods.
4. Rest the dead weight of the sampler, rods, anvil, and drive weight on the bottom of the boring and apply a seating blow. If excessive cuttings are encountered at the bottom of the borehole, remove the sampler and rods from borehole and remove the cuttings.
5. Mark the drill rods in three successive 6-inch increments so that the advance of the sampler can be observed.
6. Drive the sampler with blow from the 140 pound hammer and count the number of blows applied in each 6-inch increment until:
   a. Fifty (50) blows have been applied during one of the three 6-inch increments.
   b. A total of 100 blows have been applied.
   c. There is no observed advance of the sampler during the application of 10 successive blows of the hammer.
7. The sampler is advanced the complete 18-inches without the limiting blow counts occurring as described above.
8. Record the number of blows that is required to achieve each 6-inch increment of penetration or fraction of this increment on the boring.
   a. The first 6 inches is considered the seating driver.
   b. The sum of the second and third 6-inch penetration intervals is termed the “standard penetration resistance” or “N-value.”
   c. If the sampler is driven less than 18 inches as discussed in No. 6, then the number of blow for each partial increment will be recorded.
   d. For partial increments, the depth of penetration should be recorded to the nearest 1-inch on the boring log.
   e. If the sampler advances below the bottom of the boring under the weight of rods (static) and/or hammer, then this information will be recorded on the boring log.
9. The raising and dropping of the 140 pound hammer may be accomplished by:
   a. Using a trip, automatic, or semi-automatic hammer drop system that lifts the hammer and allows it to drop 30± 1 inches.

b. Using a cathead shall be essentially free of rust, oil, or grease and have a diameter in the range of 6 to 10 inches. The cathead should be operated at a minimum speed of rotation of 100 revolutions per minute. No more than 2-1/4 rope turns on the cathead may be used when conducting the penetration test.

10. For each hammer blow, a 30-inch lift and drop shall be used.
11. After completing the penetration test, retrieve the sampler and open. Record the percent recovery or the length of sample recovered. Following the procedures outlined in SOP 30.1 when collecting environmental soil samples.
12. Borehole logging should be completed per SOP 10.3.
13. Split-barrel samples must be decontaminated before and after each use per the requirements of SOP 80.1.

3.2 THIN WALLED TUBE SAMPLING

The following general procedure may be followed for collection of relatively undisturbed, thin walled tube samples (e.g., Shelby tube) as outlined in ASTM Standard Practice D 1587-94.

1. Clean out the borehole to targeted sampling depth using most appropriate method, which avoids disturbing the material to be sampled. If groundwater is encountered, maintain the liquid level in the borehole at or above the groundwater level during sampling.
2. Place the sample tub so that its bottom rests on the bottom of the borehole.
3. Advance the sampler without rotation by a continuous relatively rapid motion.
4. Determine the length of the advance by the resistance and condition of the formation, the length of the advance should never exceed 5 to 10 diameters of the tube in sands and 10 to 15 diameters of the tube in clay.
5. When the formation is too hard for push type of sampling, the tube may be driven or the practice used for ring-lined barrel sampling may be used per ASTM Standard D 3550-84 (1995). When a sample is driven, the weight and fall of the hammer must be recorded along with the penetration achieved.
6. The maximum length of sample advance will be no longer than the sample-tube length minus an allowance for the sample head and a minimum of 3-inches for sludge-end cuttings.
7. Upon removal of the tube, measure the length of the sample in the tube. Remove the disturbed material in the upper end of the tube and re-measure the sample length.
8. Remove at least one-inch of material from the lower end of the tube for soil description and identification per SOP 10.3. Measure the overall sample length. Seal the lower end of the tube. If directed, the material from the end of the tube will not be removed for soil identification and description; in this case the tube will be sealed promptly.
9. Prepare sample labels and affix (or markings) on the tube.

3.3 DIRECT PUSH SOIL BORING

The following general procedures outlined in this section may be followed as described in ASTM Standard Test Method D 6282-98.

General considerations for this method include the following:

- A variety of direct push drive systems may be used to advance soil borings based on the intended sampling depths and subsurface conditions and include the following:

  Shallower Depths and Less Difficult Conditions

  - Percussive driving systems – use hydraulically operated hammers and mechanically operated hammers.
  - Static push drive systems – use hydraulic rams to apply pressure and exert static pull (e.g., cone penetrometer systems).
  - Vibratory/sonic systems – use a vibratory device, which is attached to the top of the sampler extension rods.

  Greater Depths and More Difficult Conditions

  - Sonic or resonance drilling systems – use a high power vibratory system to advance larger diameter single or dual tube systems.
  - Rotary drilling equipment – use hydraulic system of drill rig for direct push.

- The equipment used for direct push must be capable of apply sufficient static force, or dynamic force, or both, to advance the sampler to the required depth of collection. Additionally, this equipment must have adequate retraction force to remove the sampler and extension/drive rods once the sample has been collected.
- Avoid using excessive down pressure when advancing the drilling tools/sampler. Excessive pressure may cause the direct push unit to offset from the boring location and may damage drilling tools and samplers.
- Sample liners should be compatible with the material being sampled and the type of analysis to be conducted on the sample. Sealing of liners for submittal to the laboratory for physical testing should be accomplished according to ASTM Standard D 4220-95 (Standard Practice for Preserving and Transporting Soil Samples).
- The general procedure for completing direct push soil borings is the following:

1. Stabilize direct push unit and raise mast at desired location.
2. Attach the hammer assembly to the drill head if not permanently attached. Attach the anvil assembly in the prescribed manner, slide the direct push unit the position over the borehole, and ready the tools for insertion.
3. Inspect the direct push tools before and after use. Decontaminate all down hole tools before and after use per SOP 80.1.
4. Inspect drive shoes for damaged cutting edges, dents or thread failures and these conditions could cause loss of sample recovery and slow the rate of advancement.
5. Assemble samplers and install where required, install sample retainers where needed, and install and secure sampler pistons to ensure proper operation where needed (see Steps 14 through 20 for the various sampler assembly procedures, etc.).
6. After sampler has been appropriately installed (see Steps 14 through 20 for installation procedures, etc.) advance the boring to the target sampling depth using an appropriate direct push technique, as identified above under general considerations.
7. Collect the soil sample from the target sampling depth using one of the methods identified in Steps 14 through 20.
8. Retrieve the sampler and appropriately process the soil sample as identified in Steps 14 through 20 below and in SOP 30.1.

9. Log the borehole per the requirements of SOP 10.3.
10. If collecting another soil sample, decontaminate the sampler for reuse per the requirements of SOP 80.1 or use another decontaminated sampler.
11. Appropriately manage investigation-derived material (discarded samples, decontamination fluids, etc.) per SOP 70.1.
12. Upon completion of the boring and collection of the desired soil samples, abandon the boring per the requirements of SOP 20.2.
13. The following single tube sampling systems (generally piston rod) may be used to collect soil samples (see Steps 14 through 16 below):
    a. Open Solid Barrel Sampler;
    b. Closed Solid Barrel Sampler (e.g. Geoprobe Macro-Core® Piston Rod Sampler); and
    c. Standard Split Barrel Sampler (see Section 3.1).
14. The following two tube sampling systems may be used to collect soil samples (see Steps 17 through 20 below):
    a. Split Barrel Sampler;
    b. Thin Wall Tubes;
    c. Thin Wall Tube Piston Sampler; and
    d. Open Solid Barrel Samplers.
15. Sampling with the single tube, open solid barrel sampler:
    a. Attach the required liner to the cutting shoe by insertion into the machined receptacle are or by sliding over the machined tube.
    b. Insert the liner and shoe into the solid barrel and attach the shoe.
    c. Attach the sampler head to the sampler barrel.
    d. Attach the sampler assembly to the drive rod and the drive head to the drive rod.
    e. Position the sampler assembly under the hammer anvil and advance the sampler assembly into the soil at a steady rate slow enough to allow the soil to be cut by the shoe and move up into the sample barrel.
    f. At the completion of the sampling interval, removal the sampler from the borehole. Remove the filled sampler liner from the barrel by unscrewing the shoe. Cap the liner for laboratory testing or split open for field processing (see SOP 30.1).
    g. Log the borehole per the requirements of SOP 10.3.
16. Sampling with the closed, solid barrel sampler (e.g., Macro-Core® sampler).
    a. Insert or attach the sample liner to the shoe and insert the assembly into the solid barrel sampler. Install the sample, retaining basket, if desired.
    b. Attach the latch coupling or sampler head to the sampler barrel, and attach the piston assembly with point and "O" rings if free water is present, to the latching mechanism.
    c. Insert the piston or packer into the liner to its proper position so that the point leads the sampler shoe. Set latch, charge packer, or install locking pin, and attach assembled sampler to drive rod.
    d. Add drive head and position under the hammer anvil. Apply down pressure, and hammer if needed, to penetrate the soil strata above the targeted sampling interval.
    e. When the sampling interval is reached, insert the piston latch release and recovery tool, removing the piston, or insert the locking pin removal/extension rods through the drive rods, turn counter

clockwise, and remove the piston locking pin so the piston can float on top of the sample, or release any other piston holding device.

f. Direct push or activate the hammer to advance the sampler the desired interval.

g. Retrieve the sampler from the borehole by removing the extension/drive rods. Remove the shoe, and withdraw the sample line with sample for processing (see SOP 30.1).

h. Clean and decontaminate the sampler, reload as described above and repeat the same procedure for collection of addition samples.

i. Log the borehole per the requirements of SOP 10.3.

17. Sampling with standard split barrel (split spoon) sampler generally consists of the following:

a. Attach the split barrel sampler to an extension rod or drill rod.

b. Using a mechanical or hydraulic hammer drive the ampler into the soil the desired interval. The maximum interval that should be driven is equal to the sample chamber length of the split barrel sampler, which is either 18-inches or 24-inches.

c. Retrieve the sampler from the borehole by removing the extension/drive rods.

d. Split the sampler open for field processing (see SOP 30.1).

e. Clean and decontaminate the sampler (SOP 80.1), re-attach and repeat the same procedure for collection of additional samples.

f. Log the borehole per the requirements of SOP 10.3.

18. Sampling with a two tube, split barrel sampler generally consists of the following:

a. Assemble the outer casing with the drive shoe on the bottom, attach the drive head to the top of the outer casing, and attach the sampler to the extension rods.

b. Connect the drive head to the top of the sampler extension rods, and insert the sampler assembly into the outer casing.

c. The cutting shoe of the sampler should contact the soil ahead of the outer casing to minimize sample disturbance.

d. The sample barrel should extend a minimum of 0.25 inches ahead of the outer casing.

e. Mark the outer casing to identify the required drive length, position the outer casing and sampler assembly under the drill head.

f. Move the drill head downward to apply pressure on the tool string. Advance the casing assembly into the soil at a steady rate, which is slow enough to allow the soil to be cut by the shoe and move up inside the sample barrel.

g. Occasional hammer action during the push may assist recovery.

h. If smooth push advancement is not possible because of subsurface conditions, use the hammer to advance the sampler.

i. Stop the application of pressure or hammering when target interval has been sampled. Move the drill head off the drive head. Attach a pulling device to the extension rods or position the hammer bail and retrieve the sampler from the borehole.

j. At the surface, remove the sampler from the extension rods and process the sample per Section 3.01 and SOP 30.1.

k. Log the borehole per the requirements of SOP 10.3.

19. Sampling with a two tube, thin wall tube sampler generally consists of the following:
    a. Attach the tube to the tube head using removable screws.
    b. Attach the tube assembly to the extension rods and position at the base of the outer casing shoe protruding a minimum of 0.25 inches to contact the soil ahead of the outer casing.
    c. Advance the tube with or without the outer casing at a steady rate.
    d. After completing the sampling interval, let the tube remain stationary for one minute. Rotate the tube slowly two revolutions to shear off the sample.
    e. Remove the tube from the borehole and measure the recovery, and log the borehole per the requirements of SOP 10.3.
    f. For field processing, extrude the sample from the tube sampler and process per SOP 30.1. Alternatively, the tube may be sealed and shipped to the laboratory.
20. Sampling with two tube, thin wall tube, piston sampler generally consists of the following:
    a. Check the fixed piston sampling equipment for proper operation of the cone clamping assembly and the condition of the "O" rings.
    b. Slide the thin wall tube over the piston, and attach it to the tube head. Position the piston at the sharpened end of the thin wall tube just above the sample relief bend.
    c. Attach the tube assembly to the extension rods and lower the sampler into position through the outer casing. Install the actuator rods through the extension rod, and attach to the actuator rod in the sampler assembly.
    d. Attach a holding ring to the to top of the actuator rod string and hook the winch cable or other hook to the holding ring to hold the actuator rods in a fixed position.
    e. Attach the pushing fork to the drill head/probe hammer and slowly apply downward pressure to the extension rods advancing the thin wall tube over the fixed piston into the soil for the length of the sampling interval.
    f. After completing the sampling interval, let the tube remain stationary for one minute. Rotate the tube slowly one revolution to shear off the sample.
    g. Remove the tube sampler from the borehole and measure the recovery, and log the borehole per the requirements of SOP 10.3.
    h. For field processing, extrude the sample from the tube sampler and process per SOP 30.1.
21. Sampling with an two tube, open solid barrel sampler generally consists of the following:
    a. This sampling technique may be used when soil conditions prevent advancement of a split barrel sampler or advancement of an outer casing.
    b. The solid, single, or segmented barrel sampler requires the use of a liner.
    c. Use sampler in advance of outer casing when this casing cannot be advanced.
    d. Follow the procedures outlined for two tube, split barrel sampling.

3.4 HOLLOW-STEM AUGER DRILLING

The following general procedure may be followed as outlined in ASTM Standard Guide D 5784.

1. Stabilize drill rig and raise mast at desired location.
2. Attach an initial assembly of hollow-stem auger components (hollow stem auger, hollow auger head, center rod and pilot assembly, as appropriate) to the rotary drive of the drill rig.
3. Push the auger assembly below the ground surface and initiate rotation at a low velocity.

4. Decontamination of auger head may be necessary after this initial penetration if this surface soil is contaminated.
5. Continue drilling from the surface, usually at a rotary velocity of 50 to 100 rotations per minute to the depth where sampling or in-situ testing is required or until the drive assembly is within approximately 6- to 18 inches of the ground surface.
6. As appropriate, collect a soil sample from the required depth interval. The sample may be conducted by
    a. Removing the pilot assembly, if used, and inserting and driving a sampler through the hollow stem auger of the auger column; or
    b. Using a continuous sampling device within the lead auger section, where the sampler barrel fills with material as the auger is advanced.
7. Additional sections of hollow stems augers may be added to drill to a greater depth. After these auger sections are added, rotation of the hollow-stem auger assembly may be resumed.
8. When drilling through material suspected of being contaminated, the installation of single or multiple (nested) outer casings may be required to isolate zones suspected contamination (see SOP 20.1). Outer casings may be installed in a pre-drilled borehole or using a method in which casing is advanced at the same of drilling.

    Monitoring wells or piezometers may be installed using hollow-stem augers by:

    a. Drilling with or without sampling to the target depth.
    b. Removal of the pilot assembly, if used, and insertion of the monitoring well (or piezometer) assembly.
    c. The hollow stem auger column should be removed incrementally as the monitoring well (or piezometer) completion materials are placed (see SOP 20.1 for grouting).
9. If materials enter the bottom of the auger hollow stem during the removal of the pilot assembly, it should be removed with a drive sampler or other appropriate device.
10. If sampling or *in-situ* testing is not required during completion of the boring, the boring may be advanced with an expendable knock out plate or plug of an appropriate material instead of a pilot assembly.
11. Drill cuttings should be appropriately controlled and contained as IDM per SOP 70.1. It may be necessary to drill through a hole of sheet of plywood or similar material to prevent cuttings from contacting the ground surface.
12. The hollow-auger assembly and sampling devices must be decontaminated before and after each use per the methods specified in SOP 80.1.
13. Borehole logging should be completed per SOP 10.3.
14. Borehole abandonment, when required, should be conducted according to SOP 20.3.

3.5 DIRECT AIR ROTARY DRILLING

The following general procedure may be followed as outlined in ASTM Standard Guide D 5784-95.

1. Stabilize drill rig and raise mast at desired location. Appropriately position the cyclone separator and seal it to the ground surface considering the prevailing wind direction (exhaust).
2. Establish point for borehole measurements.
3. Attach an initial assembly of a bit, down hole hammer, or core barrel with a single section of drill rod, below the rotary table or top-head drive unit, with the bit placed below the top of the dust collector.
4. Activate the air compressor to circulate air through system.

5. Initiate rotation of bit.
6. Continue with air circulation and rotation of the drill-rod column to the depth where sampling or in-situ testing is required or until the length of the drill rod section limits further penetration.
7. Monitor air pressure during drilling operations. Maintain low air pressure at bit to prevent fracturing of surrounding material.
8. Stop rotation and lift the bit slightly off the bottom of the hole to facilitate removal of drill cuttings and continue air circulation until the drill cuttings are removed from the borehole annulus.
9. Open reaching a desired depth of sampling, stop the air circulation and rest bit on bottom of hole to determine the depth. Record the borehole depth and any resultant caving in. If borehole caving is apparent set a decontaminated casing to protect the boring.
10. When sampling, remove the drill rod column from the borehole or leave the drill rod assembly in place if the sampling can be performed through the hollow axis of the drill rods and bit.
11. Compare the sampling depth to clean-out depth by first resting the sampler on the bottom of the hole and compare that measurement with the clean-out depth measurement.
12. If bottom-hole contamination is apparent (indicated by comparison of sample depth to clean-out depth), it is recommended that the minimum depth below the sampler/bit be 18 inches for testing. Record the depth of sampling or in-situ testing and the depth below the sampler/bit.
13. The procedure described in Steps 8 through 12 should be conducted for each sampling or testing interval.
14. Drilling to a greater depth may be accomplished by attaching an additional drill rod section to the top of the previously advanced drill-rod column and resuming drilling operations as described above.
15. When drilling through material suspected of being contaminated, the installation of single or multiple (nested) outer casings may be required to isolate zones suspected contamination (see SOP 20.1 for grouting requirements). Outer casings may be installed in a pre-drilled borehole or using a method in which casing is advanced at the same of drilling.
16. Monitoring wells or piezometers may be installed by:
    a. Drilling with or without sampling to the target depth.
    b. Removal of the drill rod assembly and insertion of the monitoring well (or piezometer) assembly.
    c. Addition of monitoring well (or piezometer) completion materials (see SOP 20.1).
17. Drill cuttings should be appropriately controlled and contained as IDM per SOP 70.1.
18. The drill rod assembly, sampling devices, and other drilling equipment contacting potentially contaminated material must be decontaminated before and after each use per the methods specified in SOP 80.1.
19. Borehole logging should be completed per SOP 10.3.
20. Borehole abandonment, when required, should be conducted according to SOP 20.3

3.6 DRILL-THROUGH CASING DRILLING

The following general procedure may be followed as outlined in ASTM Standard Guide D 5872-95.

1. Stabilize drill rig and raise mast at desired location. Appropriately position the cyclone separator and seal it to the ground surface considering the prevailing wind direction (exhaust).
2. Establish point for borehole measurements.
3. Attach an initial assembly of a bit or down hole hammer with a single section of drill rod and casing to the top-head drive unit.

4. Activate the air compressor to circulate air through system.
5. Drilling may be accomplished by
    a. Method 1- the casing will fall, or can be pushed downward behind the bit.
    b. To drill using Drive the casing first followed by drilling out the plug inside the casing.
    c. Method 2 - Advancing the casing and bit as a unit, with the drill bit or hammer, extending up to 12-inches below the casing.
6. Method 3 - Under reaming method where bit or hammer pens a hole slightly larger than the casing so that Method 1, drive the casing first and drill out the plug in the casing by moving the bit or hammer beyond the casing and then withdrawing it into the casing. Air exiting the bit will remove the cuttings up the hole. Separate cuttings from the return air with a cyclone separator or similar device.
7. To drill using Method 2, advance casing and bit as unit with the bit or hammer extending up to 12-inches beyond the casing depending on the conditions. While drilling, occasionally stop the casing advancement, retract the bit or hammer inside the casing to clear and maintain air circulation to clear cuttings.
8. To drill using Method 3, use a special down hole bit or hammer to open a hole slightly larger than the outside diameter of the casing so that the casing will fall or can be pushed downward immediately behind the bit. After advancing the casing, retract the radial dimension of the drill bit to facilitate removal of the down hole bit or hammer and drill tools inside the casing. Cuttings are removed from the borehole with the air that operates the bit or hammer and can be separated from the air with a cyclone separator or similar device.
9. Monitor air pressure during drilling operations. Maintain low air pressure at bit or hammer to prevent fracturing of surrounding material.
10. Continue air circulation and rotation of the drill rod column until drilling is completed to the target depth (for sampling, in-situ sampling, etc.) or until the length of the drill-rod section limits further penetration.
11. Stop rotation and lift bit or hammer slightly off the bottom of the hole to facilitate removal of drill cuttings and continue air circulation until the drill cuttings are removed from the borehole annulus.
12. After reaching a desired depth of sampling, stop the air circulation and rest the bit on bottom of hole to determine the depth. Record the borehole depth and any resultant caving in. If borehole caving is apparent set a decontaminated casing to protect the boring.
13. When sampling, remove the drill rod column from the borehole. Compare the sampling depth to clean-out depth by first resting the sampler on the bottom of the hole and compare that measurement with the clean-out depth measurement.
14. If bottom-hole contamination is apparent (indicated by comparison of sample depth to clean-out depth), it is recommended that the minimum depth below the sampler/bit be 18 inches for testing. Record the depth of sampling or in-situ testing and the depth below the sampler/bit.
15. The procedure described in Steps 11 through 14 should be conducted for each sampling or testing interval.
16. Drilling to a greater depth may be accomplished by attaching an additional drill rod section and casing section to the top of the previously advanced drill-rod column/casing and resuming drilling operations as described above.
17. Monitoring wells or piezometers may be installed by:
    a. Casing advancement in increments, with or without sampling to the target depth.
    b. Removal of the drill rods and the attached drill bit while the casing is temporarily left in place to support the borehole wall.

c. Insertion of the monitoring well (or piezometer) assembly.

d. Addition of monitoring well (or piezometer) completion materials (see SOP 20.1).

18. Drill cuttings should be appropriately controlled and contained as IDM per SOP 70.1.
19. The drill rod assembly, casing, sampling devices, and other drilling equipment contacting potentially contaminated material must be decontaminated before and after each use per the methods specified in SOP 80.1.
20. Borehole logging should be completed per SOP 10.3.
21. Borehole abandonment, when required, should be conducted according to SOP 20.3.

3.7 DIRECT WATER-BASED ROTARY DRILLING

The following general procedure may be followed as outlined in ASTM Standard Guide D 5783-95.

1. Stabilize drill rig and raise mast at desired location. Appropriately position the mud tub and install surface casing and seal at the ground surface.
2. Establish point for borehole measurements.
3. Attach an initial assembly of a bit or core barrel with a single section of drill rod, below the rotary table or top-head drive unit, with the bit placed with the top of the surface casing.
4. Activate the drilling-fluid circulation pump to circulate drill fluid through the system.
5. Initiate rotation of bit and apply axial force to bit.
6. Document drilling conditions and sequence (fluid loss, circulation pressures, depths of lost circulation, etc.) as described in SOP 10.3.
7. Continue with drill fluid circulation as rotation and axial force are applied to the bit until drilling to the depth

    a) Where sampling or in-situ testing is required;

    b) Until the length of the drill rod section limits further penetration; or

    c) Until core specimen has completely entered the core barrel (when coring) or blockage has occurred.

8. Stop rotation and the lift bit slightly off the bottom of the hole to facilitate removal of drill cuttings and continue fluid circulation until the drill cuttings are removed from the borehole annulus.
9. After reaching a desired depth of sampling, stop the fluid circulation and rest the bit on bottom of hole to determine the depth. Record the borehole depth and any resultant caving in. If borehole caving is apparent set a decontaminated casing to protect the boring.
10. When sampling, drill rod removal is not necessary if the sampling can be performed through the hollow axis of the drill rods and bit.
11. Compare the sampling depth to clean-out depth by first resting the sampler on the bottom of the hole and compare that measurement with the clean-out depth measurement.
12. If bottom-hole contamination is apparent (indicated by comparison of sample depth to clean-out depth), it is recommended that the minimum depth below the sampler/bit be 18 inches for testing. Record the depth of sampling or in-situ testing and the depth below the sampler/bit.
13. The procedure described in Steps 8 through 11 should be conducted for each sampling or testing interval.
14. Drilling to a greater depth may be accomplished by attaching an additional drill rod section to the top of the previously advanced drill-rod column and resuming drilling operations as described above.

15. When drilling through material suspected of being contaminated, the installation of single or multiple (nested) outer casings may be required to isolate zones suspected contamination (see SOP 20.1 for grouting requirements). Outer casings may be installed in a pre-drilled borehole or using a method in which casing is advanced at the same of drilling.
16. Monitoring wells or piezometers may be installed using hollow-stem augers by:
    a. Drilling with or without sampling to the target depth.
    b. Removal of the drill rod assembly and insertion of the monitoring well (or piezometer) assembly.
    c. Addition of monitoring well (or piezometer) completion materials (see SOP 20.1).
17. Drill cuttings and fluids should be appropriately controlled and contained as IDM per SOP 70.1.
18. The drill rod assembly, sampling devices, and other drilling equipment contacting potentially contaminated material must be decontaminated before and after each use per the methods specified in SOP 80.1.
19. Borehole logging should be completed per SOP 10.3.
20. Borehole abandonment, when required, should be conducted according to SOP 20.3.

3.8 DIRECT ROTARY WIRELINE CASING ADVANCEMENT DRILLING

The following general procedure may be followed as outlined in ASTM Standard Guide D 5876-95.

1. Stabilize drill rig and raise mast at desired location. Appropriately position the mud tub (for water based rotary) and install surface casing and seal at the ground surface.
2. Record the hole depth by knowing the length of the rod-bit assemblies and comparing its position relative to the established surface datum.
3. Attach an initial assembly of a lead drill rod and a bit or core barrel below the top-head drive unit, with the bit placed with the top of the surface casing.
4. Activate the drilling-fluid circulation pump to circulate drill fluid through the system.
5. Initiate rotation of bit and apply axial force to bit.
6. Document drilling conditions and sequence (fluid loss, circulation pressures, depths of lost circulation, down feed pressures etc.) as described in SOP 10.3.
7. In general, the pilot bit or core barrel can be inserted or removed at any time during the drilling process and the large inside diameter rods can act as a temporary casing for testing or installation of monitoring devices.
8. Continue with drill fluid circulation as rotation and axial force are applied to the bit until drilling to the depth
    a) Where sampling or in-situ testing is required;
    b) Until the length of the drill rod section limits further penetration; or
    c) Until core specimen has completely entered the core barrel (when coring) or blockage has occurred.
9. Stop rotation and lift the bit slightly off the bottom of the hole to facilitate removal of drill cuttings and continue fluid circulation until the drill cuttings are removed from the borehole annulus.
10. After reaching a desired depth of sampling, stop the fluid circulation and rest the bit on bottom of hole to determine the depth. Record the borehole depth and any resultant caving in. If borehole caving is apparent set a decontaminated casing to protect the boring.

11. When sampling, drill rod removal is not necessary if the sampling can be performed through the hollow axis of the drill rods and bit.
12. Compare the sampling depth to clean-out depth by first resting the sampler on the bottom of the hole and compare that measurement with the clean-out depth measurement.
13. If bottom-hole contamination is apparent (indicated by comparison of sample depth to clean-out depth), it may be necessary to further clean the hole by rotary recirculation.
14. Continuous sampling may be conducted with a soil core barrel or rock core barrel (see Section 1.7).
15. The pilot bit or core barrel may need to be removed during drilling such as when core barrels are full or there is evidence of core blocking. Before the drill string is reinserted, the depth of the boring should be rechecked to evaluate hole quality and determine whether casing may be required.
16. Water testing may be performed in consolidated deposits by pulling back on the drill rods and passing inflatable packer(s) with pressure fitting to test the open borehole wall (see ASTM Standards D 4630 and D 4631).
17. Drilling to a greater depth may be accomplished by attaching an additional drill rod section to the top of the previously advanced drill-rod column and resuming drilling operations as described above.
18. When drilling through material suspected of being contaminated, the installation of single or multiple (nested) outer casings might be required to isolate zones suspected contamination (see SOP 20.1 for grouting requirements). Outer casings may be installed in a pre-drilled borehole or using a method in which casing is advanced at the same of drilling.
19. Monitoring wells or piezometers may be installed by:
    a. Drilling with or without sampling to the target depth.
    b. Removal of the pilot bit or core barrel and insertion of the monitoring well (or piezometer) assembly.
    c. Addition of monitoring well (or piezometer) completion materials (see SOP 20.1).
20. Drill cuttings and fluids should be appropriately controlled and contained as IDM per SOP 70.1.
21. The drill rod assembly, sampling devices, and other drilling equipment contacting potentially contaminated material must be decontaminated before and after each use per the methods specified in SOP 80.1.
22. Borehole logging should be completed per SOP 10.3.
23. Borehole abandonment, when required, should be conducted according to SOP 20.3.

3.9 DIAMOND CORE DRILLING

The following general procedure may be followed as outlined in ASTM Standard Practice D 2113-83 (1993).

1. Use core-drilling procedures, such as the water-rotary drilling method outlined in Section 3.6.
2. Seat the casing on bedrock or firm formation to prevent raveling of the borehole and to prevent loss of drilling fluid. Level the formation that the casing will be seated on as needed.
3. Begin core drilling using an N-size double-tube, swivel-type core barrel or other approved size or type. Continue core drilling until core blockage occurs or until the net length of the core has been drilled.
4. Remove the core barrel from the borehole, and dis-assemble the core barrel as necessary to remove the core.
5. Reassemble the core barrel and return it to hole.
6. Continue core drilling.

7. Place the recovered core in the core box with the upper (surface) end of the core at the upper-left corner of the core box. Wrap soft or friable cores, etc. as needed or required. Use spacer blocks or slugs properly marked to indicate any noticeable gap in recovered core that might indicate a change or void in the formation. Fit fracture, bedded, or jointed pieces of core together as they naturally occurred.
8. The core within each completed box should be photographed after core surface has been cleaned or peeled, as appropriate, and wetted. Each photo should be in sharp focus and contain a legible scale in feet and tenths of feet (or metric if appropriate). The core should be oriented so that the top of the core is at the top of the photograph. A color chart should be included in the photograph frame as a check on photographic accuracy. The inside lid of the box should also be shown.
9. The inside of the box lid should be labeled at a minimum with the facility name, project name, boring number, box number, and core interval.
10. A preliminary field log of the core must be completed before the core box has been packed for transport (see SOP 10.3). Detailed logging may be conducted at a later time providing the core is appropriately handled and transported.
11. Four levels of sample protection may be used depending on character of the rock and the intended use of the rock core including:
    a. *Routine care* – for rock cored in 5 to 10 foot runs. Consists of placing in structurally sound boxes. Lay flat tubing may be used prior to placing the core.
    b. *Special care* – for rock samples to be tested that are potentially moisture sensitive, such as shale. This care consists of sealing with a tight fitting wrapping of plastic film and application of wax at the ends of the sample.
    c. *Critical care* – for rock samples that may be sensitive to shock and vibration and/or temperature. Protect by encasing each sample in cushioning material, such as sawdust, rubber, polystyrene, foam, etc. A minimum one-inch thick layer of cushioning material should be used. Thermally insulate samples that are potentially sensitive to changes in temperature.
    d. *Soil-Like care* – handle per ASTM Standard D 4220-95.
12. Drilling conditions and sequence (fluid loss, circulation pressures, depths of lost circulation, down feed pressures, core blockage etc.) should be documented on the boring log as described in SOP 10.3.
13. Drill cuttings and fluids should be appropriately controlled and contained as investigation-derived material per SOP 70.1.
14. The drill rod assembly, sampling devices, and other drilling equipment contacting potentially contaminated material must be decontaminated before and after each use per the methods specified in SOP 80.1.
15. Borehole logging should be completed per SOP 10.3.
16. Borehole abandonment, when required, should be conducted according to SOP 20.3.

4.0 MAINTENANCE

Not applicable.

5.0 PRECAUTIONS

Refer to site-specific health and safety plan included in work plan addenda.

6.0 REFERENCES

ASTM Standard D 2113-83 (1993). 1993. *Standard Practice for Diamond Core Drilling for Site Investigation.*

ASTM Standard D 1586-84 (1992). 1992. *Standard Test Method for Penetration Test and Split-Barrel Sampling of Soils.*

ASTM Standard D 1587-94. 1994. *Standard Practice for Thin-Walled Tube Geotechnical Sampling of Soils.*

ASTM Standard D 4220-95. 1995. *Standard Practices for Preserving and Transporting Soil Samples.*

ASTM Standard D 5079-90. 1995. *Standard Practices for Preserving and Transporting Rock Core Samples.*

ASTM Standard D 5782-95. 1995. *Standard Guide for Use of Direct Air-Rotary Drilling for Geoenvironmental Exploration and the Installation of Subsurface Water-Quality Monitoring Devices.*

ASTM Standard D 5783-95. 1995. *Standard Guide for Use of Direct Rotary Drilling with Water-Based Drilling Fluid for Geoenvironmental Exploration and the Installation of Subsurface Water-Quality Monitoring Devices.*

ASTM Standard D 5784-95. 1995. *Standard Guide for Use of Hollow-Stem Augers for Geoenvironmental Exploration and the Installation of Subsurface Water-Quality Monitoring Devices.*

ASTM Standard D 5872-95. 1995. *Standard Guide for Use of Casing Advancement Drilling Methods for Geoenvironmental Exploration and the Installation of Subsurface Water-Quality Monitoring Devices.*

ASTM Standard D 5876-95. 1995. *Standard Guide for Use of Direct Rotary Wireline Casing Advancement Drilling Methods for Geoenvironmental Exploration and the Installation of Subsurface Water-Quality Monitoring Devices.*

ASTM Standard D 6282-98. 1998. *Standard Guide for Direct Push Soil Sampling for Environmental Site Characterizations.*

USACE. 1998. *Monitoring Well Design, Installation, and Documentation at Hazardous, Toxic, and Radioactive Waste Sites.* EM 1110-1-4000. 1, November.

STANDARD OPERATING PROCEDURE 30.1
SOIL SAMPLING

1.0 SCOPE AND APPLICATION

The purpose of this standard operating procedure (SOP) is to delineate protocols for sampling surface and subsurface soils.

2.0 MATERIALS

- Stainless steel scoop, spoon, trowel, knife, spatula, (as needed);
- Split-spoon, Shelby tube, or core barrel sampler;
- Hand auger or push tube sampler;
- Drill rig and associated equipment (subsurface soil);
- Stainless steel bowls;
- Photoionization detector or other appropriate instrument as specified in site-specific health and safety plan;
- Sampling equipment for collection of volatile organic samples;
- Appropriate sample containers;
- Appropriate sample labels and packaging material.;
- Personal protective equipment and clothing (PPE) per site-specific health and safety plan; and
- Decontamination equipment and supplies (SOP 80.1).

3.0 PROCEDURE

3.1 DOCUMENTATION

Soil sampling information should be recorded in the field logbooks as described in SOPs 10.1 and 10.2.

3.2 SURFICIAL SOIL SAMPLES

The targeted depths for surficial soil samples (surface and near surface) will be specified in the work plan addenda developed for site-specific investigations.

1. All monitoring equipment should be appropriately calibrated before beginning sampling according to the requirements of the work plan addenda and SOP 90.1 or 90.2.
2. All sampling equipment should be appropriately decontaminated before and after use according to the requirements of the work plan addendum and SOP 80.1.
3. Use a spade, shovel, or trowel or other equipment (manufactured from material, which is compatible with the soil to be sampled) to remove any overburden material present (including vegetative mat) to the level specified for sampling.
4. Measure and record the depth at which the sample will be collected with an engineers scale or tape.

5. Remove the thin layer that was in contact with the overburden removal equipment using a clean stainless steel scoop or equivalent and discard it.
6. Begin sampling with the acquisition of any discrete sample(s) for analysis of volatile organic compounds (VOCs), with as little disturbance as possible. VOC samples will not be composited or homogenized.
7. When a sample will not be collected with a core type of sampler (push tube, split spoon, etc.), the sample for VOC analysis will be collected from freshly exposed soil. The method of collection will follow the procedures specified in SOP 30.8 (Methanol Preservation Method) or 30.9 (En Core® Method) based on the requirements of the work plan addenda.
8. Field screen the sample with properly calibrated photoionization detector (PID) or other appropriate instrument. Cut a cross-sectional slice from the core or center of the sample and insert the monitoring instrument(s). Based on the screening results, collect the VOC fraction, as applicable.
9. Collect a suitable volume of sample from the targeted depth with a clean stainless steel scoop (or similar equipment), push tube sampler, or bucket auger
10. For core type of samplers, rough trimming of the sampling location surface should be considered if the sampling surface is not fresh or other waste, different soil strata, or vegetation may contaminate it. Surface layers can be removed using a clean stainless steel, spatula, scoop, or knife. Samples collected with a bucket auger or core type of sampler should be logged per the requirements of SOP 10.3.
11. If homogenization or compositing of the sampling location is not appropriate for the remaining parameters, the sample should be directly placed into appropriate sample containers with a stainless steel spoon or equivalent.
12. If homogenization of the sample location is appropriate or compositing of different locations is desired, transfer the sample to a stainless steel bowl for mixing. The sample should be thoroughly mixed with a clean stainless steel spoon, scoop, trowel, or spatula and then placed in appropriate sample containers per the requirements for containers and preservation specified in work plan addenda. Secure the cap of each container tightly.
13. Appropriately, label the samples (SOP 50.1), complete the chain-of-custody (SOP 10.4), and package the samples for shipping (SOP 50.2).
14. Return any remaining unused soil to the original sample location. If necessary, add clean sand to bring the subsampling areas back to original grade. Replace the vegetative mat over the disturbed areas.

3.3 SUBSURFACE SAMPLES

All sampling equipment should be appropriately decontaminated before and after use according to the requirements of the work plan addendum and SOP 80.1.

1. All monitoring equipment should be appropriately calibrated before sampling according to the requirement of the work plan addendum and SOP 90.1 or SOP 90.2.
2. All sampling equipment should be appropriately decontaminated before and after use according to the requirements of the work plan addendum and SOP 80.1.
3. Collect split-spoon; core barrel, Shelby tube, sonic core or other similar samples during drilling.
4. Upon opening sampler or extruding sample, immediately screen soil for VOCs using a PID or appropriate instrument. If sampling for VOCs, determine the area of highest concentration; use a

stainless steel knife, trowel, or lab spatula to cut the sample; and screen for VOCs with monitoring instrument(s).

5. Log the sample on the boring log before extracting from the sampler per the requirements of SOP 10.3.
6. Any required VOC samples will be collected first followed by the other parameters. VOC samples will not be composited or homogenized and will be collected from the area exhibiting the highest screening level. The method of VOC sample collection will follow the procedures specified in SOP 30.8 (Methanol Preservation Method) or 30.9 (En Core® Method) based on the requirements of the work plan addenda.
7. Field screen the sample with properly calibrated photoionization detector (PID) or other appropriate instrument. Cut a cross-sectional slice from the core or center of the sample and insert the monitoring instrument(s). Based on the screening results, collect the VOC fraction, as applicable.
8. Rough trimming of the sampling location surface should be considered if the sampling surface is not fresh or other waste, different soil strata, or vegetation may contaminate it. Surface layers can be removed using a clean stainless steel, spatula, scoop, or knife.
9. If homogenization or compositing of the sampling location is not appropriate for other parameters, the sample should be directly placed into appropriate sample containers with a stainless steel spoon or equivalent.
10. If homogenization of the sample location is appropriate or compositing of different locations is desired, transfer the sample to a stainless steel bowl for mixing. The sample should be thoroughly mixed with a clean stainless steel spoon, scoop, trowel, or spatula and placed in appropriate sample containers per the requirements for containers and preservation specified in work plan addenda. Secure the cap of each container tightly.
15. Appropriately, label the samples (SOP 50.1), complete the chain-of-custody (SOP 10.4), and package the samples for shipping (SOP 50.2).
16. Discard any remaining sample into the drums used for collection of cuttings.
17. Abandon borings according to procedures outlined in SOP 20.2.

3.4 INVESTIGATION-DERIVED MATERIAL

Investigation-derived material will be managed in accordance with procedures defined in the work plan addenda for the site being investigated and SOP 70.1.

NOTES: If sample recoveries are poor, it may be necessary to composite samples before placing them in jars. In this case, the procedure will be the same except that two split-spoon samples (or other types of samples) will be mixed together. The boring log should clearly state that the samples have been composited, which samples were composited, and why the compositing was done. In addition, VOC fraction should be collected from the first sampling device.

When specified, samples taken for geotechnical analysis (e.g., percent moisture, density, porosity, and grain size) will be undisturbed samples, such as those collected using a thin-walled (Shelby tube) sampler, sonic core sampler, etc.

4.0 MAINTENANCE

Not applicable.

5.0 PRECAUTIONS

Refer to the site-specific health and safety plan.

Soil samples will not include vegetative matter, rocks, or pebbles unless the latter are part of the overall soil matrix.

6.0 REFERENCES

ASTM Standard D 1586-84. 1984. *Penetration Test and Split-Barrel Sampling of Soils.*

ASTM Standard D 1587-83. 1983. *Thin Walled Sampling of Soils.*

ASTM Standard D 5633-94. 1994. *Standard Practice for Sampling with a Scoop.*

USACE. 2001. *Requirements for the Preparation of Sampling and Analysis Plans.* EM 200-1-3. 1 February.

STANDARD OPERATING PROCEDURE 30.2
GROUNDWATER SAMPLING

1.0 SCOPE AND APPLICATION

The purpose of this standard operating procedure (SOP) is to delineate protocols for the collection of groundwater samples from monitoring wells.

2.0 MATERIALS

- Work Plans;
- Field logbooks and field parameter forms;
- Plastic sheeting;
- Decontamination equipment and supplies (SOP 80.1);
- Variable-speed, low-flow submersible pump with safety drop cable;
- Nylon stay-ties;
- Generator;
- Dedicated Teflon tubing or Teflon lined polyethylene tubing;
- Flow-through-cell and probes for measuring pH, temperature, specific conductance, oxidation/reduction potential, dissolved oxygen, and turbidity (SOP 40.1);
- Electronic water-level indicator;
- Appropriate sample bottles, labels, chain-of-custody forms, and sample shipping supplies etc;
- Cooler with ice;
- Silicone tubing;
- 0.45-micron disposable filters (as appropriate).
- Personal protective equipment and clothing (PPE) per site-specific health and safety plan;
- Photoionization detector (PID) or other appropriate monitoring instrument per the site-specific health and safety plan; and
- Appropriate containers for investigation-derived material.

3.0 PROCEDURE

3.1 DOCUMENTATION

Groundwater sampling information should be recorded in the field logbooks as described in SOPs 10.1 and 10.2.

The following are general rules for the field parameter logbook for groundwater, as described in SOP 10.2:

- Only information for one site or installation per logbook. The same book maybe used for more than one sampling event.
- The first five pages will be reserved for index, general notes, etc. Sign and date each entry.
- Fill in the forms.
- Duplicate copies, index pages, and calibration sheets remain intact.

3.2 OVERVIEW OF SAMPLING TECHNIQUES

In general, two different techniques may be used to sample groundwater from monitoring wells at Radford Army Ammunition Plant (RFAAP):

- Low flow purging and sampling (Type I); and
- Conventional purging and low-flow sampling (Type II).

These two sampling techniques are intended to address the different groundwater conditions that may be encountered at RFAAP.

The Type I sampling technique will be used in the following situations:

- In wells where only one discrete water-producing zone is encountered;
- In wells with no discrete water bearing zone and a low yield (generally < 0.5 liters per minute); and
- In wells sampled during seasonal low groundwater conditions with greatly reduced yield.

The Type II sampling technique will be used in the following situations:

- In a well with potential or documented multiple flow zones and where individual flow zones will not be evaluated;
- In moderately producing wells (> 0.5 liters per minute) where no discrete flow zones were documented during drilling; and
- In wells sampled during seasonal high groundwater conditions with enhanced yield (and potentially additional flow zones).

Groundwater samples should be collected no sooner than 14 days after well development. Information from the boring logs, well completion records, and well development records should be reviewed before sampling a well to determine the most appropriate sampling technique. Pertinent information for each well to be sampled includes:

- Well construction;
- Depth and nature of water producing zones;
- Sustainable pumping rate of the well to be sampled;
- Well recharge characteristics; and
- Baseline turbidity.

Because of the heterogeneous nature of the fracture and solution-enhanced fractured bedrock at RFAAP, monitoring well purging and sampling techniques will need to be flexible. This flexibility is necessary to

obtain representative samples that meet the data quality objectives (DQOs) specified in site-specific work plan addenda.

In general, when using the pumps specified in the following sections, situate any gasoline-powered generator on level ground approximately 15 ft downwind from the well. All generator maintenance (oil and fueling) is to be performed off site. If the hose(s) and/or power cord of the pump is not on a reel, place the pump with its hose and power cord on the plastic sheeting downhill from the well.

3.3 TYPE I SAMPLING PROCEDURES

Type I low flow purging and sampling procedures include the following:

- The work area outside the well will be prepared by placing plastic sheeting on the ground around the well casing to avoid cross-contamination.
- All equipment used to purge and sample the wells will be thoroughly decontaminated before and after use according to the requirements of the work plan addenda and SOP 80.1.
- All equipment to be used for monitoring water quality parameters will be calibrated before beginning purging according to the requirements of the work plan addenda and SOP 40.1.
- Note the condition of the well and well head.
- Monitor the headspace of the well with a photoionization detector as the well cap is removed.
- Measure and record the depth to water with an electronic water level indicator. The measurement of well depth will not be taken until after sampling is completed so that potential re-suspension of any settled solids at the bottom of the well is avoided.
- Well depth at the time of purging will be obtained from well construction and existing data.
- Slowly lower a clean, stainless steel, adjustable flow rate, submersible pump and dedicated Teflon or Teflon-lined polyethylene tubing to the desired depth. As the pump is slowly lowered into the well, secure the safety drop cable, tubing, and electrical lines to each other using nylon stay-ties.
- For wells with very low sustainable pumping rates ($\leq$ 0.5 liters per minute), the pump should be set in the middle of the saturated screen section of the well or middle of the water column for open wells. The pump should be set 12 hours prior to purging so that the depth to water equilibrates and sediments disturbed during pump placement have time to settle.
- For wells with sustainable pumping rates ($>$ 0.5 liters per minute), the pumps will be set at a desired depth prior to purging, allowing for the depth to water to equilibrate before sampling. The desired depth will be specified in work plan addenda based on site-specific conditions and DQOs.
- Connect the pump tubing to an in-line flow-through cell(s) and connect the multi-parameter probe to the cell(s). The end of the tubing exiting the in-line flow-through cell should be placed to discharge into a appropriate container(s) to collect purge water.
- Immediately prior to purging, the depth to water will be measured and record. Start pumping the water at a rate of 100 to 400 milliliters per minute. Avoid surging. The pumping rate should cause minimal drawdown (less than 0.2 ft). Water level measurements should be collected continuously to document stabilization of the water level. Pumping rates should, if needed, be reduced to the minimal capabilities of the pump to avoid dewatering the screen interval and ensure stabilization of indicator parameters.

- During purging, water quality indicator parameters will be monitored at the in-line flow-through cell(s) every 3 to 5 minutes. The parameters to be monitored include pH, specific conductance, oxidation/reduction potential (Eh), dissolved oxygen, and turbidity.
- Continue purging until stabilization of indicator parameters is achieved. Stabilization is defined as three consecutive readings that are within the following criteria:
  - ± 0.1 for pH;
  - ±3% for specific conductance;
  - ±10 mV for oxidation/reduction potential (Eh); and
  - ±10% for turbidity and dissolved oxygen.
- If the parameters have stabilized, but the turbidity is not in the range of 5 to 10 NTU, then both filtered and unfiltered samples should be collected for any metals analysis. Filter metal samples should be collected with an in-line filter using a high capacity 0.45-micron particulate filter. This filter should be pre-rinsed according to the manufacturer's instructions.
- Once purging is completed, reduce the pumping rate to its lowest steady rate and disconnect the tubing from the in-line flow-though cell(s).
- Collect groundwater samples directly from the end of the tubing into clean containers provided by the laboratory. The container requirements and preservatives for groundwater samples are specified in work plan addenda. Allowing the pump discharge to flow gently down the inside of the container with minimal turbulence should fill all sample containers. Volatile organic compound (VOC) and gas sensitive parameter samples should be collected first followed by other parameters.
- In general, samples should be collected and containerized in the order of the volatilization sensitivity of the parameters. A preferred collection order for some common parameters is VOCs, extractable organics, metals, cyanide, sulfate and chloride, turbidity, and nitrate and ammonia. The parameters to be collected at any well location are site-specific and are specified in work plan addenda.
- Appropriately, label the samples (SOP 50.1), complete the chain-of-custody (SOP 10.4), and package the samples for shipping (SOP 50.2).
- After the sample collection is complete, remove the pump, tubing, and associated lines. Note: sample tubing will be dedicated to each well.
- Measure and record the total depth of the well.
- Secure the well be replacing and locking the lid.

3.4 TYPE II SAMPLING PROCEDURES

- The work area outside the well will be prepared by placing plastic sheeting on the ground around the well casing to avoid cross-contamination.
- All equipment used to purge and sample the wells will be thoroughly decontaminated before and after use according to the requirements of the work plan addenda and SOP 80.1.
- All equipment to be used for monitoring water quality parameters will be calibrated before beginning purging according to the requirements of the work plan addenda and SOP 40.1.
- Note the condition of the well and well head.
- Monitor the headspace of the well with a photoionization detector as the well cap is removed.

- Measure and record the depth to water with an electronic water level indicator. The measurement of well depth will not be taken until after sampling is completed so that potential re-suspension of any settled solids at the bottom of the well is avoided.
- Well depth at the time of purging will be obtained from well construction and existing data.
- Calculate the standing water column in the well by subtracting the depth to water from the total depth of the well as recorded during completion of the well.
- From the water depth, well diameter, sand pack length, etc., calculate the equivalent volume (1 EV) of water in the well.

  1 EV = volume in casing + volume in saturated sand pack. Therefore; if the water table lies below the top of the sand pack, use the following equation:

  $1\ EV = (pR_w^2h_w) + (0.30p(R_s^2-R_w^2)h_w) * (0.0043)$

  If the water table lies above the top of the sand pack use this equation:

  $1\ EV = [(pR_w^2h_w) + (0.30p(R_s^2-R_w^2)h_s)] * (0.0043)$

  Where: R_s = radius of sand pack in inches
  R_w = radius of well casing in inches
  h_s = height of sand pack in inches
  h_w = water depth in inches

  $0.0043\ gal/in^3$
  Assumed filter pack porosity = 30%

Tables and graphs showing equivalent volumes for typical well constructions are available.

- Slowly lower a clean, stainless steel, adjustable flow rate, submersible pump and dedicated Teflon or Teflon-lined polyethylene tubing to the middle of the saturated screen interval or water column in an open borehole. As the pump is slowly lowered into the well, secure the safety drop cable, tubing, and electrical lines to each other using nylon stay-ties.
- Connect the pump tubing to an in-line flow-through cell(s) and connect the multi-parameter probe to the cell(s). The end of the tubing exiting the in-line flow-through cell should be placed to discharge into an appropriate container to collect purge water.
- Start purging the well at the minimally achievable pumping rate. Gradually increase the pumping rate to achieve the maximum flow rate of the pump or the maximum sustainable flow rate that does not draw down the static water level to a point below the top of the first water bearing zone, whichever is achieved first.
- During purging, water level measurements should be collected periodically to verify water levels in the well.
- During purging, water quality indicator parameters will be monitored at the in-line flow-through cell(s) every 3 to 5 minutes. The parameters to be monitored include pH, specific conductance, oxidation/reduction potential (Eh), dissolved oxygen, and turbidity.
- Note when each indicator parameter stabilizes. Stabilization is defined as three consecutive readings that are within the following criteria:
  - ± 0.1 for pH;
  - ±3% for specific conductance;

- ±10 mV for oxidation/reduction potential (Eh); and
- ±10% for turbidity and dissolved oxygen.

- Three calculated eVs of water in the will be purged prior to sampling. It will be documented if stabilization of the indicator parameters has not occurred after three calculated well volumes have been removed and sampling procedures begin.
- If the turbidity is not in the range of 5 to 10 NTU when purging has been completed, then both filtered and unfiltered samples should be collected for any metals analysis. Filter metal samples should be collected with an in-line filter using a high capacity 0.45-micron particulate filter. This filter should be pre-rinsed according to the manufacturer's instructions.
- Once purging is completed, reduce the pumping rate to its lowest steady rate and disconnect the tubing from the in-line flow-though cell(s).
- Collect groundwater samples directly from the end of the tubing into clean containers provided by the laboratory. The container requirements and preservatives for groundwater samples are specified in work plan addenda. Allowing the pump discharge to flow gently down the inside of the container with minimal turbulence should fill all sample containers. Volatile organic compound (VOC) and gas sensitive parameter samples should be collected first followed by other parameters.
- Appropriately, label the samples (SOP 50.1), complete the chain-of-custody (SOP 10.4), and package the samples for shipping (SOP 50.2).
- After the sample collection is complete, remove the pump, tubing, and associated lines. Note: sample tubing will be dedicated to each well.
- Measure and record the total depth of the well.
- Secure the well be replacing and locking the lid.

3.5 INVESTIGATION-DERIVED MATERIAL

Investigation-derived material will be managed in accordance with procedures defined in the work plan addendum for the site being investigated and SOP 70.1.

4.0 MAINTENANCE

Refer to manufacturer's requirements for maintenance of pumps and generators.

5.0 PRECAUTIONS

Refer to the site-specific health and safety plan.

6.0 REFERENCES

USACE. 2001. R*equirements for the Preparation of Sampling and Analysis Plans.* EM 200-1-3, 1 February.

USEPA. 1997. *Recommended Procedure for Low-flow Purging and Sampling of Groundwater Monitoring Wells.* Bulletin No. QAD023, October.

STANDARD OPERATING PROCEDURE 30.3
SURFACE WATER SAMPLING

1.0 SCOPE AND APPLICATION

The purpose of this standard operating procedure (SOP) is to delineate protocols for collecting grab samples of surface water. This procedure can be applied to the collection of surface water samples from streams, rivers, ditches, lakes, ponds, and lagoons.

2.0 MATERIALS

- Work Plans;
- Field logbooks;
- Photoionization detector (PID) or other appropriate monitoring instrument as specified site-specific health and safety plan;
- Appropriate sample bottles, labels, chain-of-custody forms, and sample shipping supplies etc;
- Long-handled dip sampler (polytetrafluoroethylene (PTFE) or stainless steel), as applicable;
- Short-handled dip sampler (PTFE or stainless steel), as applicable;
- Pond sampler (PTFE or stainless steel), as applicable;
- Boat, other stable working platform, personal flotation device, as applicable;
- Sample filtration apparatus, as applicable;
- Peristaltic pump with 0.45-µm filters and disposable PTFE tubing, as applicable;
- Personal protective equipment and clothing (PPE) per site specific health and safety plan; and
- Appropriate containers for investigation-derived material.

3.0 PROCEDURE

3.1 CONSIDERATIONS

Factors that will need to be considered for selection of a surface water sampler include the width, depth, and flow of the surface water body, and whether the sample will be collected from the shore or a vessel. The most appropriate method(s) of sample collection and the appropriate depths of sampling (sampling strategies) will be specified in work plan addenda based on site-specific conditions and data quality objectives (DQOs).

3.2 DOCUMENTATION

Surface water sampling information should be recorded in the field logbooks as described in SOPs 10.1 and 10.2. This information should include a description of the water body characteristics (size, depth, flow, etc.).

Sampling locations should be marked on a site map. Describe each location and place a numbered stake above the visible high water mark on the bank closest to the sampling location and/or mark adjacent trees with surveyor's flagging. The descriptions must be adequate to allow the sampling station to be relocated at some future date by someone other than the original sampling crew.

3.3 SAMPLE LOCATION AND TIMING

Sampling should proceed from downstream locations to upstream locations so that disturbance related to sampling does not affect the samples collected upstream. In addition, if sediment samples are to be collected at the same locations as the surface water samples, the water samples must be collected first. Sampling should be performed quickly and in a manner that minimizes disturbance of bottom sediments to ensure a representative sample.

In general, surface water samples should be collected and containerized in the order of the volatilization sensitivity of the parameters. A preferred collection order for some common parameters is volatile organic compounds (VOCs), extractable organics, metals, cyanide, sulfate and chloride, turbidity, and nitrate and ammonia. The parameters to be collected at any location are site-specific and are specified in work plan addenda.

3.4 SAMPLING METHODS

Various methods may be used to collect samples of surface water and the method used will depend on the considerations discussed in Section 3.1. Some of the more common methods used to collect surface water samples from shallow depths include:

- Submergence of sampling containers;
- Dipper and pond sampler; and
- Peristaltic pump (for non-volatile parameters).

Submergence of Sampling Container

Direct filling the sample containers by submergence is advantageous when the sample might be significantly altered during transfer from a collection device into another container. This method would not be appropriate for sampling at depth.

1. All sampling equipment should be appropriately decontaminated before and after use according to the requirements of the work plan addendum and SOP 80.1.
2. Spread new plastic sheeting on the ground at each sampling location to prevent cross-contamination. If sample access is restricted, use appropriate vessel or another stable working platform adjacent to the area to be sampled.
3. Samples should be collected in order specified in the work plan addenda prepared for the site-specific investigation (also see Section 3.3).
4. Submerge an appropriate sample container with the cap in place with minimal surface disturbance so that the open end is pointing upstream. Sample container requirements are specified in work plan addenda.
5. Allow the container to fill slowly and continuously using the cap to regulate the inflow of water.
6. Retrieve the sample from the surface water with minimal disturbance.
7. Preserve the sample as specified in work plan addenda. Secure the cap on the sample container tightly.

8. Appropriately, label the samples (SOP 50.1), complete the chain-of-custody (SOP 10.4), and package the samples for shipping (SOP 50.2).

Sampling with Dip and Pond Sampler

Dipper and pond samplers prevent unnecessary contamination of the outer surface of the sample container that would occur with the direct submergence method of sampling.

A long handled dipper sampler or a pond sampler can be used to remotely obtain samples where access is poor or non-contact with water is suggested in the health and safety plan.
Sampling with the PTFE or stainless steel dipper or pond sampler (long-handled or measuring cup type):

1. All sampling equipment should be appropriately decontaminated before and after use according to the requirements of the work plan addendum and SOP 80.1.
2. Spread new plastic sheeting on the ground at each sampling location to prevent cross-contamination. If sample access is restricted, use appropriate vessel or another stable working platform adjacent to the area to be sampled.
3. Assemble the sampler.
4. Samples should be collected in order specified in the work plan addenda prepared for the site-specific investigation (also see Section 3.3).
5. Collect samples by slowly submerging the pre-cleaned dipper or pond sampler with minimal surface disturbance. Make sure the open end is pointing upstream.
6. Remove the cap from the sample container and slightly tilt the mouth of the bottle below the edge of the sampler. Sample container requirements are specified in work plan addenda.
7. Empty the sampler slowly. Allow the sample stream to flow gently down the side of the bottle with entry turbulence. Avoid aerating the sample.
8. Continue filling the sample container until the container is filled.
9. Preserve the sample as specified in work plan addenda. Secure the cap on the sample container tightly.
10. Appropriately, label the samples (SOP 50.1), complete the chain-of-custody (SOP 10.4), and package the samples for shipping (SOP 50.2).

Sampling with a Peristaltic Pump

Sampling with a peristaltic pump will extend the lateral reach of the sampler and allow sampling from depths below the water surface. A disadvantage of this method is that it cannot be used to sample for volatile organic compounds because of potential degassing effects.

1. All sampling equipment should be appropriately decontaminated before and after use according to the requirements of the work plan addendum and SOP 80.1.
2. Spread new plastic sheeting on the ground at each sampling location to prevent cross-contamination. If sample access is restricted, use appropriate vessel or another stable working platform adjacent to the area to be sampled.
3. Install clean medical grade silicone tubing in the pump head, as instructed by the manufacturer.
4. Select the length of appropriate suction tubing (PFTE or other) necessary to reach the required sample location/depth and attach to the pump intake or extended section of silicone tubing emanating from the intake side of the pump head.

5. Turn on pump and adjust flow to draw water through tubing. If possible, allow several liters of sample to pass through the system before actual sample collection.
6. Samples should be collected in order specified in the work plan addenda prepared for the site-specific investigation (also see Section 3.3).
7. VOC samples, if required, will be collected using another type of sampling device, as specified in the work plan addenda.
8. Collect surface water samples directly from the end of the tubing into clean laboratory-prepared (preserved) containers. Allowing the pump discharge to flow gently down the inside of the container with minimal turbulence should fill all sample containers. Sample container requirements are specified in work plan addenda.
9. Preserve the sample as specified in work plan addenda. Secure the cap on the sample container tightly.
10. Appropriately, label the samples (SOP 50.1), complete the chain-of-custody (SOP 10.4), and package the samples for shipping (SOP 50.2).

3.5 SAMPLE FILTRATION

If specified in work plan addenda, certain parameters such as metals may need to be collected for both total and dissolved fractions. In this case, filtration will be performed immediately after collecting sample. Set up filtration equipment before collecting sample. Filtration may be accomplished by gravity or, if necessary, due to slow filtering, a peristaltic pump can be used to pressure filter the sample. Vacuum filtration will not be used due to the possibility of analyte volatilization.

Gravity Filtration

1. Using decontaminated forceps, place a 0.45-µm membrane in a decontaminated filter funnel.
2. Slowly pour sample into the funnel and collect filtrate directly into appropriate sample container(s).
3. Preserve the sample as specified in work plan addenda. Secure the cap on the sample container tightly.
4. Appropriately, label the samples (SOP 50.1), complete the chain-of-custody (SOP 10.4), and package the samples for shipping (SOP 50.2).
5. Appropriately dispose of filter membrane.

Filter with a Peristaltic Pump

1. Using previously assembled disposable tubing, 0.45-µm in-line filter, and peristaltic pump, filter sample from collection bucket into appropriate container.
2. Adjust pump rate to avoid aeration of sample.
3. Preserve the sample as specified in work plan addenda. Secure the cap on the sample container tightly.
4. Appropriately, label the samples (SOP 50.1), complete the chain-of-custody (SOP 10.4), and package the samples for shipping (SOP 50.2).

4.0 MAINTENANCE

Refer to manufacturer's specifications for maintenance procedures on generators and pumps.

5.0 PRECAUTIONS

Refer to the site-specific health and safety plan.

6.0 REFERENCES

ASTM Standard D 5358-93. 1993. *Standard Practice for Sampling with a Dipper or Pond Sampler.*

Environmental Monitoring System Laboratory (EMSL), ORD, U.S. Environmental Protection Agency. *Characterization of Hazardous Waste Site-A Method Manual, Volume II-Available Sampling Methods.* 1983.

USACE. 2001. *Requirements for the Preparation of Sampling and Analysis Plans.* EM 200-1-3. 1 February.

STANDARD OPERATING PROCEDURE 30.4
SEDIMENT SAMPLING WITH SCOOP OR TUBE SAMPLER

1.0 SCOPE AND APPLICATION

The purpose of this standard operating procedure (SOP) is to delineate protocols for obtaining representative sediments sampling using a scoop or hand corer.

Sediments include solid matter derived from rocks or biological materials that are suspended in, or settled from, water. This procedure can be applied to the collection of sediment samples from areas of deposition such as streams, rivers, ditches, lakes, ponds, and lagoons.

SOP 30.5 describes two methods of grab sampling (Ekman and Ponar) that are suitable for sampling surface or deep sediments. SOP 30.12 describes a method of sampling deep sediments by using a Vibracore sampler.

2.0 MATERIALS

- Work Plans;
- Field logbooks;
- Photoionization detector (PID) or other appropriate monitoring instruments as specified in site-specific health and safety plan;
- Appropriate sample bottles, labels, chain-of-custody forms, and sample shipping supplies etc;
- Stainless steel bowls;
- Stainless steel or polytetrafluoroethylene (PTFE) scoops, trowels, spoons, and knives;
- Hand core sediment sampler, liners (optional) and extensions;
- Hand auger with buckets, rods, and T-handles;
- Rubber boots/waders;
- Decontamination equipment and supplies (SOP 80.1);
- Plastic sheeting;
- Utility knife;
- Boat or other stable work platform, and personal flotation devices, as applicable; and
- Personal protective equipment and clothing (PPE) as specified in site-specific health and safety plan.

3.0 PROCEDURE

The water content of the sediment may vary greatly. Likewise, the sediments themselves may range from very soft to dense. It may be necessary to use a variety of equipment to obtain the required samples, even at a single site.

3.1 CONSIDERATIONS

Factors that determine the type of sediment water sampler used are primarily related to project objectives of surficial versus subsurface samples, site constraints of the water depth, sampling and sediment conditions, and cost-effectiveness of the sampler.

The most appropriate method(s) of sample collection and the appropriate depths of sampling (sampling strategies) will be specified in the work plan addendum based on site-specific conditions and data quality objectives (DQOs).

3.2 DOCUMENTATION

Sediment sampling information should be recorded in the field logbooks as described in SOPs 10.1 and 10.2. This information should include a description of the water body characteristics (size, depth, flow, etc.) and nature of sediments.

Sampling locations should be marked on a site map. Describe each location and place a numbered stake above the visible high water mark on the bank closest to the sampling location and/or mark adjacent trees with surveyor's flagging. The descriptions must be adequate to allow the sampling station to be relocated at some future date by someone other than the original sampling crew.

3.3 SAMPLE LOCATION AND TIMING

Sampling should proceed from downstream locations to upstream locations so that disturbance related to sampling does not affect the samples collected upstream. In addition, if surface water samples are to be collected at the same locations as the sediment samples, the surface water samples must be collected first. Sampling should be conducting using appropriate sampling devices that minimize disturbance and sample washing as the sample is retrieved through the liquid column.

In general, sediment samples should be collected and containerized in the order of the volatilization sensitivity of the parameters. A preferred collection order for some common parameters is volatile organic compounds (VOCs), extractable organics, metals, cyanide, sulfate and chloride, turbidity, and nitrate and ammonia. The parameters to be collected at any location are site-specific and are specified in work plan addenda.

3.4 LOCATION

For all samples, mark the sampling location on a site map. Photograph (optional, recommended) and describe each location, and place a numbered stake above the visible high water mark on the bank closest to the sampling location. The photographs and description must be adequate to allow the sampling station to be relocated at some future date.

3.5 GENERAL PROCEDURES

1. All sampling equipment should be appropriately decontaminated before and after use according to the requirements of work plan addenda and SOP 80.1.
2. Spread new plastic sheeting on the ground at each sampling location to prevent cross-contamination. If sample access is restricted, use appropriate vessel or another stable working platform adjacent to the area to be sampled.
3. Document sample location and conditions appropriately in the field logbooks and on site maps.
4. Collect surface water sample as described in the work plan addenda and SOP 30.3, as necessary.
5. Collect sediment sample using the appropriate sampling device as described in the following sections.

3.6 SCOOP OR TROWEL METHOD

The scoop or trowel method is a very accurate procedure for collecting representative samples, but is limited to sampling exposed sediments or sediments in surface water less than 6-inches deep, with nominal flow.

1. Insert scoop or trowel into material and remove sample.
2. Begin sampling with the acquisition of any discrete sample(s) for analysis of volatile organic compounds (VOCs), with as little disturbance as possible. VOC samples will not be composited or homogenized.
3. The method of collection for VOC samples will follow the procedures specified in SOP 30.8 (Methanol Preservation Method) or 30.9 (En Core® Method) based on the requirements of the work plan addenda and sampling conditions.
4. Field screen the sample with properly calibrated photoionization detector (PID) or other appropriate instrument. Based on the screening results collect the VOC fraction, as applicable.
5. If homogenization or compositing of the sampling location is not appropriate for the remaining parameters, the sample should be directly placed into appropriate sample containers with a stainless steel spoon or equivalent.
6. If homogenization of the sample location is appropriate or compositing of different locations is desired, transfer the sample to a stainless steel bowl for mixing. The sample should be thoroughly mixed with a clean stainless steel spoon, scoop, trowel, or spatula and then placed in appropriate sample containers. Secure the cap of each container tightly. Sample container requirements are specified in work plan addenda.
7. Appropriately, label and package the samples according to the requirements specified in SOPs 50.1 and 50.2, respectively, and with any additional sample handling requirements specified in work plan addenda.

3.7 TUBE SAMPLER

Tube samplers are a simple and direct method for obtaining sediment samples. The tube sampler is forced into the sediment and then withdrawn and the sample collected. Non-cohesive sediments may limit the effectiveness of this type of sampler.

1. Ensure that the corers and (optional) liners are properly cleaned.
2. Gradually force the corer into the sediment.
3. Carefully retrieve the tube sampler.
4. Remove the sediment core from the tube sampler and place core on a clean working surface.
5. Begin sampling with the acquisition of any discrete sample(s) for analysis of VOCs, with as little disturbance as possible. VOC samples will not be composited or homogenized.
6. The method of collection for VOC samples will follow the procedures specified in SOP 30.8 (Methanol Preservation Method) or 30.9 (En Core® Method) based on the requirements of the work plan addenda and sampling conditions.
7. Field screen the sample with properly calibrated photoionization detector (PID) or other appropriate instrument. Based on the screening results collect the VOC fraction, as applicable.

8. If homogenization or compositing of the sampling location is not appropriate for the remaining parameters, the sample should be directly placed into appropriate sample containers with a stainless steel spoon or equivalent.
9. If homogenization of the sample location is appropriate or compositing of different locations is desired, transfer the sample to a stainless steel bowl for mixing. The sample should be thoroughly mixed with a clean stainless steel spoon, scoop, trowel, or spatula and then placed in appropriate sample containers. Secure the cap of each container tightly. Sample container requirements are specified in work plan addenda.
10. Appropriately, label and package the samples according to the requirements specified in SOPs 50.1 and 50.2, respectively, and with any additional sample handling requirements specified in work plan addenda.

3.8 HAND AUGER AND TUBE SAMPLER

In general, the use of a hand auger and tube sampler will allow for sampling deeper sediments than possible with the tube sampling method described in Section 3.7. A potential disadvantage of using this method is that it limited to use for water bodies of limited depth and hand augers may not be an effective method for penetrating soft sediments since the borehole may collapse prior to sampling.

1. Attach the auger bucket to a drill rod extension and attach the T-handle to the drill rod.
2. Begin drilling with the auger. Periodically remove accumulated sediment from the bucket.
3. After reaching the desired depth, slowly and carefully remove the auger from the boring.
4. Remove the auger bucket from the drill rod(s) and replace with a clean thin-wall tube sampler.
5. Remove the sediment core from the tube sampler and place core on a clean working surface.
6. Carefully lower the tube sampler down the borehole and gradually force it into the sediment, avoiding scraping the borehole sides.
7. Carefully retrieve the tube sampler and unscrew the drill rod(s).
8. Begin sampling with the acquisition of any discrete sample(s) for analysis of VOCs, with as little disturbance as possible. VOC samples will not be composited or homogenized.
9. The method of collection for VOC samples will follow the procedures specified in SOP 30.8 (Methanol Preservation Method) or 30.9 (En Core® Method) based on the requirements of the work plan addenda and sampling conditions.
10. Field screen the sample with properly calibrated photoionization detector (PID) or other appropriate instrument. Based on the screening results collect the VOC fraction, as applicable.
11. If homogenization or compositing of the sampling location is not appropriate for the remaining parameters, the sample should be directly placed into appropriate sample containers with a stainless steel spoon or equivalent.
12. Appropriately, label and package the samples according to the requirements specified in SOPs 50.1 and 50.2, respectively, and with any additional sample handling requirements specified in work plan addenda.

3.9 INVESTIGATION-DERIVED MATERIAL

Investigation-derived material will be managed in accordance with procedures defined in the work plan addenda for the site being investigated and SOP 70.1.

4.0 MAINTENANCE

Not applicable.

5.0 PRECAUTIONS

Refer to the site-specific health and safety plan.

6.0 REFERENCES

ASTM Standard D 4700-91. 1991. *Standard Guide for Soil Sampling from the Vadose Zone.*

ASTM Standard D 5633-94. 1994. *Standard Practice for Sampling with a Scoop.*

USEPA. 1987. *A Compendium of Superfund Field Operations Methods.* EPA/540/P-87/001.

USACE. 2001. *Requirements for the Preparation of Sampling and Analysis Plans.* EM 200-1-3. 1 February.

STANDARD OPERATING PROCEDURE 30.6
CONTAINERIZED MATERIAL

1.0 SCOPE AND APPLICATION

The purpose of this standard operating procedure (SOP) is to delineate protocols for the opening and sampling of containerized liquids of potentially unknown substances.

2.0 MATERIALS

- Work Plans;
- Field logbooks;
- Personal protective equipment and clothing per the site-specific health and safety plan;
- Monitoring instruments per the site-specific health and safety plan;
- Decontamination equipment and supplies (SOP 80.1);
- Tools;
- Historical data, if available;
- Sampling tube; and
- Remote samplers, as required.

3.0 PROCEDURE

Sealed containers with unknown contents represent potential severely hazardous situations for sampling teams. Even when the original identity of the contents is reasonably certain, contents may be under pressure or in a decomposed state and may readily react (sometimes violently) with air or water vapor in the atmosphere.

Only hazardous material specialists that have appropriate training and experience will inspect and sample unidentifiable drums or containers. Specialist team members will use extreme caution and care when opening sealed drums or cans of unknown content for purposes of inspection and sampling.

Efforts will be made to determine the identity of the contents, through markings, history of activities at the site, and similarity and proximity to containers of known contents. The range of possible hazards will dictate which specific procedure will be followed, and specific procedures will be identified in work plan addenda. All predetermined procedures will be strictly followed as designated by the site-specific conditions.

Using this SOP and appropriate health and safety protocols, field personnel will use extreme caution and care in opening sealed drums or cans of unknown contents for purposes of inspection and sampling. Specific activities include the following:

- Determine the identity of the contents through markings, history of activities at the site, and similarity and proximity to containers of known contents. The range of possible hazards will dictate which specific procedure should be followed.
- Handle containers as little as possible; however, if it is necessary to reorient a drum to allow access to a bung or cap, perform this activity using remote-handling forklift equipment with special drum-holding attachments.
- If contents are deemed to be under pressure, highly reactive, or highly toxic (or if these possibilities cannot be disproven), perform initial opening of the container remotely.
- Air monitoring stations will be established as necessary, using the following procedures:
    1. Affix a remote bung opener to the drum.
    2. Evacuate personnel to a safe distance or station them behind a barricade.
    3. Activate the non-sparking motor of the opener.
    4. After the bung is removed, monitor the drum for potential activity of the contents, such as vapor emission, smoking, or audible reaction.
    5. Approach cautiously while monitoring for toxic levels of airborne contaminants.
- If the contents of the drum pose acceptable hazards, accomplish opening (or inspection if previously opened remotely) and sampling with one of three approved devices. The preferred method is to use a clean glass tube, with or without bottom stopper, which can be placed in the drum (breaking it if necessary) after sampling is complete. Alternately (if a bung has been removed), a well sampler such as a Kemmererbailer can be used (but would require removal and cleaning or disposal according to the nature of the waste). By opening either of these devices at a desirable depth, stratified sampling can be performed. Also, the sampling tubes can be made with a plunger rod and O-ring seals at selected intervals, allowing simultaneous collection of multiple samples in a stratified medium.
- Following sampling, the drum will be resealed and/or overpacked to prevent any possibility of leakage while analysis determines the identity of the contents.
- Drums that do not have removable bungs may be opened remotely with a solenoid-activated punch (this requires that the drum be recontainerized or overpacked after sampling is complete).

4.0 MAINTENANCE

Not applicable.

5.0 PRECAUTIONS

Not applicable.

6.0 REFERENCE

USEPA, 1989. A Compendium of Superfund Field Operation Methods. EPA/540/P-87/001. December.

STANDARD OPERATING PROCEDURE 30.7
SAMPLING STRATEGIES

1.0 SCOPE AND APPLICATION

The purpose of this standard operating procedure (SOP) is to delineate sampling strategies for sampling various media.

2.0 MATERIALS

- Historical site data;
- Site topography;
- Soil types; and
- Sampled media.

3.0 PROCEDURE

The primary goal of any investigation is to collect samples representative of existing site conditions. Statistics are generally used to ensure samples are as representative as possible. Sampling plans may employ more than one approach to ensure project data quality objectives are adequately addressed. A comparison of sampling strategies is presented in Table 1.

3.1 CLASSICAL STATISTICAL SAMPLING

Classical statistical sampling strategies are appropriately applied to either sites where the source of contamination is known or small sites where the entire area is remediated as one unit. Primary limitations of this sampling approach include (1) inability to address media variability; (2) inadequate characterization of heterogenous sites; and (3) inadequate characterization of sites with unknown contamination characteristics.

3.1.1 Simple Random Sampling

Simple random sampling is generally more costly than other approaches because of the number of samples required for site characterization. This approach is generally used when minimal site information is available and visible signs of contamination are not evident and includes the following features:

- Sampling locations are chosen using random chance probabilities.
- This strategy is most effective when the number of sampling points is large.

3.1.2 Stratified Random Sampling

This sampling approach is a modification to simple random sampling. This approach is suited for large site investigations that encompass a variety of soil types, topographic features, and/or land uses. By dividing the site into homogenous sampling strata based on background and historical data, individual random sampling techniques are applied across the site. Data acquired from each stratum can be used to determine the mean or total contaminant levels and provide these advantages:

- Increased sampling precision results due to sample point grouping and application of random sampling approach.

- Control of variances associated with contamination, location, and topography.

3.1.3 Systematic Grid

The most common statistical sampling strategy is termed either systematic grid or systematic random sampling. This approach is used when a large site must be sampled to characterize the nature and extent of contamination.

Samples are collected at predetermined intervals within a grid pattern according to the following approach:

- Select the first sampling point randomly; remaining sampling points are positioned systematically from the first point.
- Determine the grid design: one or two-dimensional. One-dimensional sample grids may be used for sampling along simple man-made features. Two-dimensional grid systems are ideal for most soil applications.
- Determine the grid type: square or triangular. Sampling is usually performed at each grid-line intersection. Other strategies include sampling within a grid center or obtaining composite samples within a grid.
- Each stratum is sampled based on using the simple random sampling approach but determined using a systematic approach.

3.1.4 Hot-Spot Sampling

Hot spots are small, localized areas of media characterized by high contaminant concentrations. Hot-spot detection is generally performed using a statistical sampling grid. The following factors should be addressed:

- Grid spacing and geometry. The efficiency of hot-spot searches is improved by using a triangular grid. An inverse relationship exists between detection and grid point spacing, e.g., the probability of hot-spot detection is increased as the spacing between grid points is decreased.
- Hot-spot shape/size. The larger the hot spot, the higher the probability of detection. Narrow or semicircular patterns located between grid sampling locations may not be detected.
- False-negative probability. Estimate the false negative (β-error) associated with hot-spot analysis.

3.1.5 Geostatistical Approach

Geostatistics describe regional variability in sampling and analysis by identifying ranges of correlation or zones of influence. The general two-stage approach includes the following:

- Conducting a sampling survey to collect data defining representative sampling areas.
- Defining the shape, size, and orientation of the systematic grid used in the final sampling event.

3.2 NON-STATISTICAL SAMPLING

3.2.1 Biased Sampling

Specific, known sources of site contamination may be evaluated using biased sampling. Locations are chosen based on existing information.

3.2.2 Judgmental Sampling

This sampling approach entails the subjective selection of sampling locations that appear to be representative of average conditions. Because this method is highly biased, it is suggested that a measure of precision be included through the collection of multiple samples.

4.0 MAINTENANCE

Not applicable.

5.0 REFERENCES

USACE. 2001. *Requirements for the Preparation of Sampling and Analysis Plans.* EM200-1-3. 1 February.

TABLE 1
SAMPLING STRATEGIES

SAMPLING STRATEGY	DESCRIPTION	APPLICATION	LIMITATIONS
Classical Statistical Sampling Strategies			
Simple Random Sampling	Representative sampling locations are chosen using the theory of random chance probabilities.	Sites where background information is not available and no visible signs of contamination are present.	May not be cost-effective because samples may be located too close together. Does not take into account spatial variability of media.
Stratified Random Sampling	Site is divided into several sampling areas (strata) based on background or site survey information.	Large sites characterized by a number of soil types, topographic features, past/present uses, or manufacturing storage areas.	Often more cost-effective than random sampling. More difficult to implement in the field and analyze results. Does not take into account spatial variability of media.
Systematic Grid Sampling	Most common statistical strategy; involves collecting samples at predetermined, regular intervals within a grid pattern.	Best strategy for minimizing bias and providing complete site coverage. Can be used effectively at sites where no background information exists. Ensures that samples will not be taken too close together.	Does not take into account spatial variability of media.
Hot-Spot Sampling	Systematic grid sampling strategy tailored to search for hot spots.	Sites where background information or site survey data indicate that hot spots may exist.	Does not take into account spatial variability of media. Tradeoffs between number of samples, chance of missing a hot spot, and hot spot size/shape must be weighed carefully.
Geostatistical Approach	Representative sampling locations are chosen based on spatial variability of media. Resulting data are analyzed using kriging, which creates contour maps of the contaminant concentrations and the precision of concentration estimates.	More appropriate than other statistical sampling strategies because it takes into account spatial variability of media. Especially applicable to sites where presence of contamination is unknown.	Previous investigation data must be available and such data must be shown to have a spatial relationship.
Non-Statistical Sampling Strategies			
Biased Sampling	Sampling locations are chosen based on available information.	Sites with known contamination sources.	Contaminated areas can be overlooked if background information or visual signs of contamination do not indicate them. Best used if combined with a statistical approach, depending on the project objectives.
Judgmental Sampling	An individual subjectively selects sampling locations that appear to be representative of average conditions.	Homogenous, well-defined sites.	Not usually recommended due to bias imposed by individual, especially for final investigations.

STANDARD OPERATING PROCEDURE 30.9
COLLECTION OF SOIL SAMPLES BY USEPA SW 846 METHOD 5035 USING DISPOSABLE SAMPLERS

1.0 SCOPE AND APPLICATION

This standard operating procedure (SOP) outlines the recommended protocol and equipment for collection of representative soil samples to monitor potential volatile organic contamination in soil samples.

This method of sampling is appropriate for surface or subsurface soils contaminated with low to high levels of volatile organic compounds (VOCs). This sampling procedure may be used in conjunction with any appropriate determinative gas chromatographic procedure, including, but not necessarily limited to, SW-846 Method 8015, 8021, and 8260.

2.0 MATERIALS

- Work Plans;
- Field Logbook;
- Photoionization Detector (PID) or other monitoring instrument(s) per site-specific health and safety plan;
- Personal protective equipment and clothing per site-specific health and safety plan;
- Soil sampling equipment, as applicable (SOP 30.1);
- Disposable sampler;
- T-handle and/or Extrusion Tool; and
- Decontamination equipment and supplies (SOP 80.1).

3.0 PROCEDURE

3.1 METHOD SUMMARY

Disposable samplers are sent to the field to be used to collect soil samples. Three samplers must be filled for each soil sampling location, two for the low-level method (sodium bisulfate preservation) and one for the high level method (methanol preservation). After sample collection, disposable samplers are immediately shipped back to the laboratory for preservation (adding soil sample into methanol and sodium bisulfate solution). The ratio of volume of methanol to weight of soil is 1:1 as specified in SW-846 Method 5035 (Section 2.2.2). The amount of preservative in the solution corresponds to approximately 0.2 g of preservative for each 1 g of sample. Enough sodium bisulfate should be present to ensure a sample pH of ≤ 2.

If quality assurance/quality control (QA/QC) samples are needed, seven samplers will be needed for the original, matrix spike, and matrix spike duplicate analysis. Soil samples are collected in the field using the

disposable samplers, sealed and returned to the laboratory. A separate aliquot of soil is collected in a 125-mL container for dry weight determination.

3.2 SAMPLE CONTAINERS, PRESERVATION, HANDLING AND STORAGE

After sample collection, the disposable samplers must be cooled to and maintained at 4°C. The contents of the samplers will be analyzed using EPA methods 8015, 8021, and/or 8260. The **disposable** sampler is a single use device. It cannot be cleaned and/or reused.

Disposable samplers have a 48 hour holding time from sample collection to sample preparation in the laboratory. Return the samplers to the laboratory immediately after sampling.

3.3 SAMPLE PROCEDURES

Before sampling, the disposable sampler should be prepared as follows:

1. Unpack the cooler/sampling kit received from the laboratory. Disposable samplers are packed in sealed aluminized bags. These should be over packed in plastic zip lock bags. A T-Handle will also be needed to collect samples with the disposable sampler.
2. Hold coring body and push plunger rod down until small 0-ring rests against tabs. This will assure that plunger moves freely.
3. Depress locking lever on the sampler T-Handle (or other extraction device). Place coring body, plungers end first, into the open end of the T-Handle, aligning the two slots on the coring body with the two locking pins in the T-Handle. Twist the coring body clockwise to lock the pins in the slots. Check to ensure the sampler is locked in place. Sampler is ready for use.

The following procedure should be followed when using a disposable sampler to sample for VOCs in soil:

1. After the soil-sampling device (split spoon, corer, etc.) is opened, the sampling process should be completed in a minimum amount of time with the least amount of disruption.
2. Visual inspection and soil screening should be conducted after the sampler is opened and a fresh surface is exposed to the atmosphere. Soil screening should be conducted with an appropriate instrument (PID or FID).
3. Rough trimming of the sampling location surface should be considered if the sampling surface is not fresh or other waste, different soil strata, or vegetation may contaminate it. Surface layers can be removed using a clean stainless steel, spatula, scoop, or knife.
4. Orient the T-Handle with the T-up and the coring body down. This positions the plunger bottom flush with bottom of coring body (ensure that plunger bottom is in position). Using T-Handle, push sampler into soil until the coring body is completely full taking care not to trap air behind the sampler. When full, the small o-ring will be centered in the T-Handle viewing hole. Remove sampler from soil. Wipe excess soil from coring body exterior with a clean disposable paper towel.
5. Cap coring body while it is still on the T-Handle. ***Push*** cap over flat area of ridge ***and twist*** to lock cap in place. ***Cap must be seated to seal sampler.***
6. Remove the capped sampler by depressing locking lever on T-Handle while twisting and pulling sampler from T-Handle.
7. Lock plunger by rotating extended plunger rod fully counterclockwise until wings rest firmly against tabs.

8. Fill the 125-mL wide mouth jar for the non-preserved portion of the sample to be used for a moisture determination. These may be in a cardboard box. Retain all packaging to return the samples.
9. The disposable sampler should collect approximately 5 grams of soil (not necessary to weigh in the field). After a sample has been collected and capped, tear off the identification tag found at the bottom of the label on the aluminized bag. This tag is added to the sampler on the cap used to seal the sampler.
10. Place the sampler back in the aluminized bag and seal the top (a zip-lock seal). Make sure all the appropriate information is on the label. Record the sampler ID number on the chain-of-custody. Make sure each sampler and 125-mL container is labeled with the same location identification. The sampler should be placed inside the plastic zip-lock bags.
11. Place the 125-mL wide mouth jars in the cooler with the sampler on top. These should be sandwiched between bags of ice to maintain the correct temperature. If sent with the jars and samplers, a temperature bottle (used to evaluate the temperature on receipt) should be placed in the middle of the jars. The sample temperature should be 4ºC during shipment.
12. Ship the samples so that they will be received within 24 hours of sampling. The laboratory must receive the sampler within 40 hours of the collection so that they can be correctly preserved.

3.4 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

1. All data must be documented on chain-of-custody forms, field data sheets and in the field logbook.
2. An equipment blank is a QA/QC sample that will determine potential contamination from sampling equipment used to collect and transfer samples from the point of collection to the sample container. An equipment blank is performed by pouring demonstrated analyte free water from one sample container, over a sampler, and into a separate set of identical sample containers. The equipment blank is optional when sampling with the methanol preservation technique. It may be required on a site-specific basis if elevated analytical results are suspected to be due to cross contamination from sampling equipment.
3. A trip blank is a QA/QC sample, which will determine additional sources of contamination that may potentially influence the samples. The sources of the contamination may be from the laboratory, sample containers, or during shipment. The laboratory prepares a trip blank at the same time and in the same manner as the sample containers. The trip blank must accompany the sample containers to the field and back to the laboratory along with the collected samples for analysis. It must remain sealed at all times until it is analyzed at the laboratory. The frequency of collection for the trip blank must be at a rate of one per sample shipment.

3.5 LIMITATIONS IN SAMPLING

This sampling protocol will not be applicable to all solid environmental matrices, such as those that cannot be cored including non-cohesive granular material, gravel, or hard dry clay. In this case, the procedure for collecting VOC samples using Methanol Preservation should be used (see SOP 30.8).

4.0 MAINTENANCE

Not applicable.

5.0 PRECAUTIONS

None.

6.0 REFERENCES

En Novative Technologies, Inc. 2000. Users Manual for En Core® Sampler. February 2001.

USACE. 2001. *Requirements for the Preparation of Sampling and Analysis Plans.* EM 200-1-3, 1 February.

USEPA. 1997. *Test Methods for Evaluating Solid Waste, Volume IB: Laboratory Manual Physical/Chemical Methods,* Third Edition, (as updated through update IIIA). Office of Solid Waste and Emergency Response, Washington, DC.

STANDARD OPERATING PROCEDURE 50.1
SAMPLE LABELS

1.0 SCOPE AND APPLICATION

Every sample will have a sample label uniquely identifying the sampling point and analysis parameters. The purpose of this standard operating procedure (SOP) is to delineate protocols for the use of sample labels. An example label is included as Figure 50.1-A. Other formats with similar levels of detail are acceptable.

2.0 MATERIALS

- Sample label; and
- Indelible marker.

3.0 PROCEDURE

The use of preprinted sample labels is encouraged and should be requested from the analytical support laboratory during planning activities.
As each sample is collected, fill out a sample label ensuring the following information has been collected:

- Project name;
- Sample ID: enter the SWMU number and other pertinent information concerning where the sample was taken. This information should be included in site-specific work plan addenda;
- Date of sample collection;
- Time of sample collection;
- Initials of sampler(s);
- Analyses to be performed (NOTE: Due to number of analytes, details of analysis should be arranged with lab *a priori*); and
- Preservatives (water samples only).

Double-check the label information to make sure it is correct. Detach the label, remove the backing and apply the label to the sample container. Cover the label with clear tape, ensuring that the tape completely encircles the container.

4.0 MAINTENANCE

Not applicable.

5.0 PRECAUTIONS

None.

6.0 REFERENCES

USEPA. 1998. *EPA Requirements for Quality Assurance Project Plans.* EPA/600/R-98/018, QA/R5, Final, Office of Research and Development, Washington, D.C.

FIGURE 50.1-A
SAMPLE LABEL

PROJECT NAME _____

SAMPLE ID _____

DATE: ____/____/____ TIME: _____:_____

ANALYTES: VOC SVOC P/P METALS CN

PAH D/F HERBs ANIONS TPH

ALK TSS

PRESERVATIVE: [HCl] [HNO_3] [NaOH] [H_2SO_4]

SAMPLER: _____

STANDARD OPERATING PROCEDURE 50.2
SAMPLE PACKAGING

1.0 SCOPE AND APPLICATION

The purpose of this standard operating procedure (SOP) is to delineate protocols for the packing and shipping of samples to the laboratory for analysis.

2.0 MATERIALS

- Waterproof coolers (hard plastic or metal);
- Metal cans with friction-seal lids (e.g., paint cans);
- Chain-of-custody forms;
- Chain-of-custody seals (optional);
- Packing material;
- Sample documentation;
- Ice;
- Plastic garbage bags;
- Clear Tape;
- Zip-top plastic bags; and
- Temperature blanks provided by laboratory for each shipment.

3.0 PROCEDURE

1. Check cap tightness and verify that clear tape covers label and encircles container.
2. Wrap sample container in bubble wrap or closed cell foam sheets. Samples may be enclosed in a secondary container consisting of a clear zip-top plastic bag. Sample containers must be positioned upright and in such a manner that they will not touch during shipment.
3. Place several layers of bubble wrap, or at least 1 in. of vermiculite on the bottom of the cooler. Line cooler with open garbage bag, place all the samples upright inside the garbage bag and tie.
4. Double bag and seal loose ice to prevent melting ice from soaking the packing material. Place the ice outside the garbage bags containing the samples.
5. Pack shipping containers with packing material (closed-cell foam, vermiculite, or bubble wrap). Place this packing material around the sample bottles or metal cans to avoid breakage during shipment.
6. A temperature blank (provided by laboratory) will be included in each shipping container to monitor the internal temperature. Samples should be cooled to 4 degrees C on ice immediately after sampling.

7. Enclose all sample documentation (i.e., Field Parameter Forms, Chain-of-Custody forms) in a waterproof plastic bag and tape the bag to the underside of the cooler lid. If more than one cooler is being used, each cooler will have its own documentation. Add the total number of shipping containers included in each shipment on the chain-of-custody form.
8. Seal the coolers with signed and dated custody seals so that if the cooler were opened, the custody seal would be broken. Place clear tape over the custody seal to prevent damage to the seal.
9. Tape the cooler shut with packing tape over the hinges and place tape over the cooler drain.
10. Ship all samples via overnight delivery on the same day they are collected if possible.

4.0 MAINTENANCE

Not applicable.

5.0 PRECAUTIONS

5.1 PERMISSIBLE PACKAGING MATERIALS

- Non-absorbent
  - — Bubble wrap; and
  - — Closed cell foam packing sheets.
- Absorbent
  - — Vermiculite.

5.2 NON-PERMISSIBLE PACKAGING MATERIALS

- Paper;
- Wood shavings (excelsior); and
- Cornstarch “peanuts”.

6.0 REFERENCES

USEPA. 1990. *Sampler’s Guide to the Contract Laboratory Program.* EPA/540/P-90/006, Directive 9240.0-06, Office of Emergency and Remedial Response, Washington, D.C., December 1990.

USEPA. 1991. *User’s Guide to the Contract Laboratory Program.* EPA/540/O-91/002, Directive 9240.0-01D, Office of Emergency and Remedial Response. January 1991.

USEPA. 1998. *EPA Requirements for Quality Assurance Project Plans.* EPA/600/R-98/018, QA/R5, Final, Office of Research and Development, Washington, D.C

STANDARD OPERATING PROCEDURE 70.1
INVESTIGATION-DERIVED MATERIAL

1.0 SCOPE AND APPLICATION

Management of investigation-derived material (IDM) minimizes the potential for the spread of waste material onsite or offsite through investigation activities. The purpose of this standard operating procedure (SOP) is to provide general guidelines for appropriate management of potentially contaminated materials derived from the field investigations. Specific procedures related to the transportation and disposal of hazardous waste are beyond the scope of this SOP.

2.0 INTRODUCTION

Investigation derived material (IDM) consists of waste materials that are known or suspected to be contaminated with waste substances through the actions of sample collection or personnel and equipment decontamination. These materials include decontamination solutions, disposable equipment, drill cuttings and fluids, and water from groundwater monitoring well development and purging. To the extent possible, the site manager will attempt to minimize the generation of these materials through careful design of decontamination schemes and groundwater sampling programs. Testing conducted on soil and water investigation-derived material will show if they are also hazardous wastes as defined by RCRA. This will determine the proper handling and ultimate disposal requirements.

The criteria for designating a substance as hazardous waste according to RCRA is provided in 40 CFR 261.3. If IDM meet these criteria, RCRA requirements will be followed for packaging, labeling, transporting, storing, and record keeping as described in 40 CFR 262.34. Those materials that are judged potentially to meet the criteria for a regulated solid or hazardous waste will be placed in DOT-approved 55-gallon steel drums or another type of DOT approved container; based on waste characteristics and volume.
Investigation-derived material will be appropriately placed in containers, labeled, and tested to determine disposal options in accordance with RCRA regulations and Virginia Hazardous Waste Management Regulations.

3.0 INVESTIGATION-DERIVED MATERIAL MANAGEMENT

Procedures that minimize potential for the spread of waste material include minimizing the volume of material generated, material segregation, appropriate storage, and disposal according to RCRA requirements.

3.1 WASTE MINIMIZATION

In the development of work plan addenda, each aspect of the investigation will be reviewed to identify areas where excess waste generation can be eliminated. General procedures that will eliminate waste include avoidance of unnecessary exposure of materials to hazardous material and coordination of sampling schedules to avoid repetitious purging of wells and use of sampling equipment.

3.2 WASTE SEGREGATION

Waste accumulation and management procedures to be used depend upon the type of material generated. For this reason, IDM described below are segregated into separate 55-gallon storage drums or other appropriate DOT containers. Waste materials that are known to be free of potential hazardous waste contamination (such as broken sample bottles or equipment containers and wrappings) must be collected separately for disposal to municipal systems. Large plastic garbage or "lawn and leaf" bags are useful for collecting this trash. Even "clean" sample bottles or Tyvek should be disposed of with care. Although they are not legally a problem, if they are discovered by the public they may cause concern. Therefore, items that are known to be free from contamination but are also known to represent "hazardous or toxic waste" to the public must not be disposed of in any public trash receptacle, such as found at your hotel or park.

3.2.1 Decontamination Solutions

Solutions considered investigation-derived materials range from detergents, organic solvents, and acids used to decontaminate small hand samplers to steam-cleaning rinsate used to wash drill rigs and other large equipment. These solutions are to be placed in 55-gallon drums with bolt-sealed lids or other appropriate DOT approved containers. Residual liquid IDM from decontamination pads will be removed and appropriately placed in container(s) at the end of each field day.

3.2.2 Soil Cuttings and Drilling Muds

Soil cuttings are solid to semi-solid soils generated during trenching activities or drilling for the collection of subsurface soil samples or the installation of monitoring wells. Depending on the type of drilling, drilling fluids known as "muds" may be used to remove soil cuttings. Drilling fluids flushed from the borehole must be directed into a settling section of a mud pit. This allows reuse of the decanted fluids after removal of the settled sediments. Drill cuttings, whether generated with or without drilling fluids, are to be removed with a flat-bottomed shovel and placed in 55-gallon drums with bolt-sealed lids or other appropriate DOT containers, as conditions or volume of IDM dictate.

3.2.3 Well Development and Purge Water

Well development and purge water is removed from monitoring wells to repair damage to the aquifer following well installation, obtain characteristic aquifer groundwater samples, or measure aquifer hydraulic properties. The volume of groundwater to be generated will determine the appropriate container to be used for accumulation of IDM.

For well development and purging, 55-gallon drums are typically an efficient container for accumulation. When larger volumes of water are removed from wells, such as when pumping tests are conducted, the use of large-volume portable tanks such as "Baker Tanks" should be considered for IDM accumulation.

Analytical data for groundwater samples associated with the well development and purge water will be used to assist in characterizing IDM and evaluating disposal options.

3.2.4 Personal Protective Equipment and Disposable Sampling Equipment

Personal protective equipment and clothing (PPE) may include such items as Tyvek coveralls, gloves, booties, and APR cartridges. Disposable sampling equipment may include such items as plastic sheeting, bailers, disposable filters, disposable tubing and paper towels. PPE and disposable sampling equipment that have or may have contacted contaminated media (soil, water, etc.) will be segregated and placed in 55-gallon drums separate from soil and water IDM. Disposition of this type of IDM will be determined by the results of IDM testing of the media in which the PPE and sampling equipment contacted.

3.3 MATERIAL ACCUMULATION

The IDM in containers must be placed in an appropriate designated RCRA container accumulation area at RFAAP, where it is permissible to accumulate such waste. IDM placed into a designated 90-day accumulation area will be properly sealed, labeled and covered. All drums will be placed on pallets.

A secure and controlled waste staging area will be designated by the installation prior the commencement of field sampling activities. Per the facility's requirements as a RCRA large quantity generator, waste accumulation cannot exceed 90 days for materials presumed or shown to be RCRA-designated hazardous wastes; waste which is known not to be RCRA-designated waste should be promptly disposed to municipal waste systems or appropriate facility.

3.3.1 IDM Accumulation Containers

Containers will be DOT-approved (DOT 17H 18/16GA OH unlined) open-head steel drums or other DOT approved container, as appropriate.

Container lids should lift completely off be secured by a bolt ring (for drum). Order enough containers to accumulate all streams of expected IDM including soil, PPE and disposable sampling equipment, decontamination water, purge water, etc.

Solid and liquid waste streams will not be mixed in a container. PPE and expendable sampling equipment will be segregated from other IDM and placed in different containers than soil. Containers inside containers are not permitted. PPE must be placed directly in a drum not in a plastic bag.

Pallets are often required to allow transport of filled drums to the staging area with a forklift. Normal pallets are 3×4 ft and will hold two to three 55-gallon drums depending on the filled weight. If pallets are required for drum transport or storage, field personnel are responsible for ensuring that the empty drums are placed on pallets before they are filled and that the lids are sealed on with the bolt-tighten ring after the drums are filled. Because the weight of one drum can exceed 500 lbs, under no circumstances should personnel attempt to move the drums by hand.

3.3.2 Container Labeling

Each container that is used to accumulate IDM will be appropriately labeled at the time of accumulation and assigned a unique identification number for tracking purposes. The following information will be written in permanent marker on a drum label affixed on the exterior side at a location at least two-thirds of the way up from the bottom of the drum.

- Facility name.
- Accumulation start date and completion date.
- Site identifier information (SWMU, boring, well, etc.).
- Description of IDM.
- Drum ID No.

4.0 MATERIAL CHARACTERIZATION AND DISPOSAL

IDM will be characterized and tested to determine whether it is a hazardous waste as defined by 40 CFR Part 261 and to determine what disposal options exist in accordance with RCRA regulations and the Virginia Hazardous Waste Management Regulations (VHWMR).

In general, IDM will be considered a hazardous waste if it contains a listed hazardous waste or if the IDM exhibits a characteristic of hazardous waste.

Work plan addenda will identify the appropriate characterization and testing program for IDM based on the following:

- Site-specific conditions related to chemicals of concern, etc.
- The nature and quantity of expected IDM to be generated during site-specific investigations.
- Applicable Federal, State, and local regulations, such as RCRA, VHWMR regulations and policies and procedures, and Army Regulation 200-1.
- RFAAP specific requirements and policies for IDM characterization and disposal at the time of the investigation.

In general, appropriate USEPA SW 846 Test Methods for Evaluating Solid Waste will be used for testing IDM and will be specified in work plan addenda. Other appropriate test methods may be specified by RFAAP in addition to SW 846 Methods that are specific to installation operations, the site of interest (percent explosive content, reactivity, etc.), or requirements for disposal at RFAAP water treatment facilities or publicly owned treatment works.

Responsibility for the final disposal of IDM will be determined before field activities are begun and will be described in work plan addenda. Off-site disposal of IDM will be coordinated with RFAAP (generator) to ensure appropriate disposition. The contractor will coordinate IDM transportation and disposal activities for RFAAP (generator).

At the direction of RFAAP, appropriate waste manifests will be prepared by the USACE contractor or Alliant Techsystems subcontractor for transportation and disposal. Alliant Techsystems or other appropriate RFAAP entity will be listed as the generator and an appointed representative from RFAAP will review and sign the manifest for offsite disposal.

RFAAP will make the final decision on the selection of the transporter, storage, and disposal facility (TSDFs) or recycling facility. RFAAP will provide the contractor a listing of previously used TSDFs for priority consideration. Proposed facilities that are not included on the listing are required to provide a copy of the TSDFs most recent state or federal inspection to the installation. Waste characterization and testing results will be submitted to RFAAP (generator) for review and approval before final disposition of the material.

Hazardous waste: Prior to final disposition, a hazardous waste manifest will be furnished by the TSDF to accompany transport to the disposal facility. Following final disposition, a certificate of disposal will be furnished by the disposal facility. Copies of the manifests and certificates of disposal are to be provided to RFAAP and retained on file by the contractor or subcontractor.

4.0 PRECAUTIONS

- Because the weight of one drum can exceed 500 lbs, under no circumstances should personnel attempt to move drums by hand.
- Refer to the site-specific health and safety plan when managing IDM.

5.0 REFERENCES

Safety Rules for Contractors and Subcontractors, 1995. Alliant Techsystems, Incorporated, Radford Army Ammunition Plant.

STANDARD OPERATING PROCEDURE 80.1
DECONTAMINATION

1.0 SCOPE AND APPLICATION

Before leaving the site, all personnel or equipment involved in intrusive sampling or having entered a hazardous waste site during intrusive sampling must be thoroughly decontaminated to prevent adverse health effects and minimize the spread of contamination. Equipment must be decontaminated between sites to preclude cross-contamination. Decontamination water will be free of contaminants as evidenced through either chemical analyses or certificates of analysis. This standard operating procedure (SOP) describes general decontamination requirements for site personnel and sampling equipment. Decontamination procedures for contaminants requiring a more stringent procedure, e.g., dioxins/furans, will be included in site-specific addenda.

2.0 MATERIALS

- Plastic sheeting, buckets or tubs, pressure sprayer, rinse bottles, and brushes;
- U.S. Army Corps of Engineers or installation approved decontamination water source;
- Deionized ultra-filtered, HPLC-grade organic free water (DIUF);
- Non-phosphate laboratory detergent;
- Nitric Acid, 0.1 Normal (N) solution;
- Pesticide-grade solvent, Methanol;
- Aluminum foil;
- Paper towels;
- Plastic garbage bags; and
- Appropriate containers for management of investigation-derived material (IDM).

3.0 PROCEDURE

3.1 SAMPLE BOTTLES

At the completion of each sampling activity the exterior surfaces of the sample bottles must be decontaminated as follows:

- Be sure that the bottle lids are on tight.
- Wipe the outside of the bottle with a paper towel to remove gross contamination.

3.2 PERSONNEL DECONTAMINATION

Review the site-specific health and safety plan for the appropriate decontamination procedures.

3.3 EQUIPMENT DECONTAMINATION

3.3.1 Drilling Rigs

Drilling rigs and associated equipment, such as augers, drill casing, rods, samplers, tools, recirculation tank, and water tank (inside and out), will be decontaminated before site entry, after over-the-road mobilization and immediately upon departure from a site after drilling a hole. Supplementary cleaning will be performed before site entry. There is a likelihood that contamination has accumulated on tires and as spatter or dust en route from one site to the next.

1. Place contaminated equipment in an enclosure designed to contain all decontamination residues (water, sludge, etc.).
2. Steam-clean equipment until all dirt, mud, grease, asphaltic, bituminous, or other encrusting coating materials (with the exception of manufacturer-applied paint) has been removed.
3. Water used will be taken from an approved source.
4. When cross-contamination from metals is a concern, rinse sampling components such as split spoons, geo-punch stems, and augers with nitric acid, 0.1N.
5. Rinse with DIUF water.
6. When semi-volatile and non-volatile organics may be present, rinse the sampling components with pesticide-grade solvent methanol.
7. Double rinse the sampling components with DIUF water.
8. Decontamination residues and fluids will be appropriately managed as IDM per work plan addenda and SOP 80.1.

3.3.2 Well Casing and Screen

Prior to use, well casing and screen materials will be decontaminated. This activity will be performed in the leak proof, decontamination pad, which will be constructed prior to commencement of the field investigation. The decontamination process will include:

- Steam cleaning with approved source water.
- Rinse with DUIF water.
- Air-dry on plastic sheeting.
- Wrap in plastic sheeting to prevent contamination during storage/transit.

3.3.3 Non Dedicated Submersible Pumps Used for Purging and Sampling

1. Scrub the exterior of the pump to remove gross (visible) contamination using appropriate brushes, approved water, and non-phosphate detergent (steam cleaning may be substituted for detergent scrub).
2. Pump an appropriate amount of laboratory detergent solution (minimum 10 gallons) to purge and clean the interior of the pump.
3. Rinse by pumping no less than 10 gallons of approved water to rinse.
4. Rinse the pump exterior with approved decontamination water.
5. When cross-contamination from metals is a concern, rinse the pump exterior with approved nitric acid 0.1N solution.
6. Rinse the pump exterior with DIUF water.

7. When semi-volatile and non-volatile organics may be present, rinse the pump exterior with pesticide-grade solvent methanol.
8. Double rinse the pump exterior with DIUF water.
9. Air-dry on aluminum foil or clean plastic sheeting.
10. Wrap pump in aluminum foil or clean plastic sheeting, or store in a clean, dedicated PVC or PTFE storage container.
11. Solutions and residuals generated from decontamination activities will be managed appropriately as IDM per work plan addenda and SOP 80.1.

3.3.4 Sample Equipment and Measuring Water Level Devices

1. Scrub the equipment to remove gross (visible) contamination using appropriate brush (es), approved water, and non-phosphate detergent.
2. Rinse with approved source water.
3. When cross-contamination from metals is a concern, rinse the sampling equipment with approved nitric acid 0.1N solution.
4. Rinse equipment with DIUF water.
5. When semi-volatile and non-volatile organics may be present, rinse the sampling equipment with pesticide-grade solvent methanol.
6. Double rinse the sampling equipment with DIUF water.
7. Air-dry on aluminum foil or clean plastic sheeting.
8. Wrap in aluminum foil, clean plastic sheeting, or zip top bag or store in a clean, dedicated PVC or PTFE storage container.
9. Solutions and residuals generated from decontamination activities will be managed appropriately as IDM per work plan addenda and SOP 80.1.

3.3.5 Other Sampling and Measurement Probes

Temperature, pH, conductivity, Redox, and dissolved oxygen probes will be decontaminated according to manufacturer's specifications. If no such specifications exist, remove gross contamination and triple-rinse probe with DIUF water.

4.0 PRECAUTIONS

- Manage IDM appropriately according to the requirements specified in work plan addenda.
- Follow appropriate procedures as specified in the site-specific health and safety plan.

5.0 REFERENCES

USACE. 2001. Requirements for the Preparation of Sampling and Analysis Plans. EM 200-1-3. 1 February.

STANDARD OPERATING PROCEDURE 90.1
PHOTOIONIZATION DETECTOR (HNu Model PI–101 and HW–101)

1.0 SCOPE AND APPLICATION

The purpose of this standard operating procedure (SOP) is to delineate protocols for field operations with a photoionization detector (HNu Systems Model PI–101 or HW–101). The photoionization detector (PID) detects total ionizables; hence it is used to monitor both organic and inorganic vapors and gases to determine relative concentrations of air contaminants. This information is used to establish level of protection and other control measures such as action levels. The PID cannot effectively detect compounds having ionization potentials above the photon energy level of the lamp used; therefore, methane, which has an ionization potential of 12.98 eV, is undetectable by PIDs because the lamps produce 9.5, 10.2, or 11.7 eV.

Use of brand names in this SOP is in not intended as an endorsement or mandate that a given brand be used. Alternate equivalent brands of detectors, sensors, meters, etc., are acceptable. If alternate equipment is to be used, the contractor shall provide applicable and comparable SOPs for its maintenance and calibration.

2.0 MATERIALS

- HNu Systems Model PI–101 or HW–101 survey probe with 9.5, 10.2, or 11.7 eV lamp;
- Lead-acid gel-cell battery;
- Calibration gas (e.g., isobutylene, 101 ppm) with regulator;
- Tygon tubing;
- Tedlar bag (optional);
- Instrument logbook; and
- Field logbook.

3.0 PROCEDURE

These procedures are to be followed when using the HNu in the field.

3.1 STARTUP

1. Before attaching the probe, check the function switch on the control panel to ensure that it is in the off position. Attach the probe by plugging it into the interface on the top of the readout module.
2. Turn the function switch to the battery check position. The needle on the meter should read within or above the green battery arc on the scale; if not, recharge the battery. If the red indicator light comes on, the battery needs recharging or service may be indicated.
3. Turn the function switch to any range setting. Listen for the hum of the fan motor. Check meter function by holding a solvent-based marker pen near the sample intake. If there is no needle deflection, look briefly into the end of the probe (no more than 1 or 2 sec) to see if the lamp is on; if it is on, it will give a purple glow. Do not stare into the probe any longer than 2 sec. Long-term exposure to UV light can damage the eyes. (See further information in Section 5.)

4. To zero the instrument, turn the function switch to the standby position and rotate the zero adjustment until the meter reads zero. A calibration gas is not needed since this is an electronic zero adjustment. If the span adjustment setting is changed after the zero is set, the zero should be rechecked and adjusted if necessary. Allow the instrument to warm up for 3–5 min to ensure that the zero reading is stable. If necessary, readjust the zero.

3.2 OPERATIONAL CHECK

Follow the startup procedure in Section 3.1.
With the instrument set on the 0–20 range, hold a solvent-based marker near the probe tip. If the meter deflects upscale, the instrument is working.

3.3 FIELD CALIBRATION PROCEDURE

1. Follow the startup procedures in Section 3.1 and the operational check in Section 3.2.
2. Set the function switch to the range setting for the concentration of the calibration gas.
3. Attach a regulator HNu P/N 101-351 or equivalent (flow = 200 to 300 ml/min) to a disposable cylinder of isobutylene (HNu 101-351 or equivalent). Connect the regulator to the probe of the HNu with a piece of clean Tygon tubing. Turn on the valve of the regulator.
4. After 5 sec, adjust the span dial until the meter reading equals the benzene concentration of the calibration gas used, corrected to its equivalence, which should be marked on the canister (Isobutylene ~0.7X benzene).
5. Record in the field log the instrument ID No., serial No., initial and final span settings, date, time, location, concentration and type of calibration gas used, and the signature of the person who calibrated the instrument.
6. If the HNu does not function or calibrate properly, the project equipment manager is to be notified as soon as possible. Under no circumstances is work requiring monitoring with a PI–101 or HW–101 to be done with a malfunctioning instrument.

3.4 CALIBRATION TO A GAS OTHER THAN ISOBUTYLENE

The HNu may be calibrated to any certified calibration gas. However, after calibration, all subsequent instrument readings will be relative to the calibration gas used. General procedures include the following:

1. Calibrate according to procedure 3.3.
2. Partially fill and flush one-to-two times a gas bag (Tedlar recommended) with the certified National Institute of Standards and Technology (NIST) (formerly NBS) traceable calibration gas. Then fill the bag with 1–3 L of the calibration gas. If the gas is toxic, this must be done in a fume hood.
3. Feed the calibration gas into the probe with the range set for the value of the gas. After 5 sec, adjust the span control until the meter reads the value of the calibration gas.
4. Record the results of the calibration on the calibration/maintenance log and attach a new calibration sticker (if available) or correct the existing sticker to reflect the new calibration data. All subsequent readings will be relative to the new calibration gas.

3.5 OPERATION

1. Follow the startup procedure, operational check, and calibration check (refer to Section 3.1).

2. Set the function switch to the appropriate range. If the concentration of gas vapors is unknown, set the function switch to 0-20 ppm range. Adjust if necessary.
3. Prevent exposing the HNu to excessive moisture, dirt, or contaminant while monitoring the work activity as specified in the Site Health and Safety Plan.
4. When the activity is completed, or at the end of the day, carefully clean the outside of the HNu with a damp disposable towel to remove all visible dirt. Return the HNu to a secure area and place on charge. Charge after each use; the lead acid batteries cannot be ruined by over charging.
5. With the exception of the probe's inlet and exhaust, the HNu can be wrapped in clear plastic to prevent it from becoming contaminated and to prevent water from getting inside in the event of precipitation. If the instrument becomes contaminated, make sure to take necessary steps to decontaminate it. Call the Equipment Administrator if necessary; under no circumstances should an instrument be returned from the field in a contaminated condition.

4.0 MAINTENANCE

Calibration/maintenance logs are to be filled in completely whenever a PI-101 or HW-101 receives servicing. This is true of both contractor-owned and rental instruments.

The equipment manager should be called to arrange for a fresh instrument when necessary. The contractor's equipment facility is responsible for arranging all repairs that cannot be performed by the project equipment manager.

4.1 ROUTINE SERVICE

The PID's performance is affected by a number of factors. These include but are not limited to the decay of the UV lamp output over time and the accumulation of dust and other particulate material and contaminates on the lamp and in the ion chamber. Because of these factors, the PID should not be left in the field for a period of more than 2 weeks before being replaced with a fresh instrument. If a site is going to be inactive for a period of more than a week, all monitoring instruments are to be returned to the project equipment manager or his trained designee for servicing and/or reassignment. The following procedures are to be performed at the designated intervals for routine service.

Procedure	Frequency
Operational check	Before use and at instrument return
Field calibration	Before use and at instrument return
Full calibration	Bi-weekly (return instrument to equipment manager for replacement with a fresh unit)
Clean UV lamp and	Bi-weekly or as needed ion chamber
Replace UV Lamp	As needed

4.1.1 UV Lamp and Ion Chamber Cleaning

During periods of analyzer operation, dust and other foreign materials are drawn into the probe forming deposits on the surface of the UV lamp and in the ion chamber. This condition is indicated by meter readings that are low, erratic, unstable, non-repeatable, or drifting and show apparent moisture sensitivity. These

deposits interfere with the ionization process and cause erroneous readings. Check for this condition regularly to ensure that the HNu is functioning properly. If the instrument is malfunctioning, call your equipment manager to arrange to have a fresh replacement.

4.1.2 Lamp eV Change

If different applications for the analyzer would require different eV lamps, separate probes, each with its own eV lamp, must be used. A single readout assembly will serve for any of the probes (9.5, 10.2, and 11.7 eV). A change in probe will require resetting of the zero control and recalibrating the instrument. The 11.7 eV lamp will detect more compounds than either of the two lower eV lamps. However, the 11.7 eV probe needs more frequent calibration; it burns out much faster than the lower eV lamps.

5.0 PRECAUTIONS

- The HNu PI–101 and HW–101 are designed to sample air or vapors only. *Do not allow any liquids or low boiling vapors to get into the probe or meter assembly.*
- High concentrations of any gas can cause erroneous readings. High humidity can also cause the instrument readings to vary significantly from the actual concentration of gases or vapors present. This is true even through the HNu cannot react to water vapor.
- High humidity, dust, and exposure to concentrations of low boiling vapors will contaminate the ion chamber, causing a steady decrease in sensitivity.
- Continued exposure to ultraviolet light generated by the light source can be harmful to eyesight. If a visual check of the UV lamp is performed *do not look at the light source from a distance closer than 6 inches with unprotected eyes.* Use eye protection (UV-blocking sunglasses or safety glasses). Only look briefly—never more than about 2 sec.

Place the instrument on charge after each use; the lead batteries cannot be ruined by over charging.

- If at any time the instrument does not check out or calibrate properly in the field, the equipment manager is to be notified immediately and a replacement obtained for the malfunctioning instrument. Under no circumstances should fieldwork requiring continuous air monitoring for organic vapors and/or gases be done with a malfunctioning Hnu or without a HNu or an approved comparable instrument.

6.0 REFERENCES

Manufacturer's Equipment Manual.

APPENDIX D

RCRA FACILITY INVESTIGATION
BORING LOGS

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Project: Radford Army Ammunition Plant- SSP Project Location: Radford, Virginia Project Number: 09604-317	Log of Borehole 13SB7 Sheet 1 of 1

Date(s) Drilled	10-09-03 0940-1015	Logged By	J. Spangler	Reviewed By	C. Lawrence
Drilling Method	Geoprobe - Direct Push Technology	Drilling Contractor	Richard Simmons Drilling	Total Depth of Borehole	12.7 feet
Drill Rig Type	Tractor- mounted Geoprobe	Drill Bit Size/Type	4 ft x 2 in Rectractable Macrocore Sampler	Ground Surface Elevation	
Groundwater Level(s)	12.5 ft bgs during drilling	Sampling Method	4 ft x 2 in Macrocore Sampler with Liner	Hammer Data	NA
Borehole Backfill	Bentonite Pellets	Comments			

Elevation, feet / Downhole Depth, feet	SAMPLES Type	Number	Recovery (feet)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
0				ND			7.5YR 3/3 dark brown, Silty Sand, very fine, slightly moist, loose, micaceous, homogeneous	Sample 13SB7A collected 0.0-1.0 ft bgs
1				ND				
2		1	3.6	ND		SM		
3				ND				
4				ND				
5				ND				
						SP	7.5YR 4/4 brown, Sand, medium, slightly moist, loose	Sample 13SB7B collected 5.0-6.0 ft bgs
6		2	2.7	ND			7.5YR 3/4 dark brown, Silty Sand, very fine, moist, micaceous, loose to moderately dense	
7				ND				
8				ND		SM		
9				ND				
10		3	4.0	ND				Sample 13SB7C, MS, MSD collected 10.0-12.0 ft bgs
							Decomposed wood chips at 10.9 ft bgs	
11				ND		SM	7.5YR 4/4 brown, Silty Sand, fine, moist	
12				ND		GC	7.5YR 4/4 brown, Silty Gravel, moist	
		4	0.3				Groundwater at 12.5 ft bgs ▽	
13							Boring Refusal 12.7 ft bgs	
14								
15								

Report: ENV_12AS_CLEVELAND+/-USCS; File: RFAAP_SSP.GPJ; 12/8/2003 13SB7

URS

Project: Radford Army Ammunition Plant- SSP
Project Location: Radford, Virginia
Project Number: 09604-317

Log of Borehole 13SB8

Sheet 1 of 1

Date(s) Drilled	10-09-03 1515-1530	Logged By	J. Spangler	Reviewed By	C. Lawrence
Drilling Method	Hand Auger	Drilling Contractor	URS Group, Inc.	Total Depth of Borehole	3.9 feet
Drill Rig Type	NA	Drill Bit Size/Type	3-inch Hand Auger	Ground Surface Elevation	
Groundwater Level(s)	3.7 ft bgs during drilling	Sampling Method	Stainless-Steel 3-inch Hand Auger	Hammer Data	NA
Borehole Backfill	Bentonite Pellets	Comments			

Elevation, feet	Downhole Depth, feet	SAMPLES Type	SAMPLES Number	Recovery (feet)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
	0			1.0			SM	5YR 4/4 reddish brown, Silty Sand, fine, moist, loose, micaceous	Sample 13SB8A collected 0.0-1.0 ft bgs
	1			1.0	ND			Increasing moisture with depth	
	2			1.0				Rounded Gravel, fine to coarse, 2.0-3.0 ft bgs	
	3			0.9	ND			Groundwater at 3.7 ft bgs ▽	Sample 13SB8B collected 3.5-3.7 ft bgs
	4							Boring Refusal 3.9 ft bgs	
	5								
	6								
	7								
	8								
	9								
	10								

URS

Report: ENV_12AS_CLEVELAND+/-USCS; File: RFAAP_SSP.GPJ; 12/8/2003 13SB8

Project: Radford Army Ammunition Plant- SSP
Project Location: Radford, Virginia
Project Number: 09604-317

Log of Borehole 13SB9

Sheet 1 of 1

Date(s) Drilled	10-09-03 1350-1430	Logged By	J. Spangler	Reviewed By	C. Lawrence
Drilling Method	Hand Auger	Drilling Contractor	URS Group, Inc.	Total Depth of Borehole	4.0 feet
Drill Rig Type	NA	Drill Bit Size/Type	3-inch Hand Auger	Ground Surface Elevation	
Groundwater Level(s)	NA	Sampling Method	Stainless-Steel 3-inch Hand Auger	Hammer Data	NA
Borehole Backfill	Bentonite Pellets	Comments			

Elevation, feet	Downhole Depth, feet	SAMPLES Type	SAMPLES Number	Recovery (feet)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
	0						SM	5YR 3/3 dark reddish brown, Silty Sand, very fine, moist, micaceous, loose	Sample 13SB9A, MS, MSD, and SBD9 collected 0.0-1.0 ft bgs
	1						SM	7.5YR 4/6 strong brown, Silty Sand, fine to medium, moist	Sample 13SB9B collected 1.5-2.0 ft bgs
	2								
	3						GM	Silty Gravel with sand, moist	Sample 13SB9C collected 3.5-4.0 ft bgs
	4							Boring Refusal 4.0 ft bgs	
	5								
	6								
	7								
	8								
	9								
	10								

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Report: ENV_12AS_CLEVELAND+/-USCS; File: RFAAP_SSP.GPJ; 12/8/2003 13SB9

Project: Radford Army Ammunition Plant- SSP
Project Location: Radford, Virginia
Project Number: 09604-317

Log of Borehole 13SB10

Sheet 1 of 1

Date(s) Drilled	10-09-03 1300-1330	Logged By	J. Spangler	Reviewed By	C. Lawrence
Drilling Method	Hand Auger	Drilling Contractor	URS Group, Inc.	Total Depth of Borehole	4.8 feet
Drill Rig Type	NA	Drill Bit Size/Type	3-inch Hand Auger	Ground Surface Elevation	
Groundwater Level(s)	NA	Sampling Method	Stainless-Steel 3-inch Hand Auger	Hammer Data	NA
Borehole Backfill	Bentonite Pellets	Comments			

Elevation, feet	Downhole Depth, feet	SAMPLES Type	SAMPLES Number	Recovery (feet)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
	0							10YR 3/3 dark brown, Silty Sand, fine, dry to slightly moist, loose, micaceous	Sample 13SB10A collected 0.0-1.0 ft bgs
				1.0					
	1				ND			7.5YR 4/4 brown, 1.0-2.0 ft bgs	
				1.0					
	2						SM	10YR 3/4 dark yellowish brown, 2.0-3.0 ft bgs	Sample 13SB10B collected 2.5-3.0 ft bgs
				1.0					
	3				ND			Silt and moisture increases with depth	
				1.0				3.5-4.8 ft bgs, 10YR 3/4 dark yellowish brown, moist	
	4								Sample 13SB10C collected 4.5-4.8 ft bgs
				0.8					
	5							Boring Refusal 4.8 ft bgs	
	6								
	7								
	8								
	9								
	10								

URS

Report: ENV_12AS_CLEVELAND+/-USCS; File: RFAAP_SSP.GPJ; 12/8/2003 13SB10

Project: Radford Army Ammunition Plant- SSP Project Location: Radford, Virginia Project Number: 09604-317	Log of Borehole 13SB11 Sheet 1 of 1

Date(s) Drilled	10-09-03 1215-1245	Logged By	J. Spangler	Reviewed By	C. Lawrence
Drilling Method	Hand Auger	Drilling Contractor	URS Group, Inc.	Total Depth of Borehole	8.6 feet
Drill Rig Type	NA	Drill Bit Size/Type	3-inch Hand Auger	Ground Surface Elevation	
Groundwater Level(s)	NA	Sampling Method	Stainless-Steel 3-inch Hand Auger	Hammer Data	NA
Borehole Backfill	Bentonite Pellets	Comments			

Elevation, feet	Downhole Depth, feet	SAMPLES Type	SAMPLES Number	Recovery (feet)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
	0			1.0	ND		ML	7.5YR 4/4 brown, Sandy Silt, very fine, slightly moist, loose, micaceous	Sample 13SB11A collected 0.0-1.0 ft bgs
	1			1.0			SM	7.5YR 4/2 brown, Silty Sand with gravel	
	2			1.0	ND		SM	7.5YR 4/2 brown, Silty Sand Metal fragment/wire found 2.5 ft bgs	
	3			1.0					
	4			1.0	ND				Sample 13SB11B collected 4.5-5.0 ft bgs
	5			1.0			SC	7.5YR 5/6 strong brown, Clay Sand, silty, very fine, slightly moist, plastic	
	6			1.0	ND		SM	5YR 4/6 yellowish red, Silty Sand, very fine, slightly moist, micaceous, loose	
	7			1.0			ML	5YR 4/6 yellowish red, Silt, trace medium sand, soft, micaceous, cohesive	
	8			0.6					Sample 13SB11C collected 8.0-8.5 ft bgs
	9							Boring Refusal 8.6 ft bgs	
	10								

Report: ENV_12AS_CLEVELAND+/-USCS; File: RFAAP_SSP.GPJ; 12/8/2003 13SB11

URS

Project: Radford Army Ammunition Plant- SSP
Project Location: Radford, Virginia
Project Number: 09604-317

Log of Borehole 13SB12

Sheet 1 of 1

Date(s) Drilled	10-09-03 1045-1115	Logged By	J. Spangler	Reviewed By	C. Lawrence
Drilling Method	Hand Auger	Drilling Contractor	URS Group, Inc.	Total Depth of Borehole	4.0 feet
Drill Rig Type	NA	Drill Bit Size/Type	3-inch Hand Auger	Ground Surface Elevation	
Groundwater Level(s)	NA	Sampling Method	Stainless-Steel 3-inch Hand Auger	Hammer Data	NA
Borehole Backfill	Bentonite Pellets	Comments	Boring located inside settling lagoon		

Elevation, feet	Downhole Depth, feet	SAMPLES Type	SAMPLES Number	Recovery (feet)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
	0			1.0	ND		SP/SM	7.5YR 4/4 brown, Sand, medium, trace silt, moist, loose	Sample 13SB12A collected 0.0-1.0 ft bgs
	1			1.0				sand grades to fine with increasing silt 1.0-2.0 ft bgs 1.0-2.0 ft bgs, micaceous	
	2			1.0	ND		ML	7.5YR 2.5/1 black, Silt with trace fine sand, very moist	Sample 13SB12B and SBD8 collected 2.0-3.0 ft bgs
	3			1.0				3.0-4.0 ft bgs, Color grades to 7.5YR 3/1 very dark gray; sand grades fine to coarse Groundwater at 4.0 ft bgs ▽	Sample 13SB12C collected 3.5-4.0 ft bgs
	4							Boring terminated at 4.0 ft bgs	
	5								
	6								
	7								
	8								
	9								
	10								

URS

Report: ENV_12AS_CLEVELAND+/-USCS; File: RFAAP_SSP.GPJ; 12/8/2003 13SB12

Project: Radford Army Ammunition Plant- SSP
Project Location: Radford, Virginia
Project Number: 09604-317

Log of Borehole 37SB1

Sheet 1 of 1

Date(s) Drilled	10-01-03 1528; 10-02-03 0748	Logged By	J. Spangler	Reviewed By	C. Lawrence
Drilling Method	Geoprobe - Direct Push Technology	Drilling Contractor	Richard Simmons Drilling	Total Depth of Borehole	24.0 feet
Drill Rig Type	Tractor- Mounted Geoprobe	Drill Bit Size/Type	4 ft x 2 in Rectractable Macrocore Sampler	Ground Surface Elevation	
Groundwater Level(s)	20.5 ft bgs during drilling	Sampling Method	4 ft x 2 in Macrocore Sampler with Liner	Hammer Data	NA
Borehole Backfill	Bentonite Pellets	Comments	Two Boreholes-10/01/03 TD 16.0; 10/02/03 TD 24.0		

Elevation, feet / Downhole Depth, feet	SAMPLES Type	Number	Recovery (feet)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
0		1	3.7	ND		SLUDGE	10YR 6/4 light yellowish brown, $CaSO_4$ Sludge, soft 7.5YR 8/1 white mottled with 7.5YR 4/6 strong brown, $CaSO_4$ Sludge, soft	Sample 37SB1A collected 0.0-1.0 ft bgs
						SM	7.5YR 4/6 strong brown, Silty Sand, fine, moist, well-sorted, micaceous, and dense.	
5		2	3.8	ND		SM	7.5YR 3/2 dark brown, Silty Sand, very fine, moist, micaceous, medium dense with soft layers grading soft	
						SM	7.5YR 4/6 brown, Sand, some silt, wet, well sorted, micaceous, homogeneous	
10		3	3.4	ND		CL	7.5YR 3/2 dark brown, Clay, moist, moderately stiff, plastic; increasing sand, fine to medium with depth	
		4	4.0	ND		SM	5YR 4/6 yellowish red, Silty Sand, fine, moist, dense, micaceous	Sample 37SB1B collected 14.0-16.0 ft bgs
15		5	3.5	ND				Sample 37SB1C collected 18.0-20.0 ft bgs
20		6	0.5	ND		GM	5YR 4/6 yellowish red, Silty Gravel with sand; gravel, medium to coarse; sand, medium	
25							Boring terminated 24.0 ft bgs; groundwater 20.5 ft bgs	
30								

Report: ENV_12AS_CLEVELAND+/-USCS; File: RFAAP_SSP.GPJ; 12/8/2003 37SB1

URS

Project: Radford Army Ammunition Plant- SSP
Project Location: Radford, Virginia
Project Number: 09604-317

Log of Borehole 37SB2

Sheet 1 of 1

Date(s) Drilled	10-03-03 0845-0910	Logged By	J. Spangler	Reviewed By	C. Lawrence
Drilling Method	Geoprobe - Direct Push Technology	Drilling Contractor	Richard Simmons Drilling	Total Depth of Borehole	22.9 feet
Drill Rig Type	Tractor- Mounted Geoprobe	Drill Bit Size/Type	4 ft x 2 in Rectractable Macrocore Sampler	Ground Surface Elevation	
Groundwater Level(s)	NA	Sampling Method	4 ft x 2 in Macrocore Sampler with Liner	Hammer Data	NA
Borehole Backfill	Bentonite Pellets	Comments			

Elevation, feet	Downhole Depth, feet	SAMPLES Type	Number	Recovery (feet)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
	0		1	3.5	ND		SLUDGE	7.5YR 7/6 reddish yellow, $CaSO_4$ Sludge, soft	Sample 37SB2A, MS, MSD collected 0.0-1.0 ft bgs
	5		2	4.0	ND		SM	5YR 4/6 yellowish red, Silty Sand, fine, some clay, slightly moist, micaceous, medium dense	
								grades to loose	
	10		3	4.0	ND				Sample 37SB2B collected 10.0-12.0 ft bgs
			4	3.7	ND				
	15		5	3.5	ND		SP/SM	5YR 4/6 yellowish red, Sand with gravel and lenses of silty sand, fine, micaceous	Sample 37SB2C collected 18.0-20.0 ft bgs
	20		6	2.0	ND		ML	7.5YR 5/8 strong brown, Silt, with siltstone inclusions, wet, very soft	
	25							Boring Refusal 22.9 feet bgs	
	30								

Report: ENV_12AS_CLEVELAND+/-USCS; File: RFAAP_SSP.GPJ; 12/8/2003 37SB2

URS

Project: Radford Army Ammunition Plant- SSP Project Location: Radford, Virginia Project Number: 09604-317	Log of Borehole 37SB3 Sheet 1 of 1

Date(s) Drilled	10-02-03 1015-1120	Logged By	J. Spangler	Reviewed By	C. Lawrence
Drilling Method	Geoprobe - Direct Push Technology	Drilling Contractor	Richard Simmons Drilling	Total Depth of Borehole	28.0 feet
Drill Rig Type	Tractor- Mounted Geoprobe	Drill Bit Size/Type	4 ft x 2 in Rectractable Macrocore Sampler	Ground Surface Elevation	
Groundwater Level(s)	25.5 ft bgs during drilling	Sampling Method	4 ft x 2 in Macrocore Sampler with Liner	Hammer Data	NA
Borehole Backfill	Bentonite Pellets	Comments			

Elevation, feet	Downhole Depth, feet	SAMPLES Type	Number	Recovery (feet)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
	0						Fill	2.5YR 4/6 red, Sandy Clay, medium grained, moist, moderately stiff and moderately plastic; possible fill soil	Sample 37SB3A collected 0.0-1.0 ft bgs
			1	3.5	ND			7.5YR 3/4 dark brown, Silty Sand, medium, slightly moist, moderately dense and micaceous	
							SM	grades to loose	
	5		2	4.0	ND				
								5YR 4/4 reddish brown, lean Clay, some fine sand, moist, micaceous	
	10		3	4.0	ND		CL		
								7.5YR 4/6 strong brown, lean Clay, some fine sand and silt, moist	Sample 37SB3B, MS, MSD collected 10.0-12.0 ft bgs
			4	3.6	ND		CL		
	15						SM	5YR 4/6 yellow red, Silty Sand, fine, moist, micaceous, homogeneous, dense	
								5YR 4/6 yellowish red, Silty Sand, fine, moist, micaceous, homogeneous	
			5	3.5	ND		SM		
								Trace gravel present at 19.5 ft bgs	
	20							Gravel increases with depth	
							SM		
			6	3.0	ND				Sample 37SB3C collected 22.0-24.0 ft bgs
								5YR 4/6 yellowish red, Gravel with sand, moist	
	25						GP		
			7	2.0	ND				
								Boring terminated 28.0 ft bgs; groundwater at 25.5 ft bgs	
	30								

Report: ENV_12AS_CLEVELAND+/-USCS; File: RFAAP_SSP.GPJ; 12/8/2003 37SB3

URS

Project: Radford Army Ammunition Plant- SSP
Project Location: Radford, Virginia
Project Number: 09604-317

Log of Borehole 38SB1

Sheet 1 of 1

Date(s) Drilled	10-03-03 1045-1120	Logged By	J. Spangler	Reviewed By	C. Lawrence
Drilling Method	Hand Auger	Drilling Contractor	URS Group, Inc.	Total Depth of Borehole	7.5 feet
Drill Rig Type	NA	Drill Bit Size/Type	3-inch Hand Auger	Ground Surface Elevation	
Groundwater Level(s)	NA	Sampling Method	Stainless-Steel 3-inch Hand Auger	Hammer Data	NA
Borehole Backfill	Bentonite Pellets	Comments			

Elevation, feet	Downhole Depth, feet	SAMPLES Type	SAMPLES Number	Recovery (feet)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
	0			1.0				5YR 4/6 yellowish red, Sandy Silt, fine, dry, very soft and light weight	Sample 38SB1A collected 0.0-1.0 ft bgs
	1			1.0	ND				
	2			1.0			ML	Grades to moist from surface to 3.0 ft bgs	
	3			1.0	ND				Sample 38SB1B collected 3.5 ft bgs
	4			1.0					
	5			1.0	ND			Increasing fine sand 5.0-7.0 ft bgs	
	6			1.0 0.5					Sample 38SB1C collected 7.0-7.5 ft bgs
	7				ND		SM	5YR 5/8 yellowish red, Silty Sand, fine to medium, trace medium gravel, moist, micaceous	
	8							Boring Refusal 7.5 ft bgs	
	9								
	10								

URS

Report: ENV_12AS_CLEVELAND+/-USCS; File: RFAAP_SSP.GPJ; 12/8/2003 38SB1

Project: Radford Army Ammunition Plant- SSP
Project Location: Radford, Virginia
Project Number: 09604-317

Log of Borehole 38SB2

Sheet 1 of 1

Date(s) Drilled	10-02-03 0905-1000	Logged By	J. Spangler	Reviewed By	C. Lawrence
Drilling Method	Geoprobe - Direct Push Technology	Drilling Contractor	Richard Simmons Drilling	Total Depth of Borehole	22.0 feet
Drill Rig Type	Tractor- Mounted Geoprobe	Drill Bit Size/Type	4 ft x 2 in Rectractable Macrocore Sampler	Ground Surface Elevation	
Groundwater Level(s)	NA	Sampling Method	4 ft x 2 in Macrocore Sampler with Liner	Hammer Data	NA
Borehole Backfill	Bentonite Pellets	Comments			

Elevation, feet	Downhole Depth, feet	SAMPLES Type	Number	Recovery (feet)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
	0				30			10YR 3/4 dark yellowish brown, Silty Sand, fine, moist, micaceous, moderately dense.	Sample 38SB2A collected 0.0-1.0 ft bgs
			1	3.8	1.5		SM	Increasing silt with depth	
					5				
					ND			5YR 4/4 reddish brown, Sand with silt, very fine, moist, micaceous, very stiff	
	5				0.2				
			2	3.8	1.2		SM		
					0.2				
					ND			5YR 5/8 yellowish red, Silty Sand, very fine, trace clay, moist, micaceous, homogeneous	
	10		3	4.0	ND		SM		Sample 38SB2B and SBD4collected 10.0-12.0 ft bgs
							SM	7.5YR 5/6 strong brown, Silty Sand, some fine gravel, moist, loose to moderately dense	
			4	3.6			SM	Gravel layer	
	15							7.5YR 5/6 strong brown, Silty Sand, some fine gravel, moist, loose to moderately dense	
								5YR 4/6 yellowish red, Gravel, some medium sand and silt, moist	
								Initial Boring Refusal 16.8 ft bgs. Boring was offset 5 ft to the North to achieve desired sampling depths.	
			5	2.6			GP		Sample 38SB2C collected 18.0-20.0 ft bgs
	20								
			6	2.0					
								Offset Boring Refusal 22.0 ft bgs	
	25								
	30								

Report: ENV_12AS_CLEVELAND+/-USCS; File: RFAAP_SSP.GPJ; 12/8/2003 38SB2

URS

Project: Radford Army Ammunition Plant- SSP
Project Location: Radford, Virginia
Project Number: 09604-317

Log of Borehole 38SB3

Sheet 1 of 1

Date(s) Drilled	10-03-03 1200-1230	Logged By	J. Spangler	Reviewed By	C. Lawrence
Drilling Method	Hand Auger	Drilling Contractor	URS Group, Inc.	Total Depth of Borehole	6.0 feet
Drill Rig Type	NA	Drill Bit Size/Type	3-inch Hand Auger	Ground Surface Elevation	
Groundwater Level(s)	NA	Sampling Method	Stainless-Steel 3-inch Hand Auger	Hammer Data	NA
Borehole Backfill	Bentonite Pellets	Comments			

Elevation, feet	Downhole Depth, feet	SAMPLES Type	SAMPLES Number	Recovery (feet)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
	0			1.0	ND		ML/CL	5YR 4/6 yellowish red, Silt and Clay, moist, soft, moderately plastic	Sample 38SB3A collected 0.0-1.0 ft bgs
	1			1.0					
	2			1.0					
	3			1.0	ND		ML	7.5YR 4/6 strong brown, Silt with trace sand, moist, micaceous	Sample 38SB3B collected 4.0 ft bgs
	4			1.0			ML	5YR 4/6 yellowish red, Sandy Silt, very fine, moist	
	5			1.0	ND				Sample 39SB3C collected 6.0 ft bgs
	6							Boring Refusal at 6.0 ft bgs	
	7								
	8								
	9								
	10								

URS

Report: ENV_12AS_CLEVELAND+/-USCS; File: RFAAP_SSP.GPJ; 12/8/2003 38SB3

Project: Radford Army Ammunition Plant- SSP Project Location: Radford, Virginia Project Number: 09604-317	Log of Borehole 46SB1 Sheet 1 of 1

Date(s) Drilled	10-02-03 1205-1230	Logged By	J. Spangler	Reviewed By	C. Lawrence
Drilling Method	Geoprobe - Direct Push Technology	Drilling Contractor	Richard Simmons Drilling	Total Depth of Borehole	16.6 feet
Drill Rig Type	Tractor- Mounted Geoprobe	Drill Bit Size/Type	4 ft x 2 in Rectractable Macrocore Sampler	Ground Surface Elevation	
Groundwater Level(s)	NA	Sampling Method	4 ft x 2 in Macrocore Sampler with Liner	Hammer Data	NA
Borehole Backfill	Bentonite Pellets	Comments	1st Boring Refusal 13.3 ft bgs; 2nd Boring offset 5 ft North		

Elevation, feet	Downhole Depth, feet	SAMPLES Type	Number	Recovery (feet)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
	0							5YR 4/6 yellowish red, Silty Sand, fine, moderately dense, micaceous, homogeneous	Sample 46SB1A collected 0.0-1.0 ft bgs
	2		1	4.0	ND		SM	Silt grades less to 6.0 ft bgs	
	4								
	6		2	4.0	ND		ML	5YR 4/6 yellowish red, Silt with gravel, very moist, soft, sticky	
								Clay seam	
	8						SM	5YR 4/6 yellowish red, Silty Sand, medium, moist, micaceous, dense Sand grades to medium coarse with depth Gravelly 9.0-10.0 ft bgs	Sample 46SB1B collected 8.0-10.0 ft bgs
	10		3	3.0	ND		ML	10YR 6/6 brownish yellow, Silt, moist, saprolitic texture Claystone lenses 11.0-12.0 ft bgs, very moist	
	12								
								Claystone, hard, gray; becomes very hard at 13.3 ft bgs	
	14		4	4.0	ND		SM	Initial Boring Refusal 13.3 ft bgs; Offset Boring 5 ft to the North to achieve desired sampling depths 5YR 4/6 yellowish red, Silty Sand, very fine to medium, with trace clay, moderately dense, moist, micaceous, homogeneous	Sample 46SB1C collected 14.0-16.6 ft bgs
							ML	10YR 7/1 light gray, Silt with clay, moist, hard	
	16		5	0.6	ND		ML	Saprolitic lense 15.8 ft bgs 5YR 4/6 yellowish red, Sandy Silt, very moist, soft	
	18							Offset Boring Refusal 16.6 ft bgs	
	20								

Report: ENV_12AS_CLEVELAND+/-USCS; File: RFAAP_SSP.GPJ; 12/8/2003 46SB1

URS

Project: Radford Army Ammunition Plant- SSP
Project Location: Radford, Virginia
Project Number: 11656628

Log of Boring 46MW1

Sheet 1 of 1

Date(s) Drilled and Installed	**4/18/06**	Logged By	**J. Spangler**	Reviewed By	**B. Fisher**
Drilling Method	**Hollow Stem Auger / Air Rotary**	Drilling Contractor	**Parratt Wolff**	Total Depth of Borehole	**32.3 feet**
Sampling Method	**4 ft x 2 in Macrocore Sampler with Liner / Grab**	Drill Bit Size/Type	**4 1/4 in ID HSA / 4 in Air Hammer**	Top of Casing Elevation	
Size and Type of Well Casing	**2-inch PVC**	Screen Perforation	**10-slot**	Surface Elevation	
Seal or Backfill	**Bentonite Pellets**	Comments			

Elevation feet	Depth, feet	SAMPLES Type	SAMPLES Number	SAMPLES Recovery (feet)	SAMPLES PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES AND WELL DETAILS
	0			ND				5YR 4/6 yellowish red, silty, fine to very fine SAND, dense micaceous, slightly moist	
				ND					
			1	ND	0.0			Grading less dense	
								Increasing moisture	Bentonite cement slurry
	5			ND					
			2	ND	0.0				
				ND			SM		
								Same	
				ND					Bentonite chips
	10			ND					
			3	ND	0.2				Sand
				ND				Geoprobe refusal at 12.6 ft, switch to augers. Refusal at thinly laminated mudstone. Broke through with augers and will sample from 13-16	
			4	ND	0.2		GM	Coarse, gravel, with silt and interbedded mudstone. Auger refusal at 13.0 ft (800 lbs Auger pressure). Switch to air, break out of rock 15.0 ft. Switch to Auger again. Advance Geoprobe to 16.5 - refusal	
	15		5	ND				▽	
								Shaley limestone / dolomite cuttings, brown, dry, dusty conditions.	
	20							Less dusty.	Factory slotted PVC screen with No.2 filter pack
							LMS		
	25							No dust.	
								Dry.	
	30							Water encountered.	
									Sand
	35							Boring Terminated at 32.3 ft bgs.	

Report: ENV_12AW_CLEVELAND+/-USCS; File: RFAAP_SSP.GPJ; 1/10/2007 46MW1

URS

Project: Radford Army Ammunition Plant- SSP
Project Location: Radford, Virginia
Project Number: 09604-317

Log of Borehole 46SB2

Sheet 1 of 1

Date(s) Drilled	10-02-03 1325-1350	Logged By	J. Spangler	Reviewed By	C. Lawrence
Drilling Method	Geoprobe - Direct Push Technology	Drilling Contractor	Richard Simmons Drilling	Total Depth of Borehole	17.5 feet
Drill Rig Type	Tractor- Mounted Geoprobe	Drill Bit Size/Type	4 ft x 2 in Rectractable Macrocore Sampler	Ground Surface Elevation	
Groundwater Level(s)	17.0 ft bgs during drilling	Sampling Method	4 ft x 2 in Macrocore Sampler with Liner	Hammer Data	NA
Borehole Backfill	Bentonite Pellets	Comments			

Elevation, feet / Downhole Depth, feet	SAMPLES Type	Number	Recovery (feet)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
0							5YR 5/4 reddish brown, Silty Sand, fine, slightly moist, dense, micaceous	Sample 46SB2A collected 0.0-1.0 ft bgs
							Color changes to 5YR 4/6 yellowish red 0.5 ft bgs, moderately dense	
2		1	4.0	ND				
							Sand grades to very fine and soft	
4						SM		
6		2	4.0	ND				
							Slightly Gravelly 7.0 ft bgs	
8								
							Grading softer; Increasing moisture with depth	
10		3	4.0	ND			Slightly Gravelly	Sample 46SB2B collected 10.0-12.0 ft bgs
							7.5YR 5/8 strong brown, Gravel with sand, moderately dense	
12						GP		
							7.5YR 5/8 strong brown, Silt, moist	
14		4	4.0	ND		ML		Sample 46SB2C and SBD2collected 14.0-16.6 ft bgs
							Saprolitic texture 14.5-15.0 ft bgs	
							Sticky 15.0-16.0 ft bgs	
16				ND			Gravel lense 16.0 ft bgs	
		5	1.5			ML/GM	7.5YR 5/8 strong brown, Gravelly Silt; Silt very soft; Gravel 7.5YR 5/3 brown	
							Saprolite; Groundwater at 17.0 ft bgs	
18							Boring Refusal 17.5 ft bgs	
20								

Report: ENV_12AS_CLEVELAND+/-USCS; File: RFAAP_SSP.GPJ; 12/8/2003 46SB2

URS

Project: Radford Army Ammunition Plant- SSP
Project Location: Radford, Virginia
Project Number: 09604-317

Log of Borehole 57SB1

Sheet 1 of 1

Date(s) Drilled	10-07-03 0945-1035	Logged By	J. Spangler	Reviewed By	C. Lawrence
Drilling Method	Geoprobe - Direct Push Technology	Drilling Contractor	Richard Simmons Drilling	Total Depth of Borehole	24.0 feet
Drill Rig Type	Tractor- Mounted Geoprobe	Drill Bit Size/Type	4 ft x 2 in Rectractable Macrocore Sampler	Ground Surface Elevation	
Groundwater Level(s)	approximately 21.5 ft bgs during drilling	Sampling Method	4 ft x 2 in Macrocore Sampler with Liner	Hammer Data	NA
Borehole Backfill	Bentonite Pellets	Comments			

Elevation, feet	Downhole Depth, feet	SAMPLES Type	Number	Recovery (feet)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
	0						CL	7.5YR 4/3 brown, Clay with fine sand and trace silt, moist, moderately stiff, moderately plastic	Sample 57SB1A collected 0.0-1.0 ft bgs
			1	3.1	ND		ML	7.5YR 4/6 strong brown, Sandy Silt with clay, very fine, moist, low plasticity	
	5		2	4.0	ND		CH/CL	5YR 5/6 yellowish red, Clay, moist, highly plastic, very stiff 6.9 ft bgs, becomes sandy, fine, moderately stiff, plastic Grades to highly silty with depth	
	10		3	4.0	ND		ML	5YR 5/8 yellowish red, Silt with some clay, moist, very soft	Sample 57SB1B collected 10.0-12.0 ft bgs
			4	4.0	ND		ML	7.5YR 5/8 strong brown, Sandy Silt, very fine, moist, soft 12.25-14.8 ft bgs, 7.5YR 6/6 reddish yellow, Sandy Silt, very fine, moist, very soft Grades sandier with depth	
	15						GM/GP	10YR 6/6 brownish yellow, Gravel with silt and sand, moist	
			5	2.7	ND		ML	7.5YR 7/8 reddish yellow mottled with light gray, Silt with claystone fragments, moist, very soft	Sample 57SB1C collected 18.0-20.0 ft bgs
	20		6	3.0	ND		ML	7.5YR 6/8 reddish yellow, increasing claystone fragments, sticky Groundwater at approximately 21.5 ft bgs	
	25							Boring terminated 24.0 ft bgs	
	30								

URS

Report: ENV_12AS_CLEVELAND+/-USCS; File: RFAAP_SSP.GPJ; 12/8/2003 57SB1

Project: Radford Army Ammunition Plant- SSP
Project Location: Radford, Virginia
Project Number: 09604-317

Log of Borehole 57SB2

Sheet 1 of 2

Date(s) Drilled	10-07-03 1400-1500	Logged By	J. Spangler	Reviewed By	C. Lawrence
Drilling Method	Geoprobe - Direct Push Technology	Drilling Contractor	Richard Simmons Drilling	Total Depth of Borehole	36.0 feet
Drill Rig Type	Tractor- Mounted Geoprobe	Drill Bit Size/Type	4 ft x 2 in Rectractable Macrocore Sampler	Ground Surface Elevation	
Groundwater Level(s)	35.5 ft bgs during drilling	Sampling Method	4 ft x 2 in Macrocore Sampler with Liner	Hammer Data	NA
Borehole Backfill	Bentonite Pellets	Comments	Initial Boring Refusal 3.0 ft bgs; Offset boring 6 inches		

Elevation, feet	Downhole Depth, feet	SAMPLES Type	Number	Recovery (feet)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
	0							10YR 3/3 dark brown, Sand and Silt, very fine, underlain by Gravel fill	Sample 57SB2A collected 0.0-1.0 ft bgs
			1	3.0	ND		CL	5YR 5/6 yellowish red, Sandy Clay, fine, stiff, very plastic, alternating with sand and clay layers	
							NR	3.0-4.0 ft bgs; No Recovery, presumed Gravel	
							GM/GP	5YR 4/4 reddish brown, Gravel with sand and silt, hard	
	5		2	4.0	ND		ML/CL	7.5YR 6/8 reddish yellow, Silt and Clay, dry, friable, dense Clay grades out	
	10		3	4.0	ND			9.0 ft bgs, Claystone inclusions, slight saprolitic texture 10.0-11.5 ft bgs, Claystone inclusions; weathered, saprolitic texture; black	Sample 57SB2B, MS, MSD collected 8.0-12.0 ft bgs
	15		4	4.0	ND		ML/SM	10YR 6/6 brownish yellow, Silt, trace gravel and claystone inclusions, trace medium to coarse sand, moist 15.0 ft bgs, some very pale brown to gray mottling, trace medium to coarse sand	
			5	4.0	ND				
	20						Siltstone	10YR 6/6 brownish yellow, Siltstone with claystone layers, saprolitic texture, slightly moist	
			6	4.0	ND		ML	10YR 6/6 brownish yellow, Silt, saprolitic texture, slightly moist, very dense, hard Increasing sand and gravel (mudstone/claystone)	
	25		8	4.0	ND				
	30						GP/GM	10YR 5/8 yellowish brown, Silty Gravel with sand, moist, moderately dense; sand, fine to coarse; gravel, medium	

URS

Project: Radford Army Ammunition Plant- SSP
Project Location: Radford, Virginia
Project Number: 09604-317

Log of Borehole 57SB2

Elevation, feet	Downhole Depth, feet	SAMPLES Type	SAMPLES Number	Recovery (feet)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
	30		9	2.6	ND		GP/GM	10YR 5/8 yellowish brown, Silty Gravel with sand, moist, moderately dense; sand, fine to coarse; gravel, medium	
			10	4.0	ND				Sample 57SB2C collected 33.0-35.0 ft bgs
	35							Groundwater at 35.5 ft bgs ▽	
								Offset Boring terminated 36.0 ft bgs	
	40								
	45								
	50								
	55								
	60								
	65								

Report: ENV_12AS_CLEVELAND+/-USCS; File: RFAAP_SSP.GPJ; 12/8/2003 57SB2

URS

Project: Radford Army Ammunition Plant- SSP Project Location: Radford, Virginia Project Number: 09604-317	Log of Borehole 57SB3 Sheet 1 of 2

Date(s) Drilled	10-07-03 1045-1215	Logged By	J. Spangler	Reviewed By	C. Lawrence
Drilling Method	Geoprobe - Direct Push Technology	Drilling Contractor	Richard Simmons Drilling	Total Depth of Borehole	34.5 feet
Drill Rig Type	Tractor- Mounted Geoprobe	Drill Bit Size/Type	4 ft x 2 in Rectractable Macrocore Sampler	Ground Surface Elevation	
Groundwater Level(s)	32.0 ft bgs during drilling	Sampling Method	4 ft x 2 in Macrocore Sampler with Liner	Hammer Data	NA
Borehole Backfill	Bentonite Pellets	Comments			

Elevation, feet	Downhole Depth, feet	SAMPLES Type	Number	Recovery (feet)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
	0							5YR 3/3 reddish brown, Sandy Silt, fine, slightly moist	Sample 57SB3A and SBD6 collected 0.0-1.0 ft bgs
			1	4.0	ND		ML	2.5YR 5/8 red, Silt with clay and sand, very fine, moist, micaceous, soft	
	5		2	4.0	ND			Increasing moisture and sand with depth Black sand (weathered rock)	
	10		3	4.0	ND		SC/SM	7.5YR 5/6 strong brown, Clayey Sand with silt, very fine, soft to moderately dense, micaceous 10.0 ft bgs, some black sand	
							SM	7.5YR 6/4 light brown, Silty Sand with some clay, very fine, very moist, soft to moderately stiff, moderately dense	
			4	4.0	ND		CL/CH	7.5YR 6/4 light brown, Sandy Clay/Clayey Sand, moist, dense 13.5-14.0 ft bgs, Clay is very plastic	
	15						CL	7.5YR 7/8 reddish yellow, Clay with silt and trace sand, saprolitic texture Increasing clay	Sample 57SB3B collected 14.0-16.0 ft bgs
			5	4.0	ND		CH	7.5YR 5/8 strong brown, Clay with trace black sand, very plastic 17.6-17.8 ft bgs, Sandy Clay lense, stiff, slightly moist	
	20		6	4.0	ND		ML	7.5YR 6/8 reddish yellow, Silt with claystone inclusions, dense, moist; claystone inclusions have saprolitic texture 21.8 ft bgs, becomes soft with trace black sand, increasing moisture	
	25		7	4.0	ND				
							ML	10YR 5/8 yellowish brown, Silt with some clay, very soft	
	30							10YR 4/6 dark yellowish brown, Silt with some clay and claystone inclusions, soft;	Sample 57SB3C

Report: ENV_12AS_CLEVELAND+/-USCS; File: RFAAP_SSP.GPJ; 12/8/2003 57SB3

URS

Project: Radford Army Ammunition Plant- SSP
Project Location: Radford, Virginia
Project Number: 09604-317

Log of Borehole 57SB3

Elevation, feet	Downhole Depth, feet	SAMPLES Type	SAMPLES Number	SAMPLES Recovery (feet)	SAMPLES PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
	30		8	2.0	ND			claystone has saprolitic texture Increasing moisture	collected 29.0-31.0 ft bgs
							ML	Groundwater at 32.5 ft bgs	
			9	2.5	ND				
	35							Boring terminated 34.5 ft bgs	
	40								
	45								
	50								
	55								
	60								
	65								

Report: ENV_12AS_CLEVELAND+/-USCS; File: RFAAP_SSP.GPJ; 12/8/2003 57SB3

Project: Radford Army Ammunition Plant- SSP
Project Location: Radford, Virginia
Project Number: 09604-317

Log of Borehole 57SB4

Sheet 1 of 1

Date(s) Drilled	10-08-03 1000-1600	Logged By	J. Spangler	Reviewed By	C. Lawrence
Drilling Method	Hand Auger	Drilling Contractor	URS Group, Inc.	Total Depth of Borehole	1.5 feet
Drill Rig Type	NA	Drill Bit Size/Type	3-inch Hand Auger	Ground Surface Elevation	
Groundwater Level(s)	Surface Water	Sampling Method	Stainless-Steel 3-inch Hand Auger	Hammer Data	NA
Borehole Backfill	Bentonite Pellets	Comments	Boring located inside Settling Lagoon		

Elevation, feet	Downhole Depth, feet	SAMPLES Type	SAMPLES Number	SAMPLES Recovery (feet)	SAMPLES PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
	0							Highly organic swamp mud, wet	Sample 57SB4A collected 0.5 ft bgs
			1	1.0			CH/SC	2.5Y 5/3 light olive brown, Sandy Clay, fine, wet, very plastic, sticky, stiff	
	1		2	0.5					Sample 57SB4B collected 1.5 ft bgs
	2							Boring Refusal 1.5 ft bgs Note: 2 offset borings, identical lithology, identical refusal	
	3								
	4								
	5								
	6								
	7								
	8								
	9								
	10								

URS

Report: ENV_12AS_CLEVELAND+/-USCS; File: RFAAP_SSP.GPJ; 12/8/2003 57SB4

Project: Radford Army Ammunition Plant- SSP
Project Location: Radford, Virginia
Project Number: 09604-317

Log of Borehole 68SB1

Sheet 1 of 1

Date(s) Drilled	10-06-03 1440-1530	Logged By	J. Spangler	Reviewed By	C. Lawrence
Drilling Method	Geoprobe - Direct Push Technology	Drilling Contractor	Richard Simmons Drilling	Total Depth of Borehole	22.5 feet
Drill Rig Type	Tractor- Mounted Geoprobe	Drill Bit Size/Type	4 ft x 2 in Rectractable Macrocore Sampler	Ground Surface Elevation	
Groundwater Level(s)	20.0 ft bgs during drilling	Sampling Method	4 ft x 2 in Macrocore Sampler with Liner	Hammer Data	NA
Borehole Backfill	Bentonite Pellets	Comments			

Elevation, feet	Downhole Depth, feet	SAMPLES Type	Number	Recovery (feet)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
	0						FILL	7.5YR 5/4 brown, Sandy Silt, SM/ML, very fine, dry	Sample 68SB1A collected 0.0-1.0 ft bgs
			1	2.6	ND		FILL	7.5YR 6/8 reddish yellow, Silt and clay with saprolite chips, ML/CL, moist, soft, plastic 0.75-7.0 ft bgs, Fill Soil	
	5		2	4.0	ND				
							CL/ML	7.5YR 6/8 reddish yellow, Clay and Silt, soft, saprolitic texture Increasing Saprolitic texture	Sample 68SB1B collected 7.0-9.0 ft bgs
	10		3	4.0	ND				
							ML	10YR 5/8 yellowish brown, Sandy Silt, saprolitic, fine, soft	
	15		4	4.0	ND			Increasing Saprolitic texture; very soft, very moist	
			5	4.0	ND				Sample 68SB1C collected 18.0-20.0 ft bgs
	20							Groundwater at 20.0 ft bgs	
			6	2.5	ND			Boring Refusal 22.5 ft bgs	
	25								
	30								

Report: ENV_12AS_CLEVELAND+/-USCS; File: RFAAP_SSP.GPJ; 12/8/2003 68SB1

URS

Project: Radford Army Ammunition Plant- SSP
Project Location: Radford, Virginia
Project Number: 09604-317

Log of Borehole 68SB2

Sheet 1 of 1

Date(s) Drilled	10-06-03 1245-1430	Logged By	J. Spangler	Reviewed By	C. Lawrence
Drilling Method	Geoprobe - Direct Push Technology	Drilling Contractor	Richard Simmons Drilling	Total Depth of Borehole	24.0 feet
Drill Rig Type	Tractor- Mounted Geoprobe	Drill Bit Size/Type	4 ft x 2 in Rectractable Macrocore Sampler	Ground Surface Elevation	
Groundwater Level(s)	23.5 ft bgs during drilling	Sampling Method	4 ft x 2 in Macrocore Sampler with Liner	Hammer Data	NA
Borehole Backfill	Bentonite Pellets	Comments			

Elevation, feet	Downhole Depth, feet	SAMPLES Type	Number	Recovery (feet)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
	0						FILL	7.5YR 4/4 brown, Sandy Silt, SM/ML, very fine, slightly moist, stiff	Sample 68SB2A, MS, MSD collected 0.0-1.0 ft bgs
			1	4.0	ND		FILL	10YR 5/6 yellowish brown, Gravelly Clay with sand and silt, CL, soft, slightly moist	
	5		2	4.0	ND				
							CL	7.5YR 5/8 strong brown, Sandy Clay, fine to coarse, slight red and light yellow mottling, stiff, plastic	Sample 68SB2B collected 7.0-9.0 ft bgs
	10		3	4.0	ND		SM/GM	7.5YR 5/8 strong brown, Silt Sand with some gravel, slightly moist, soft; Gravel, medium, saprolitic texture 10.3 ft bgs, becomes harder 11.7-11.8 ft bgs, 7.5YR 4/4 brown	
			4	3.6	ND				
	15							Clay, plastic	
			5	4.0	ND		ML/CL	7.5YR 6/8 reddish yellow grading to 7.5YR 5/8 strong brown at 16.0 ft bgs, Silt and Clay with some sand and gravel, moist, soft; sand, medium to coarse; gravel, coarse, saprolitic texture	
	20		6	4.0	ND		CL/ML	10YR 5/6 yellowish brown mottled with 7.5YR 5/8 strong brown, Clay and Silt with saprolite (siltstone) Saprolite increasing Groundwater at 23.5 ft bgs	Sample 68SB2C and SBD5collected 21.0-23.0 ft bgs
	25							Boring terminated 24.0 ft bgs	
	30								

URS

Report: ENV_12AS_CLEVELAND+/-USCS; File: RFAAP_SSP.GPJ; 12/8/2003 68SB2

Project: Radford Army Ammunition Plant- SSP
Project Location: Radford, Virginia
Project Number: 09604-317

Log of Borehole 68SB3

Sheet 1 of 1

Date(s) Drilled	10-07-03 0800-0855	Logged By	J. Spangler	Reviewed By	C. Lawrence
Drilling Method	Geoprobe - Direct Push Technology	Drilling Contractor	Richard Simmons Drilling	Total Depth of Borehole	24.0 feet
Drill Rig Type	Tractor- Mounted Geoprobe	Drill Bit Size/Type	4 ft x 2 in Rectractable Macrocore Sampler	Ground Surface Elevation	
Groundwater Level(s)	22.0 ft bgs during drilling	Sampling Method	4 ft x 2 in Macrocore Sampler with Liner	Hammer Data	NA
Borehole Backfill	Bentonite Pellets	Comments			

Elevation, feet	Downhole Depth, feet	SAMPLES Type	Number	Recovery (feet)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
	0							7.5YR 3/4 dark brown, Sandy Silt, very fine, slightly moist, moderately dense	Sample 68SB3A collected 0.0-1.0 ft bgs
			1	4.0			SM/ML	No Fill Soil observed	
								2.5-3.0 ft bgs; becomes 5YR 4/6 yellowish red, clayey; sand becomes fine	
								5YR 4/6 yellowish red, Gravelly Silt	
	5						GM		
			2	4.0				7.5YR 5/8 strong brown mottled with red and light gray, Clay with some silt, stiff to very stiff, plastic	
							CL/CH	▼ Red mottling increasing	Sample 68SB3B collected 8.0-10.0 ft bgs
	10		3	4.0				10.1 ft bgs; red mottling grades out, becomes softer	
								7.5YR 6/8 reddish yellow, Gravelly Silt with clay, low plasticity; gravel, fine to medium	
								11.5 ft bgs; Saprolitic texture	
								▼ 12.0 ft bgs; Increasing Saprolitic texture; soft, moist	
			4	4.0					
	15						ML	▼ Increasing gravel (claystone and mudstone) inclusions	
								Alternating dense to soft layers of saprolite	
			5	4.0					Sample 68SB3C collected 18.0-20.0 ft bgs
	20							7.5YR 5/6 strong brown, Silt with trace fine sand, very moist to wet, saprolitic texture, soft	
			6	2.2			ML	Groundwater at 22.0 ft bgs ▽	
	25							Boring terminated 24.0 ft bgs	
	30								

Report: ENV_12AS_CLEVELAND+/-USCS; File: RFAAP_SSP.GPJ; 12/8/2003 68SB3

URS

Project: Radford Army Ammunition Plant- SSP Project Location: Radford, Virginia Project Number: 09604-317	Log of Borehole 69SB1 Sheet 1 of 1

Date(s) Drilled	10-08-03 1120-1200	Logged By	J. Spangler	Reviewed By	C. Lawrence
Drilling Method	Geoprobe - Direct Push Technology	Drilling Contractor	Richard Simmons Drilling	Total Depth of Borehole	20.0 feet
Drill Rig Type	Tractor- Mounted Geoprobe	Drill Bit Size/Type	4 ft x 2 in Rectractable Macrocore Sampler	Ground Surface Elevation	
Groundwater Level(s)	16.0 ft bgs during drilling	Sampling Method	4 ft x 2 in Macrocore Sampler with Liner	Hammer Data	NA
Borehole Backfill	Bentonite Pellets	Comments			

Elevation, feet	Downhole Depth, feet	SAMPLES Type	Number	Recovery (feet)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
	0								
			1	3.0	ND		FILL	2.5YR 4/6 red, Sandy Clay, CL, possible fill, slightly moist, stiff, low plasticity, homogeneous	Sample 69SB1A collected 0.0-1.0 ft bgs
	5		2	4.0	0.2		ML/SM	2.5YR 3/1 very dark gray, Silt with some sand, fine, very soft, very moist, "swamp-like" odor	Sample 69SB1B collected 5.0-6.0 ft bgs
	10		3	2.3	ND		ML	10YR 4/4 dark yellowish brown, Silt, with siltstone inclusions, very moist, very soft	
			4	4.0	ND				Sample 69SB1C collected 14.0-16.0 ft bgs
	15						Saprolite	Siltstone, saprolite	
							ML	10YR 4/4 dark yellowish brown, Silt, with siltstone inclusions, very moist, very soft ▽	
								Groundwater at 16.0 ft bgs	
			5	0.0			NR	Not Recovered	
	20							Boring terminated 20.0 ft bgs	
	25								
	30								

URS

Report: ENV_12AS_CLEVELAND+/-USCS; File: RFAAP_SSP.GPJ; 12/8/2003 69SB1

Project: Radford Army Ammunition Plant- SSP
Project Location: Radford, Virginia
Project Number: 09604-317

Log of Borehole 69SB2

Sheet 1 of 1

Date(s) Drilled	10-08-03 1500-1530	Logged By	J. Spangler	Reviewed By	C. Lawrence
Drilling Method	Geoprobe - Direct Push Technology	Drilling Contractor	Richard Simmons Drilling	Total Depth of Borehole	14.6 feet
Drill Rig Type	Tractor- Mounted Geoprobe	Drill Bit Size/Type	4 ft x 2 in Rectractable Macrocore Sampler	Ground Surface Elevation	
Groundwater Level(s)	10.0 ft bgs during drilling	Sampling Method	4 ft x 2 in Macrocore Sampler with Liner	Hammer Data	NA
Borehole Backfill	Bentonite Pellets	Comments			

Elevation, feet	Downhole Depth, feet	SAMPLES Type	Number	Recovery (feet)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
	0		1	2.7	ND		FILL	2.5YR 4/6 red, Sandy Clay, CL, possible fill, slightly moist, very stiff, moderately plastic	Sample 69SB1A collected 0.0-1.0 ft bgs
	5		2	3.6	ND		CL	5YR 4/6 yellowish red, Sandy Clay, fine, moist, soft, plastic	Sample 69SB1B collected 4.0-5.0 ft bgs
							CH	7.5YR 5/8 strong brown, Clay, moist, moderately stiff, highly plastic	
	10		3	3.4	ND		ML	7.5YR 6/8 strong brown, Silt with clay, moist, moderately stiff Claystone inclusions Groundwater at 10.0 ft bgs	Sample 69SBC collected 9.0-10.0 ft bgs
			4	2.6	ND				
	15							Boring Refusal 14.6 ft bgs	
	20								
	25								
	30								

URS

Report: ENV_12AS_CLEVELAND+/-USCS; File: RFAAP_SSP.GPJ; 12/8/2003 69SB2

Project: Radford Army Ammunition Plant- SSP
Project Location: Radford, Virginia
Project Number: 09604-317

Log of Borehole 69SB3

Sheet 1 of 1

Date(s) Drilled	10-08-03 1410-1435	Logged By	J. Spangler	Reviewed By	C. Lawrence
Drilling Method	Geoprobe - Direct Push Technology	Drilling Contractor	Richard Simmons Drilling	Total Depth of Borehole	14.7 feet
Drill Rig Type	Tractor- Mounted Geoprobe	Drill Bit Size/Type	4 ft x 2 in Rectractable Macrocore Sampler	Ground Surface Elevation	
Groundwater Level(s)	12.5 ft bgs during drilling	Sampling Method	4 ft x 2 in Macrocore Sampler with Liner	Hammer Data	NA
Borehole Backfill	Bentonite Pellets	Comments			

Elevation, feet	Downhole Depth, feet	SAMPLES Type	Number	Recovery (feet)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
	0		1	4.0	ND		CL	5YR 4/6 yellowish red, Sandy Clay, slightly moist, stiff, low plasticity grading soft	Sample 69SB3A and SBD7 collected 0.0-1.0 ft bgs
	5		2	3.7	ND		GC	5YR 5/6 yellowish red, Clay with gravel, fine to medium, slightly moist, stiff	Sample 69SB3B collected 5.0-6.0 ft bgs
							CH/GC	7.5YR 5/6 strong brown, Clay with gravel, moist, highly plastic	
	10		3	4.0	ND		ML	7.5 YR 5/6 strong brown, Sandy Silt, medium, moist, soft, sticky 9.1 ft bgs, interbedded layers of Silt with siltstone inclusions, soft; and hard saprolitic silt	Sample 69SB3C collected 11.0-12.0 ft bgs
							ML	7.5YR 5/8 strong brown, Silt with clay, moist, soft, sticky Groundwater at 12.5 ft bgs	
			4	2.7	ND				
	15							Boring Refusal 14.7 ft bgs	
	20								
	25								
	30								

Report: ENV_12AS_CLEVELAND+/-USCS; File: RFAAP_SSP.GPJ; 12/8/2003 69SB3

URS

Project: Radford Army Ammunition Plant- SSP
Project Location: Radford, Virginia
Project Number: 09604-317

Log of Borehole ASB1

Sheet 1 of 1

Date(s) Drilled	10-11-03 0830-1000	Logged By	J. Spangler	Reviewed By	C. Lawrence
Drilling Method	Geoprobe - Direct Push Technology	Drilling Contractor	Richard Simmons Drilling	Total Depth of Borehole	32.0 feet
Drill Rig Type	Tractor- Mounted Geoprobe	Drill Bit Size/Type	4 ft x 2 in Rectractable Macrocore Sampler	Ground Surface Elevation	
Groundwater Level(s)	28.0 ft bgs during drilling	Sampling Method	4 ft x 2 in Macrocore Sampler with Liner	Hammer Data	NA
Borehole Backfill	Bentonite Pellets	Comments			

Elevation, feet / Downhole Depth, feet	SAMPLES Type	Number	Recovery (feet)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
0						CL/CH	7.5YR 5/8 strong brown, Clay with trace silt, moist, stiff, moderately plastic	Sample ASB1A collected 0.0-1.0 ft bgs
		1	4.0	ND		SM/ML	5YR 5/8 yellowish red, Sand and Silt, moist, micaceous, loose	
5							Decreasing sand with depth to 6.5 ft bgs	
		2	4.0	ND				
						ML	5YR 4/6 yellowish red, Silt, moist, micaceous, moderately stiff	
10		3	2.5	ND				Sample ASB1B collected 10.0-12.0 ft bgs
						SM	5YR 4/4 reddish brown, Silty Sand, fine, moist, micaceous	
						SC/SM	5YR 5/6 yellowish red, Sand, fine to medium, some clay and silt, moist	
15		4	2.1	ND				
						GM/GC	7.5YR 5/6 strong brown, Gravel with sand, silt, and clay, moist	
		5	4.0	ND				
						ML	5YR 4/4 reddish brown, Sandy Silt, fine, trace fine gravel, moist, soft, micaceous	
20							Moisture increases with depth	
		6	4.0	ND				
25		7	3.0	ND				Sample ASB1C collected 26.0-28.0 ft bgs
						NR	Not Recovered; Macrocore sampler very wet when retrieved	
30		8	0.0	ND			Groundwater at 28.0 ft bgs	
							Boring terminated 32.0 ft bgs	

Report: ENV_12AS_CLEVELAND+/-USCS; File: RFAAP_SSP.GPJ; 12/8/2003 ASB1

URS

Project: Radford Army Ammunition Plant- SSP
Project Location: Radford, Virginia
Project Number: 09604-317

Log of Borehole ASB2

Sheet 1 of 1

Date(s) Drilled	10-11-03 1000-1115	Logged By	J. Spangler	Reviewed By	C. Lawrence
Drilling Method	Geoprobe - Direct Push Technology	Drilling Contractor	Richard Simmons Drilling	Total Depth of Borehole	24.0 feet
Drill Rig Type	Tractor- Mounted Geoprobe	Drill Bit Size/Type	4 ft x 2 in Rectractable Macrocore Sampler	Ground Surface Elevation	
Groundwater Level(s)	23.0 ft bgs during drilling	Sampling Method	4 ft x 2 in Macrocore Sampler with Liner	Hammer Data	NA
Borehole Backfill	Bentonite Pellets	Comments			

Elevation, feet	Downhole Depth, feet	SAMPLES Type	Number	Recovery (feet)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
	0						CL/CH	7.5YR 5/8 strong brown, Clay with silt and fine sand, moist, moderately plastic	Sample ASB2A collected 0.0-1.0 ft bgs
			1	3.6	ND		SM	7.5YR 5/8 strong brown, Silty Sand, fine, moist, loose	
	5		2	3.4	ND		ML	5YR 4/6 yellowish red, Sandy Silt, very fine, moist, moderately stiff, micaceous	
	10		3	3.6	ND		GM	7.5YR 6/6 reddish yellow, Silty Gravel, moist, hard to very hard, medium coarse gravel very dense 10.0-12.0 ft bgs	Sample ASB2B and SBD10 collected 10.0-12.0 ft bgs
			4	4.0	ND		ML	10YR 6/6 brownish yellow mottled with 2.5YR 4/6 red, Silt with medium sand and fine gravel, moist, moderately dense, low plasticity 2.5YR 4/6 red grades out with depth	
	15		5	4.0	ND		ML	10YR 6/8 brownish yellow, Silt with clay, moist Hardness grades softer and moisture increases with depth	
	20		6	4.0	ND			Groundwater at 23.0 ft bgs	Sample ASB2C, MS, MSD collected 21.0-23.0 ft bgs
	25							Boring terminated 24.0 ft bgs	
	30								

URS

Report: ENV_12AS_CLEVELAND+/-USCS; File: RFAAP_SSP.GPJ; 12/8/2003 ASB2

Project: Radford Army Ammunition Plant- SSP
Project Location: Radford, Virginia
Project Number: 09604-317

Log of Borehole ASB3

Sheet 1 of 1

Date(s) Drilled	10-11-03 1200-1230	Logged By	J. Spangler	Reviewed By	C. Lawrence
Drilling Method	Geoprobe - Direct Push Technology	Drilling Contractor	Richard Simmons Drilling	Total Depth of Borehole	14.7 feet
Drill Rig Type	Tractor- Mounted Geoprobe	Drill Bit Size/Type	4 ft x 2 in Rectractable Macrocore Sampler	Ground Surface Elevation	
Groundwater Level(s)	NA	Sampling Method	4 ft x 2 in Macrocore Sampler with Liner	Hammer Data	NA
Borehole Backfill	Bentonite Pellets	Comments			

Elevation, feet	Downhole Depth, feet	SAMPLES Type	Number	Recovery (feet)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
	0						CL/ML	7.5YR 5/8 strong brown, Clay with silt and fine sand, moist, moderately stiff, moderately plastic	Sample ASB3A collected 0.0-1.0 ft bgs
			1	3.7	ND		SM/SC	5YR 4/6 yellowish red mottled with 5YR 3/3 dark reddish brown, Silty Sand with some clay, moist, micaceous	
	5		2	3.6	ND		ML	5YR 3/3 dark reddish brown, Silt, moist, saprolitic texture, hard	Sample ASB3B collected 6.0-8.0 ft bgs
							SM/SC	7.5YR 5/8 strong brown, Silty Sand with some clay, fine to medium, moist, micaceous	
	10		3	3.0	ND		GP	7.5YR 5/8 strong brown, Sandy Gravel with some silt and clay, fine to medium, moist	
							SM/GP	5YR 4/6 yellowish red, Silty Sand, fine to medium, with some fine to medium gravel, moist, micaceous	
			4	2.0	ND		GM	5YR 4/6 yellowish red, Silty Gravel, moist	Sample ASB3C collected 13.0-14.7 ft bgs
	15							Boring Refusal 14.7 ft bgs	
	20								
	25								
	30								

Report: ENV_12AS_CLEVELAND+/-USCS; File: RFAAP_SSP.GPJ; 12/8/2003 ASB3

URS

Project: Radford Army Ammunition Plant- SSP
Project Location: Radford, Virginia
Project Number: 11656628

Log of Borehole ASB4

Sheet 1 of 1

Date(s) Drilled	**4-19-06**	Logged By	**J. Spangler**	Reviewed By	**B. Fisher**
Drilling Method	**Geoprobe - Direct Push Technology**	Drilling Contractor	**Parratt Wolff**	Total Depth of Borehole	**32.0 feet**
Drill Rig Type	**Truck - Mounted Geoprobe**	Drill Bit Size/Type	**4 ft x 2 in Rectractable Macrocore Sampler**	Ground Surface Elevation	
Groundwater Level(s)	**20**	Sampling Method	**4 ft x 2 in Macrocore Sampler with Liner**	Hammer Data	**NA**
Borehole Backfill	**Bentonite Pellets**	Comments			

Elevation, feet	Downhole Depth, feet	SAMPLES Type	Number	Recovery (feet)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
	0							7.5YR 3/2 dark brown, very fine sandy SILT, some clay, moist grades to fine silty sand at 0.6. At 0.6 1/2" green stain	
			1	4.0				7.5YR 5/8 very fine SAND, silty, micaceous, moist	11:30 Chemical Sample ASB4-A plus Dup-1 taken
	5		2	4.0			SM	Sitly SAND, sand is fine	
	10		3	4.0				Sitly SAND, sand is fine	12:00 Chemical Sample ASB4-B taken
							GM	7.5YR 5/6 GRAVEL, sandy and silty, gravel is fine to medium rounded, with fine to coarse sand and silt, moist, with occasional, reddish yellow lenses	
			4	4.0				10YR 5/6 yellow brown SILT, fine sandy silt, some clay moist very moist/very soft	
	15							Medium dense silty CLAY with very fine sandy clay	
			5	4.0				10YR 5/6 yellowish brown, slightly clayey SILT, soft, moist, trace very fine sand	
	20							▽	12:25 Chemical Sample ASB4-C taken
			6	0.0			SC		
	25		7	0.0					
	30		8	0.0					
								Boring Terminated at 32.0 ft bgs.	

URS

Report: ENV_12AS_CLEVELAND+/-USCS; File: RFAAP_SSP.GPJ; 1/11/2007 ASB4

Project: Radford Army Ammunition Plant- SSP
Project Location: Radford, Virginia
Project Number: 11656628

Log of Borehole ASB5

Sheet 1 of 1

Date(s) Drilled	**4-19-06**	Logged By	**J. Spangler**	Reviewed By	**B. Fisher**
Drilling Method	**Geoprobe - Direct Push Technology**	Drilling Contractor	**Parratt Wolff**	Total Depth of Borehole	**7.0 feet**
Drill Rig Type	**Truck - Mounted Geoprobe**	Drill Bit Size/Type	**4 ft x 2 in Rectractable Macrocore Sampler**	Ground Surface Elevation	
Groundwater Level(s)		Sampling Method	**4 ft x 2 in Macrocore Sampler with Liner**	Hammer Data	**NA**
Borehole Backfill	**Bentonite Pellets**	Comments			

Elevation, feet	Downhole Depth, feet	SAMPLES Type	SAMPLES Number	SAMPLES Recovery (feet)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
	0						GM	7.5YR 4/2 brown, fine SAND, silty, moist, medium dense gravels at surface	
	1							7.5YR 5/8 strong brown, fine sandy CLAY, silty, moist, trace gravels	13:30 Chemical Sample ASB5A taken
	2		1	4.0					
	3								
	4						CL		
	5								
	6		2	3.0					
	7							Boring Refusal at 7.0 ft bgs at possible gravel zone.	13:50 Chemical Sample ASB5B taken
	8								
	9								

Report: ENV_12AS_CLEVELAND+/-USCS; File: RFAAP_SSP.GPJ; 1/11/2007 ASB5

URS

Project: Radford Army Ammunition Plant- SSP Project Location: Radford, Virginia Project Number: 09604-317	Log of Borehole FSB1 Sheet 1 of 1

Date(s) Drilled	9-30-03 1400-1440	Logged By	J. Spangler	Reviewed By	C. Lawrence
Drilling Method	Geoprobe - Direct Push Technology	Drilling Contractor	Richard Simmons Drilling	Total Depth of Borehole	19.0 feet
Drill Rig Type	Tractor- Mounted Geoprobe	Drill Bit Size/Type	4 ft x 2 in Rectractable Macrocore Sampler	Ground Surface Elevation	
Groundwater Level(s)	16.5 ft bgs during drilling	Sampling Method	4 ft x 2 in Macrocore Sampler with Liner	Hammer Data	NA
Borehole Backfill	Bentonite Pellets	Comments			

Elevation, feet / Downhole Depth, feet	SAMPLES: Type	Number	Recovery (feet)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
0							Gravel fill, crusher run	Sample FSB1A collected 0.0-1.0 ft bgs
		1	3.0	ND			5YR 4/6 yellowish red, Silty Sand, fine, micaceous, homogeneous, loose	
5							Sand grades to very fine	
		2	1.3	ND		SM		
							7.0 ft bgs; 3 inch gravel layer	
							Grading moist, increasing Silt, very soft	
10		3	2.7	ND				Sample FSB1B collected 10.0-12.0 ft bgs
							11.0 ft bgs; very moist	
							5YR 4/6 yellowish red, Sand with gravel, medium; gravel, fine to medium	
						SP		
		4	2.0	ND			7.5YR 5/6 strong brown, Silt with some clay, trace sand and gravel	Sample FSB1C collected 14.0-16.0 ft bgs
15								
						ML	16.0 ft bgs, becomes very moist	
							Groundwater at 16.5 ft bgs	
		4	3.0	ND				
						ML	10YR 6/4 light yellowish brown, Silt, wet, soft, sticky 18.5 ft bgs, becomes hard, saprolitic texture	
20							Boring Refusal 19.0 ft bgs	
25								
30								

Report: ENV_12AS_CLEVELAND+/-USCS; File: RFAAP_SSP.GPJ; 12/8/2003 FSB1

URS

Project: Radford Army Ammunition Plant- SSP
Project Location: Radford, Virginia
Project Number: 09604-317

Log of Borehole FSB2

Sheet 1 of 1

Date(s) Drilled	9-30-03 1440-1530	Logged By	J. Spangler	Reviewed By	C. Lawrence
Drilling Method	Geoprobe - Direct Push Technology	Drilling Contractor	Richard Simmons Drilling	Total Depth of Borehole	13.2 feet
Drill Rig Type	Tractor- Mounted Geoprobe	Drill Bit Size/Type	4 ft x 2 in Rectractable Macrocore Sampler	Ground Surface Elevation	
Groundwater Level(s)	NA	Sampling Method	4 ft x 2 in Macrocore Sampler with Liner	Hammer Data	NA
Borehole Backfill	Bentonite Pellets	Comments			

Elevation, feet / Downhole Depth, feet	SAMPLES Type	Number	Recovery (feet)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
0							Gravel fill, crusher run	Sample FSB2A, MS, MSD collected 0.0-1.0 ft bgs
		1	3.0	ND		SM	5YR 4/6 yellowish red, Silty Sand, fine, micaceous, homogeneous, loose	
5		2	3.0	ND				
						ML	5YR 4/6 yellowish red, Sandy Silt with some clay, fine, slightly moist, stiff, micaceous, homogeneous	
						SM	5YR 4/6 yellowish red, Silty Sand with gravel	Sample FSB2B and SBD-1 collected 8.0-10.0 ft bgs
10		3	4.0	ND				
		4	1.2	ND				Sample FSB2C collected 12.0-13.2 ft bgs
15							Boring Refusal 13.2 ft bgs	
20								
25								
30								

URS

Report: ENV_12AS_CLEVELAND+/-USCS; File: RFAAP_SSP.GPJ; 12/8/2003 FSB2

Project: Radford Army Ammunition Plant- SSP
Project Location: Radford, Virginia
Project Number: 09604-317

Log of Borehole FSB3

Sheet 1 of 1

Date(s) Drilled	10-01-03 0800-0830	Logged By	J. Spangler	Reviewed By	C. Lawrence
Drilling Method	Geoprobe - Direct Push Technology	Drilling Contractor	Richard Simmons Drilling	Total Depth of Borehole	17.0 feet
Drill Rig Type	Tractor- Mounted Geoprobe	Drill Bit Size/Type	4 ft x 2 in Rectractable Macrocore Sampler	Ground Surface Elevation	
Groundwater Level(s)	16.0 ft bgs during drilling	Sampling Method	4 ft x 2 in Macrocore Sampler with Liner	Hammer Data	NA
Borehole Backfill	Bentonite Pellets	Comments			

Elevation, feet	Downhole Depth, feet	SAMPLES Type	Number	Recovery (feet)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
	0							Gravel fill, crusher run	
								5YR 4/6 yellowish red, Silty Sand, fine, micaceous	Sample FSB3A collected 0.0-1.0 ft bgs
			1	3.0	ND			Grades to very loose, slightly moist	
							SM		
	5							Increasing moisture; trace gravel	
			2	3.0	ND				
								7.5-8.0 ft bgs, Clayey	
								5YR 4/6 yellowish red, Sand with gravel, medium coarse, moist	
	10		3	2.0	ND		SP		Sample FSB3B collected 10.0-12.0 ft bgs
			4	4.0	ND				
	15							7.5YR 5/8 strong brown, Sandy Silt, medium, soft, sticky	Sample FSB3C collected 14.0-15.5 ft bgs
							ML		
			5	1.0	ND			Groundwater at 16.0 ft bgs	
								Boring Refusal 17.0 ft bgs	
	20								
	25								
	30								

URS

Report: ENV_12AS_CLEVELAND+/-USCS; File: RFAAP_SSP.GPJ; 12/8/2003 FSB3

Project: Radford Army Ammunition Plant- SSP
Project Location: Radford, Virginia
Project Number: 11656628

Log of Borehole FSB4

Sheet 1 of 1

Date(s) Drilled	**4-19-06**	Logged By	**J. Spangler**	Reviewed By	**J. Spangler**
Drilling Method	**Geoprobe - Direct Push Technology**	Drilling Contractor	**Parratt Wolff**	Total Depth of Borehole	**11.0 feet**
Drill Rig Type	**Truck - Mounted Geoprobe**	Drill Bit Size/Type	**4 ft x 2 in Rectractable Macrocore Sampler**	Ground Surface Elevation	
Groundwater Level(s)		Sampling Method	**4 ft x 2 in Macrocore Sampler with Liner**	Hammer Data	**NA**
Borehole Backfill	**Bentonite Pellets**	Comments			

Elevation, feet	Downhole Depth, feet	SAMPLES Type	SAMPLES Number	SAMPLES Recovery (feet)	SAMPLES PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
	0						GM	10YR 3/2 very dark grayish brown, soft sandy SILT, trace fine gravel, roots to 0.6, moist	
	1							5YR 4/6 yellow red, fine silty SAND, loose to medium dense, moist, micaceous	9:20 FSB3A plus MS/MSD 0-0.5 (0.5-1 VOC)
	2		1	4.0	ND				
								Gravel lense	
	3				ND				
	4							5YR 4/6 yellow red, fine silty SAND, loose to medium dense, more moist	
	5				ND		SM		
	6		2	4.0	ND				
	7							Slightly gravelly 7-8', gravel medium coarse	9:40 Chemical Sample FSB3B taken
	8							Same as above	
	9		3	2.8					
	10				ND			Coarse, few fines GRAVEL	10:00 Chemical Sample FSB3C taken
							GM	Wet GRAVEL, fine to coarse, slightly silty	
	11							Boring Refusal 11.0 ft bgs	
	12								

Report: ENV_12AS_CLEVELAND+/-USCS; File: RFAAP_SSP.GPJ; 1/11/2007 FSB4

URS

Project: Radford Army Ammunition Plant- SSP Project Location: Radford, Virginia Project Number: 09604-317	Log of Borehole Key Sheet 1 of 1

Date(s) Drilled		Logged By	J. Spangler	Reviewed By	C. Lawrence
Drilling Method	Geoprobe - Direct Push Technology	Drilling Contractor	Richard Simmons Drilling	Total Depth of Borehole	1.0 feet
Drill Rig Type	Tractor- Mounted Geoprobe	Drill Bit Size/Type	4 ft x 2 in Rectractable Macrocore Sampler	Ground Surface Elevation	
Groundwater Level(s)	NA	Sampling Method	4 ft x 2 in Macrocore Sampler with Liner	Hammer Data	NA
Borehole Backfill	Bentonite Pellets	Comments			

Elevation, feet	Downhole Depth, feet	SAMPLES: Type Number	SAMPLES: Recovery (feet)	SAMPLES: PID (ppm)	Graphic Log	MATERIAL DESCRIPTION	FIELD NOTES
	0						Sample 13SB7A collected 0.0-1.0 ft bgs
	5						Sample 13SB7B collected 5.0-6.0 ft bgs
	10						Sample 13SB7C collected 10.0-12.0 ft bgs
	15						
	20						
	25						
	30						

URS

Report: ENV_12AS_CLEVELAND+/-USCS; File: RFAAP_SSP.GPJ; 12/8/2003 Key

Project: Radford Army Ammunition Plant- SSP
Project Location: Radford, Virginia
Project Number: 09604-317

Log of Borehole QSB1

Sheet 1 of 1

Date(s) Drilled	10-02-03 1300-1330	Logged By	J. Spangler	Reviewed By	C. Lawrence
Drilling Method	Geoprobe - Direct Push Technology	Drilling Contractor	Richard Simmons Drilling	Total Depth of Borehole	20.6 feet
Drill Rig Type	Tractor- Mounted Geoprobe	Drill Bit Size/Type	4 ft x 2 in Rectractable Macrocore Sampler	Ground Surface Elevation	
Groundwater Level(s)	19.5 ft bgs during drilling	Sampling Method	4 ft x 2 in Macrocore Sampler with Liner	Hammer Data	NA
Borehole Backfill	Bentonite Pellets	Comments			

Elevation, feet	Downhole Depth, feet	SAMPLES Type	Number	Recovery (feet)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
	0						Sludge	10YR 4/4 very pale brown, Sludge, very soft, moist; no stains, odors, or PID detections	Sample QSB1A and SBD3 collected 0.0-1.0 ft bgs
			1	3.6	ND		ML	7.5YR 3/4 dark brown, Sandy Silt with some clay, very fine, soft, micaceous, cohesive, homogeneous	
	5		2	4.0	ND		SM	5YR 4/6 yellowish red, Silty Sand, fine, moist, micaceous, moderately dense	
							ML	5YR 5/4 reddish brown, Silt with some clay, moderately stiff	
	10		3	4.0	ND		SM	5YR 4/4 reddish brown, Silty Sand, fine, moist, micaceous Grades to less Silt	Sample QSB1B collected 10.0-12.0 ft bgs
							SM	5YR 4/4 reddish brown, Sand with silty sand lenses, fine, moist, micaceous, loose	
			4	2.0	ND		SM	5YR 4/6 yellowish red, Silty Sand, very fine, moist, micaceous	
	15						SM	7.5YR 5/8 strong brown, Sand with trace silt, medium to coarse, moist	Sample QSB1C collected 17.0-19.0 ft bgs
			5	2.0	ND				
	20		6	0.6	ND		GM	7.5YR 5/4 brown, Gravel with silt and sand Groundwater at 19.5 ft bgs ▽	
								Boring Refusal 20.6 ft bgs	
	25								
	30								

Report: ENV_12AS_CLEVELAND+/-USCS; File: RFAAP_SSP.GPJ; 12/8/2003 QSB1

URS

Project: Radford Army Ammunition Plant- SSP
Project Location: Radford, Virginia
Project Number: 09604-317

Log of Borehole QSB2

Sheet 1 of 1

Date(s) Drilled	10-02-03 1510-1530	Logged By	J. Spangler	Reviewed By	C. Lawrence
Drilling Method	Geoprobe - Direct Push Technology	Drilling Contractor	Richard Simmons Drilling	Total Depth of Borehole	28.0 feet
Drill Rig Type	Tractor- Mounted Geoprobe	Drill Bit Size/Type	4 ft x 2 in Rectractable Macrocore Sampler	Ground Surface Elevation	
Groundwater Level(s)	23.0 ft bgs during drilling	Sampling Method	4 ft x 2 in Macrocore Sampler with Liner	Hammer Data	NA
Borehole Backfill	Bentonite Pellets	Comments			

Elevation, feet / Downhole Depth, feet	SAMPLES Type	Number	Recovery (feet)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
0							5YR 4/4 reddish brown, Silty Sand, fine, slightly moist, moderately dense, micaceous	Sample QSB2A collected 0.0-1.0 ft bgs
		1	3.4	ND 1.9				
5							Some clay	
		2	3.4	ND		SM		
							9.0-9.5 ft bgs; 7.5YR 5/4 brown, less silt	
10		3	4.0	ND			9.5-14.0 ft bgs; Silt with trace fine sand and clay, slightly moist, homogeneous	Sample QSB2B collected 10.0-12.0 ft bgs
		4	4.0	ND				
15							7.5YR 4/6 strong brown, Sand, fine, slightly moist, micaceous, dense, homogeneous	
							Grades to 7.5YR 6/6 reddish yellow, fine to coarse	
						SP		
		6	2.2	ND			18.0 ft bgs; becomes Silty, SM	Sample QSB2C collected 18.0-20.0 ft bgs
20							7.5YR 5/6 strong brown, Sandy Gravel; gravel, coarse; sand, fine to coarse	
		8	1.2	ND		GP		
							Groundwater at 23.0 ft bgs	
25							No Recovery; presumed Sandy Gravel	
		9	0.0			NR		
							Boring terminated 28.0 ft bgs	
30								

URS

Report: ENV_12AS_CLEVELAND+/-USCS; File: RFAAP_SSP.GPJ; 12/8/2003 QSB2

Project: Radford Army Ammunition Plant- SSP
Project Location: Radford, Virginia
Project Number: 09604-317

Log of Borehole QSB3

Sheet 1 of 1

Date(s) Drilled	10-02-03 1400-1500	Logged By	J. Spangler	Reviewed By	C. Lawrence
Drilling Method	Geoprobe - Direct Push Technology	Drilling Contractor	Richard Simmons Drilling	Total Depth of Borehole	20.0 feet
Drill Rig Type	Tractor- Mounted Geoprobe	Drill Bit Size/Type	4 ft x 2 in Rectractable Macrocore Sampler	Ground Surface Elevation	
Groundwater Level(s)	19.8 ft bgs during drilling	Sampling Method	4 ft x 2 in Macrocore Sampler with Liner	Hammer Data	NA
Borehole Backfill	Bentonite Pellets	Comments			

Elevation, feet / Downhole Depth, feet	SAMPLES Type	Number	Recovery (feet)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
0						Sludge	Leaf litter 10YR 7/4 very pale brown, Sludge, moist, very soft	Sample QSB3A collected 0.0-1.0 ft bgs
		1	3.5	ND		ML	5YR 3/3 dark reddish brown, Sandy Silt with trace clay, very fine, slightly moist, stiff, micaceous	
5		2	3.0	ND		ML	5YR 4/6 yellowish red, Sandy Silt, very fine, with occasional soft seams, slightly moist, micaceous, stiff Increasing sand, very fine	
10		3	3.0	ND		SM	5YR 4/6 yellowish red, Silty Sand, fine, slightly moist, moderately dense, micaceous	Sample QSB3B colleceted 10.0-12.0 ft bgs
		4	2.2	ND		SM/SP	Grading less silty to sandy, fine to medium	
15		5	2.6	ND		SM	7.5YR 5/6 strong brown, Sand, medium to coarse, with trace silt, slightly moist, loose to moderately dense	Sample QSB3C collected 17.0-19.0 ft bgs
20							Boring terminated 20.0 ft bgs	
25								
30								

Report: ENV_12AS_CLEVELAND+/-USCS; File: RFAAP_SSP.GPJ; 12/8/2003 QSB3

URS

Project: Radford Army Ammunition Plant- SSP
Project Location: Radford, Virginia
Project Number: 11656628

Log of Boring FMW-1

Sheet 1 of 1

Date(s) Drilled and Installed	**4-19-06**	Logged By	**J. Spangler**	Reviewed By	**B. Fisher**
Drilling Method	**Hollow Stem Auger / Air Rotary**	Drilling Contractor	**Parratt Wolff**	Total Depth of Borehole	**55.0 feet**
Sampling Method	**4 ft x 2 in Macrocore Sampler with Liner**	Drill Bit Size/Type	**4 1/4 in ID HSA / 4 in Air Hammer**	Top of Casing Elevation	
Size and Type of Well Casing	**2-inch PVC**	Screen Perforation	**10-slot**	Surface Elevation	
Seal or Backfill	**Bentonite Pellets**	Comments			

Elevation feet	Depth, feet	SAMPLES Type	SAMPLES Number	SAMPLES Recovery (feet)	SAMPLES PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES AND WELL DETAILS
	0							10YR 3/2 very dark grayish brown, soft sandy SILT, trace fine gravel, roots to 0.6, moist	
			1	4				5YR 4/6 yellow red, fine silty SAND, loose to medium dense, moist, micaceous	Bentonite cement slurry
	5							Gravel lense	
			2	4			SM	5YR 4/6 yellow red, fine silty SAND, loose to medium dense, more moist	Bentonite chips
								Slightly gravelly 7-8', gravel medium coarse	
								Same as above	Sand
	10		3	3			GM	Coarse, few fines GRAVEL	
								Wet GRAVEL, fine to coarse, slightly silty	
								Shaly, LIMESTONE/DOLOMITE cuttings, brown, silty, dry, dusty conditions	
	15								
	20								
	25							Less dusty, slightly moist only, no water	Factory slotted PVC screen with No.2 filter pack
	30						LMS	Dry, dusty	
	35								
	40							Slightly moist, dusty	
	45								
	50							Small fracture	
								Fracture, some water	
	55							Encountered water at 55.0 ft bgs during drilling.	
								Boring Terminated at 55.0 ft bgs	

Report: ENV_12AW_CLEVELAND+/-USCS; File: RFAAP_SSP.GPJ; 1/11/2007 FMW-1

URS

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APPENDIX E

PHYSICAL SAMPLE RESULTS

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Radford Army Ammunition Plant

LABORATORY TESTING DATA SUMMARY

BORING NO.	DEPTH (ft)	IDENTIFICATION TESTS													PERMEABILITY (cm/sec)	REMARKS
		WATER CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PLAS. IND.	USCS SYMB. (1)	SIEVE MINUS NO. 200 (%)	HYDROMETER % MINUS 2 μm (%)	ORGANIC CONTENT (burnoff) (%)	pH Distilled Water	pH 0.01 M CaCl Solution	TOTAL UNIT WEIGHT (pcf)	DRY UNIT WEIGHT (pcf)	SPECIFIC GRAVITY		
13SB10	2-3	29.6		np		SM	28.6		3.5	6.9	6.6	115.9	89.4	2.688	1.3E-5	
13SB7	12.7	16.0				GC	13.3		1.1	6.3	6.2	130.0	112.0	2.711		
37SB1	6-6.5	21.8	22	18	4	SC-SM	43.0		1.5	6.3	6.0	130.1	106.8	2.677	1.6E-7	
37SB2	15.5-16	17.0				SM	33.7		1.6	5.1	5.4	122.7	104.9	2.746	2.3E-4	
38SB1	7	20.9				SM	34.8		1.7	7.1	6.6	125.8	104.1	2.713		
38SB2	15.5	3.7				SM	13.8		1.1	6.8	6.3	116.0	111.9	2.702	2.0E-3	
46SB1	14.5	24.5	32	18	14	SC	50.0	23	2.2	5.7	5.9	127.5	102.4	2.729	3.0E-8	
46SB2	9.5-10	20.4				SM	26.9		1.8	6.2	5.7	123.4	102.5	2.735		
57SB2	7.5-8	28.4				CL-ML	70.2		2.6	5.6	3.9	94.1	73.3	2.701		
57SB3	16.5-17	46.4	83	29	54	CH	89.6	46	3.6	5.3	*	106.4	72.7	2.694	1.8E-7	
68SB2	18-18.5	30.4				CL-ML	54.9		1.5	6.8	6.2	100.2	76.8	2.680		
68SB3	7-7.5	35.8	49	29	20	ML	75.9	26	3.6	5.2	3.8	115.4	85.0	2.744	1.9E-6	
69SB1	11-12	34.1	34	19	15	CL	74.1		3.3	9.5	7.8	128.2	95.6	2.688		
69SB3	7.5-8.5	32.7				CL	77.7		3.5	7.1	6.0	117.7	88.7	2.707	6.6E-9	
ASB1	22-24	36.6	63	30	33	CH	58.8		3.6	4.2	3.8	115.6	84.7	2.735		
ASB2	14-16	43.4	56	35	21	MH	78.4		2.5	4.3	3.9	110.2	76.8	2.662	6.7E-7	
FSB1	18.5-19	30.6	47	20	27	CL	79.2	30	1.4	7.1	*	119.2	91.2	2.628	8.6E-8	
FSB2	7.5-8	15.6				SM	19.9		1.4	6.8	6.3	111.0	96.1	2.807		
QSB1	9.5-10	26.4	31	21	10	CL	52.6		1.8	6.4	6.5	123.8	97.9	2.717	1.2E-7	
QSB2	24	6.2				GP	3.9		0.6	6.4	6.2	121.6	114.6	2.692		

Note: (1) CS symbol based on visual observation and Sieve and Atterberg limits reported.

TABLE _____

Radford Army Ammunition Plant

SUMMARY OF LABORATORY PERMEABILITY TESTS PERFORMED ON RECONSTITUTED SAMPLES

BORING NO.	SAMPLE NO.	DEPTH	WATER CONTENTS	TOTAL UNIT WGTS	DRY UNIT WGTS	STRESSES	DURING CONSOL.	DURING TEST	COEFFICIENT OF PERM. K,	REMARKS
			INITIAL	INITIAL	INITIAL	EFFECTIVE	TIME	PERMEANT	(@ 20 C)	
			PRE-TEST	PRE-TEST	PRE-TEST	BACK PRESSURE	VOLUMETRIC STRAIN	INITIAL GRADIENT		
		(ft)	(%)	(pcf)	(pcf)	(psi)	(days, %)		(cm/sec)	
13SB10		2-3	29.6	115.9	89.4	5.0	over night	tap water	1.3E-5	P6775
			33.2	122.9	92.3	100.0	3.2	18		
37SB1		6-6.5	21.8	130.1	106.8	5.0	over night	tap water	1.6E-7	P6776
			20.5	131.7	109.3	100.0	2.3	21		
37SB2		15.5-16	17.0	122.7	104.9	5.0	over night	tap water	2.3E-4	P6779
			23.9	130.3	105.2	100.0	0.3	4		
38SB2		15.5	3.7	116.0	111.9	5.0	over night	tap water	2.0E-3	P6785
			18.2	133.7	113.1	100.0	1.1	1		
46SB1		14.5	24.5	127.5	102.4	5.0	over night	tap water	3.0E-8	P6782
			24.4	127.8	102.8	100.0	0.4	23		
57SB3		16.5-17	46.4	106.4	72.7	5.0	over night	tap water	1.8E-7	P6783
			48.3	108.4	73.0	100.0	0.5	21		
68SB3		7-7.5	35.8	115.4	85.0	5.0	over night	tap water	1.9E-6	P6780
			36.5	116.8	85.6	100.0	0.8	18		not recon.
69SB3		7.5-8.5	32.7	117.7	88.7	5.0	over night	tap water	6.6E-9	P6773
			32.2	121.4	91.8	100.0	3.4	39		
ASB2		14-16	43.4	110.2	76.8	5.0	over night	tap water	6.7E-7	P6774
			42.0	111.4	78.4	100.0	2.1	16		
FSB-1		18.5-19.0	30.6	119.2	91.2	5.0	over night	tap water	8.6E-8	P6784
			28.8	120.8	93.8	100.0	2.7	23		
QSB1		9.5-10	26.4	123.8	97.9	5.0	over night	tap water	1.2E-7	P6781
			24.6	126.7	101.7	100.0	3.7	22		

PERMEABILITY TEST: FALLING HEAD - CONSTANT VOLUME U-TUBE

ASTM D 5084 - 90

Project No.: 31737767 BORING: 69SB3 Test No.: P6773

Project Name: Radford Army Ammunition Plant SAMPLE: DEPTH (ft): 7.5-8.5

Specimen - Apparatus set-up - Test Information Cell No. 1 Apparatus No. 2 Stage No.: 2

Preliminary Length/Area Calculations

Lo =	2.846	in	Lo=	7.230	cm
dLc=	0.021	in	Ao =	21.88	cm^2
Lc=	2.825	in	Vo =	158.19	cm^3
			Lc=	7.177	cm
dVc = 3 Vo * (dLc/Lo)			dVc=	3.50	cm^3
			Vc =	154.69	cm^3
Sc =	0.333	cm^{-1}	Ac=	21.555	cm^2

1) Specimen Tested in :	x	Triaxial Cell or		Compaction Mold or			
	x	with stones or		Stones with filter paper or			top + bottom
2) Specimen orientation for:	x	Vertical or		Horizontal permeability determination			
3) During saturation: Water flushed up sides of specimen to remove ai			x	No		Yes	
4) During consolidation:	x	Top and bottom drainage or		Top		Bottom only	
5) Direction of permeant :	x	Up during or		Down during permeation			
6) Permeant: water used	x	Tap		Distilled			
or		Demineralized		0.005 N calcium sulfate (CaSO4)			Permeability

Equations Used

Kt = - 0.0000746 * Sc/dT(min) * ln (ho/hf)

RT = (-0.02452*(ave. temp in C) + 1.495)

K @ 20 ºC = RT * Kt TubeC= 1.3214

Consol Stage-Trial No.	Temp. ° C	Date	Time hr	Time min	Time sec	Initial σ_c psi	Initial Ub psi	U-tube Reading Head (cm) (cc)	U-tube Reading Tail (cm) (cc)	Flow in/out gradient	Preliminary Final at 20ºC cm/sec Dev. from Ave.
initial	25.4	11/3/03	12	52	00	105.0	100.0	65.34	43.90	1.05	7.32E-09
final	22.7	11/3/03	17	22	00			64.10	44.28		6.70E-09
4	RT = 0.905	dT =	270.00 min			σ'_c =	0.7 ksf	0.092	0.088	io= 37.6	2%
initial	22.7	11/3/03	17	24	00	105.0	100.0	66.35	43.54	1.04	6.98E-09
final	21.3	11/4/03	09	02	00			62.35	44.78		6.75E-09
5	RT = 0.956	dT =	938.00 min			σ'_c =	0.7 ksf	0.298	0.287	io= 40.0	3%
initial	21.3	11/4/03	09	04	00	105.0	100.0	66.31	43.55	1.08	6.79E-09
final	23.0	11/4/03	12	45	00			65.30	43.85		6.55E-09
6	RT = 0.952	dT =	221.00 min			σ'_c =	0.7 ksf	0.075	0.069	io= 39.9	-1%
initial	23.0	11/4/03	12	50	00	105.0	100.0	66.45	43.47	1.00	6.77E-09
final	23.5	11/4/03	16	34	00			65.42	43.80		6.34E-09
7	RT = 0.925	dT =	224.00 min			σ'_c =	0.7 ksf	0.077	0.076	io= 40.3	-4%

TEST SUMMARY

Final Specimen and Test Conditions

Lc =	7.177	cm	ε_{axial} =	0.7%
Ac =	21.299	cm^2		
Vc=	152.85	cm^3	ε_{vol} =	3.4%
Sc =	0.337	cm^{-1}	Sc = Lc / Ac , final	

	w (%)	γ_τ (pcf)	γ_d (pcf)	S (%)
Initial	32.70	117.7	88.7	94.5
PreTest	32.24	121.4	91.8	100.0

HYDRAULIC CONDUCTIVITY SUMMARY

Averages for trials: 4-7

ave K @ 20 ºC: **6.59E-09** cm/sec

(i_o)ave = 39.4

Tested By: DT Reviewed By: G. Thomas

PERMEABILITY TEST: FALLING HEAD - CONSTANT VOLUME U-TUBE

ASTM D 5084 - 90

Project No.: 31737767 BORING: ASB2 Test No.: P6774

Project Name: Radford Army Ammunition Plant SAMPLE: DEPTH (ft): 14-16

Specimen - Apparatus set-up - Test Information Cell No. H-3 Apparatus No. 3 Stage No.: 2

Preliminary Length/Area Calculations

Lo =	3.121	in	Lo=	7.928	cm
dLc=	0.025	in	Ao =	20.07	cm^2
Lc=	3.096	in	Vo =	159.14	cm^3
			Lc=	7.865	cm
dVc = 3 Vo * (dLc/Lo)			dVc=	3.82	cm^3
			Vc =	155.32	cm^3
Sc =	0.398	cm^{-1}	Ac=	19.749	cm^2

1) Specimen Tested in :	x	Triaxial Cell or		Compaction Mold or			
	x	with stones or		Stones with filter paper or			top + bottom
2) Specimen orientation for:	x	Vertical or		Horizontal permeability determination			
3) During saturation: Water flushed up sides of specimen to remove ai			x	No		Yes	
4) During consolidation:	x	Top and bottom drainage or		Top		Bottom only	
5) Direction of permeant :	x	Up during or		Down during permeation			
6) Permeant: water used	x	Tap		Distilled			
or		Demineralized		0.005 N calcium sulfate (CaSO4)			Permeability

Equations Used

Kt = - 0.0000755 * Sc/dT(min) * ln (ho/hf)

RT = (-0.02452*(ave. temp in C) + 1.495)

K @ 20 ºC = RT * Kt TubeC= 1.3132

Consol Stage-Trial No.	Temp. ºC	Date	Time hr	Time min	Time sec	Initial σ_c psi	Initial Ub psi	U-tube Reading Head (cm) (cc)	U-tube Reading Tail (cm) (cc)	Flow in/out gradient	Preliminary Final at 20ºC cm/sec Dev. from Ave.
initial	22.3	10/31/03	09	33	00	105.0	100.0	59.18	49.30	1.04	7.13E-07
final	22.4	10/31/03	09	52	00			56.45	50.12		6.73E-07
1	RT = 0.947	dT =		19.00 min		σ'_c =	0.7 ksf	0.204	0.196	io= 15.8	0%
initial	22.4	10/31/03	09	53	00	105.0	100.0	59.30	49.26	1.08	7.28E-07
final	22.5	10/31/03	10	07	00			57.10	49.90		6.86E-07
2	RT = 0.945	dT =		14.00 min		σ'_c =	0.7 ksf	0.164	0.153	io= 16.0	2%
initial	22.5	10/31/03	10	09	00	105.0	100.0	59.30	49.26	1.05	7.10E-07
final	22.8	10/31/03	10	27	00			56.65	50.05		6.65E-07
3	RT = 0.940	dT =		18.00 min		σ'_c =	0.7 ksf	0.198	0.189	io= 16.0	-1%
initial	22.8	10/31/03	10	28	00	105.0	100.0	59.30	49.26	1.06	7.14E-07
final	23.0	10/31/03	10	45	00			56.76	50.01		6.64E-07
4	RT = 0.933	dT =		17.00 min		σ'_c =	0.7 ksf	0.190	0.179	io= 16.0	-1%

TEST SUMMARY

Final Specimen and Test Conditions

Lc =	7.865	cm	ε_{axial} =	0.8%
Ac =	19.817	cm^2		
Vc=	155.86	cm^3	ε_{vol} =	2.1%
Sc =	0.397	cm^{-1}	Sc = Lc / Ac , final	

	w (%)	γ_τ (pcf)	γ_d (pcf)	S (%)
Initial	43.43	110.2	76.8	99.3
PreTest	42.04	111.4	78.4	100.0

HYDRAULIC CONDUCTIVITY SUMMARY

Averages for trials: 1-4

ave K @ 20 ºC: **6.72E-07** cm/sec

(i_o)ave = 16.0

Tested By: DT Reviewed By: G. Thomas

PERMEABILITY TEST: FALLING HEAD - CONSTANT VOLUME U-TUBE

ASTM D 5084 - 90

Project No.: 31737767 BORING: 13SB10 Test No.: P6775

Project Name: Radford Army Ammunition Plant SAMPLE: DEPTH (ft): 2-3

Specimen - Apparatus set-up - Test Information Cell No. 5 Apparatus No. 4 Stage No.: 2

Preliminary Length/Area Calculations

Lo = 3.035 in Lo= 7.709 cm

dLc= 0.032 in Ao = 19.83 cm^2

Lc= 3.003 in Vo = 152.91 cm^3

Lc= 7.628 cm

dVc = 3 Vo * (dLc/Lo) dVc= 4.84 cm^3

Vc = 148.07 cm^3

Sc = 0.393 cm^{-1} Ac= 19.412 cm^2

1) Specimen Tested in :	x	Triaxial Cell or		Compaction Mold or		
	x	with stones or		Stones with filter paper or		top + bottom
2) Specimen orientation for:	x	Vertical or		Horizontal permeability determination		
3) During saturation: Water flushed up sides of specimen to remove ai	x	No		Yes		
4) During consolidation:	x	Top and bottom drainage or		Top		Bottom only
5) Direction of permeant :	x	Up during or		Down during permeation		
6) Permeant: water used	x	Tap		Distilled		
or		Demineralized		0.005 N calcium sulfate (CaSO4)		

Equations Used

Kt = - 0.0000750 * Sc/dT(min) * ln (ho/hf)

RT = (-0.02452*(ave. temp in C) + 1.495)

K @ 20 ºC = RT * Kt TubeC= 1.3181

TEST SUMMARY

Final Specimen and Test Conditions

Lc = 7.628 cm ε_{axial} = 1.1%

Ac = 19.415 cm^2

Vc= 148.09 cm^3 ε_{vol} = 3.2%

Sc = 0.393 cm^{-1} Sc = Lc / Ac , final

	w (%)	γ_τ (pcf)	γ_d (pcf)	S (%)
Initial	29.62	115.9	89.4	83.8
PreTest	33.17	122.9	92.3	100.0

HYDRAULIC CONDUCTIVITY SUMMARY

Averages for trials: 1-4

ave K @ 20 ºC: **1.28E-05** cm/sec

(i_o)ave = 17.5

Tested By: DT Reviewed By: G. Thomas

Consol Stage-Trial No.	Temp. ° C	Date	Time hr	Time min	Time sec	Initial σ_c psi	Initial Ub psi	U-tube Reading Head (cm) (cc)	U-tube Reading Tail (cm) (cc)	Flow in/out gradient	Preliminary Final at 20ºC cm/sec Dev. from Ave.
initial	22.2	10/31/03	00	00	00	105.0	100.0	57.00	46.37	1.01	1.35E-05
final	22.2	10/31/03	00	01	30			53.00	47.63		1.28E-05
1	RT = 0.951	dT =		1.50 min		σ'_c =	0.7 ksf	0.298	0.295	io= 17.5	0%
initial	22.2	10/31/03	00	00	00	105.0	100.0	57.00	46.37	1.01	1.35E-05
final	22.2	10/31/03	00	01	30			53.00	47.63		1.28E-05
2	RT = 0.951	dT =		1.50 min		σ'_c =	0.7 ksf	0.298	0.295	io= 17.5	0%
initial	22.2	10/31/03	00	00	00	105.0	100.0	57.00	46.37	1.01	1.35E-05
final	22.2	10/31/03	00	01	30			53.00	47.63		1.28E-05
3	RT = 0.951	dT =		1.50 min		σ'_c =	0.7 ksf	0.298	0.295	io= 17.5	0%
initial	22.2	10/31/03	00	00	00	105.0	100.0	57.00	46.37	1.01	1.35E-05
final	22.2	10/31/03	00	01	30			53.00	47.63		1.28E-05
4	RT = 0.951	dT =		1.50 min		σ'_c =	0.7 ksf	0.298	0.295	io= 17.5	0%

PERMEABILITY TEST: FALLING HEAD - CONSTANT VOLUME U-TUBE

ASTM D 5084 - 90

Project No.: 31737767 BORING: 37SB1 Test No.: P6776

Project Name: Radford Army Ammunition Plant SAMPLE: DEPTH (ft): 6-6.5

Specimen - Apparatus set-up - Test Information Cell No. H-1 Apparatus No. 8 Stage No.: 2

Preliminary Length/Area Calculations

Lo =	2.751	in	Lo=	6.987	cm
dLc=	0.032	in	Ao =	20.27	cm^2
Lc=	2.719	in	Vo =	141.60	cm^3
			Lc=	6.905	cm
dVc = 3 Vo * (dLc/Lo)			dVc=	4.94	cm^3
			Vc =	136.66	cm^3
Sc =	0.349	cm^{-1}	Ac=	19.791	cm^2

1) Specimen Tested in :	x	Triaxial Cell or		Compaction Mold or			
	x	with stones or		Stones with filter paper or			top + bottom
2) Specimen orientation for:	x	Vertical or		Horizontal permeability determination			
3) During saturation: Water flushed up sides of specimen to remove ai			x	No		Yes	
4) During consolidation:	x	Top and bottom drainage or		Top		Bottom only	
5) Direction of permeant :	x	Up during or		Down during permeation			
6) Permeant: water used	x	Tap		Distilled			
or		Demineralized		0.005 N calcium sulfate (CaSO4)			

Equations Used

Kt = - 0.0000771 * Sc/dT(min) * ln (ho/hf)

RT = (-0.02452*(ave. temp in C) + 1.495)

K @ 20 ºC = RT * Kt TubeC= 1.3564

TEST SUMMARY

Final Specimen and Test Conditions

Lc =	6.905	cm	ε_{axial} =	1.2%	
Ac =	20.037	cm^2			
Vc=	138.36	cm^3	ε_{vol} =	2.3%	
Sc =	0.345	cm^{-1}	Sc = Lc / Ac , final		

	w (%)	γ_τ (pcf)	γ_d (pcf)	S (%)
Initial	21.82	130.1	106.8	99.9
PreTest	20.51	131.7	109.3	100.0

HYDRAULIC CONDUCTIVITY SUMMARY

Averages for trials: 1-4

ave K @ 20 ºC: **1.62E-07** cm/sec

(i_o)ave = 20.5

Tested By: DT Reviewed By: G. Thomas

Consol Stage-Trial No.	Temp. ° C	Date	Time hr	Time min	Time sec	Initial σ_c psi	Initial Ub psi	U-tube Reading Head (cm) (cc)	U-tube Reading Tail (cm) (cc)	Flow in/out gradient	Preliminary Final at 20ºC cm/sec Dev. from Ave.
initial	22.3	10/31/03	09	29	00	105.0	100.0	55.40	44.12	1.01	1.77E-07
final	22.9	10/31/03	10	12	00			53.35	44.84		1.65E-07
1	RT = 0.941	dT =		43.00 min		σ'_c =	0.7 ksf	0.162	0.159	io= 20.5	1%
initial	22.9	10/31/03	10	14	00	105.0	100.0	55.40	44.12	1.08	1.79E-07
final	23.2	10/31/03	10	37	00			54.22	44.51		1.64E-07
2	RT = 0.930	dT =		23.00 min		σ'_c =	0.7 ksf	0.093	0.086	io= 20.5	1%
initial	23.2	10/31/03	10	39	00	105.0	100.0	55.40	44.12	1.06	1.77E-07
final	23.7	10/31/03	11	05	00			54.09	44.56		1.61E-07
3	RT = 0.920	dT =		26.00 min		σ'_c =	0.7 ksf	0.103	0.097	io= 20.5	-1%
initial	23.7	10/31/03	11	06	00	105.0	100.0	55.40	44.12	0.94	1.77E-07
final	24.0	10/31/03	11	37	00			53.87	44.70		1.59E-07
4	RT = 0.910	dT =		31.00 min		σ'_c =	0.7 ksf	0.121	0.128	io= 20.5	-2%

CONSTANT HEAD HYDRAULIC CONDUCTIVITY TEST
ASTM D 5084 - 90

Project No. **31737767** BORING: 37SB2

Project Name: **Radford Army Ammunition Pla** SAMPLE: DEPTH (ft): 15.5-16 Test No.: **P6779**

Specimen - Apparatus set-up - Test Information Apparatus No. C-2 Cell No. H-7 Stage 2

1) Specimen Tested in :	x	Triaxial Cell or		Compaction Mold or	
		with stones or		Stones with filter paper or	top + bottom
2) Specimen orientation for:	x	Vertical or		Horizontal permeability determination	
3) During saturation: Water flushed up sides of specimen to remove air:			x	No	Yes
4) During consolidation:	x	Top and bottom drainage or		Top	Bottom only
5) Direction of permeant :	x	Up during or		Down during permeation	
6) Permeant: water used	x	Tap		Distilled	
		Demineralized		0.005 N calcium sulfate (CaSO4)	

Consol Stage- Trial No.	Temp. ° C	Date	Time hr	Time min	Time sec	Initial σ_c psi	Initial Ub psi	Dial Indicator in	Pressure Head Reading Mercury (inch)	Pressure Head Reading Gage (psi)	Flow Reading (cm)	Flow Vol (cm3) Rate (cm3/sec)	Fluid Head Reading Head (cm)	Fluid Head Reading Tail (cm)	Total Head Uncorrected / Correction / Corrected (cm)	Gradient	Permeability Preliminary / Final at 20°C cm/sec
initial	24.7	11/3/03	00	00	00	105.0	100.0	0.213			3.90	33.088	68.00	35.85	32.15		
final	24.7	11/3/03	00	25	24						5.50	0.0217	68.00	35.85	2.93		2.67E-04
1	RT = 0.894	dT =		25.40 min		σ'_c =	0.7 ksf						68	35.85	29.22	4.14	2.36E-04
initial	24.7	11/3/03	00	00	00	105.0	100.0	0.213			4.10	47.564	68.00	35.85	32.15		
final	24.7	11/3/03	00	36	36						6.40	0.0217	68.00	35.85	2.92		2.66E-04
2	RT = 0.894	dT =		36.60 min		σ'_c =	0.7 ksf						68	35.85	29.23	4.14	2.35E-04
initial	24.7	11/3/03	00	00	00	105.0	100.0	0.213			3.60	64.108	68.00	35.85	32.15		
final	24.7	11/3/03	00	50	15						6.70	0.0213	68.00	35.85	2.87		2.61E-04
3	RT = 0.894	dT =		50.25 min		σ'_c =	0.7 ksf						68	35.85	29.28	4.15	2.30E-04
initial	24.7	11/3/03	00	00	00	105.0	100.0	0.213			4.50	41.36	68.00	35.85	32.15		
final	24.7	11/3/03	00	31	48						6.50	0.0217	68.00	35.85	2.92		2.66E-04
4	RT = 0.894	dT =		31.80 min		σ'_c =	0.7 ksf						68	35.85	29.23	4.14	2.35E-04

Preliminary Length/Area Calculations

Lo =	2.790	in	Lo=	7.087	cm
Ao=	3.076	in^2	Ao =	19.84	cm^2
Vo=	8.582	in^3	Vo =	140.63	cm^3
Lc =	7.054	cm	Vc =	138.67	cm^3
Ac=	19.659	cm^2			

Tested By: DT Reviewed By: G. Thomas

TEST SUMMARY

Final Specimen and Test Conditions

Lc =	7.054	cm	ε_{axial} =	0.5%	
Ac =	19.885	cm^2			
Vc=	140.26	cm^3	ε_{vol} =	0.3%	

	w (%)	γ_τ (pcf)	γ_d (pcf)	S (%)
Initial	16.99	122.7	104.9	70.7
PreTest	23.88	130.3	105.2	100.0

HYDRAULIC CONDUCTIVITY SUMMARY

Averages for trials: 1-4

ave K @ 20 °C: **2.34E-04** cm/sec

(i_o)ave = 4.15

HYDRAULIC CONDUCTIVITY TEST

PERMEABILITY TEST: FALLING HEAD - CONSTANT VOLUME U-TUBE

ASTM D 5084 - 90

Project No.: 31737767 BORING: 68SB3 Test No.: P6780

Project Name: Radford Army Ammunition Plant SAMPLE: DEPTH (ft): 7-7.5

Specimen - Apparatus set-up - Test Information Cell No. 5 Apparatus No. 4 Stage No.: 2

Preliminary Length/Area Calculations

Lo =	2.917	in	Lo=	7.408	cm
dLc=	0.031	in	Ao =	13.93	cm^2
Lc=	2.886	in	Vo =	103.19	cm^3
			Lc=	7.329	cm
dVc = 3 Vo * (dLc/Lo)			dVc=	3.29	cm^3
			Vc =	99.90	cm^3
Sc =	0.538	cm^{-1}	Ac=	13.630	cm^2

1) Specimen Tested in :	x	Triaxial Cell or		Compaction Mold or		
	x	with stones or		Stones with filter paper or		top + bottom
2) Specimen orientation for:	x	Vertical or		Horizontal permeability determination		
3) During saturation: Water flushed up sides of specimen to remove ai	x	No		Yes		
4) During consolidation:	x	Top and bottom drainage or		Top		Bottom only
5) Direction of permeant :	x	Up during or		Down during permeation		
6) Permeant: water used	x	Tap		Distilled		
or		Demineralized		0.005 N calcium sulfate (CaSO4)		

Equations Used

Kt = - 0.0000750 * Sc/dT(min) * ln (ho/hf)

RT = (-0.02452*(ave. temp in C) + 1.495)

K @ 20 ºC = RT * Kt TubeC= 1.3181

TEST SUMMARY

Final Specimen and Test Conditions

Lc =	7.329	cm	ε_{axial} =	1.1%	
Ac =	13.972	cm^2			
Vc=	102.40	cm^3	ε_{vol} =	0.8%	
Sc =	0.525	cm^{-1}	Sc = Lc / Ac , final		

	w (%)	γ_τ (pcf)	γ_d (pcf)	S (%)
Initial	35.78	115.4	85.0	96.6
PreTest	36.47	116.8	85.6	100.0

HYDRAULIC CONDUCTIVITY SUMMARY

Averages for trials: 1-4

ave K @ 20 ºC: **1.86E-06** cm/sec

(i_o)ave = 18.2

Tested By: DT Reviewed By: G. Thomas

Consol Stage-Trial No.	Temp. ° C	Date	Time hr	Time min	Time sec	Initial σ_c psi	Initial Ub psi	U-tube Reading Head (cm) (cc)	U-tube Reading Tail (cm) (cc)	Flow in/out gradient	Preliminary Final at 20ºC cm/sec Dev. from Ave.
initial	24.1	11/3/03	09	50	00	105.0	100.0	57.00	46.40	1.00	2.14E-06
final	24.1	11/3/03	10	06	30			52.30	47.90		1.89E-06
1	RT = 0.904	dT =		16.50 min		σ'_c =	0.7 ksf	0.350	0.351	io= 18.2	1%
initial	24.1	11/3/03	10	07	00	105.0	100.0	57.00	46.40	0.98	2.15E-06
final	24.3	11/3/03	10	19	00			53.20	47.63		1.89E-06
2	RT = 0.902	dT =		12.00 min		σ'_c =	0.7 ksf	0.283	0.288	io= 18.2	1%
initial	24.3	11/3/03	10	21	00	105.0	100.0	57.00	46.40	0.99	2.08E-06
final	24.5	11/3/03	10	39	00			52.13	47.96		1.82E-06
3	RT = 0.897	dT =		18.00 min		σ'_c =	0.7 ksf	0.363	0.365	io= 18.2	-2%
initial	24.5	11/3/03	10	40	00	105.0	100.0	57.00	46.40	1.00	2.13E-06
final	24.6	11/3/03	10	54	00			52.80	47.73		1.85E-06
4	RT = 0.893	dT =		14.00 min		σ'_c =	0.7 ksf	0.313	0.312	io= 18.2	-1%

PERMEABILITY TEST: FALLING HEAD - CONSTANT VOLUME U-TUBE

ASTM D 5084 - 90

Project No.: 31737767 BORING: QSB1 Test No.: P6781

Project Name: Radford Army Ammunition Plant SAMPLE: DEPTH (ft): 9.5-10

Specimen - Apparatus set-up - Test Information Cell No. H-1 Apparatus No. 3 Stage No.: 2

Preliminary Length/Area Calculations

Lo =	2.929	in	Lo=	7.439	cm
dLc=	0.041	in	Ao =	20.06	cm^2
Lc=	2.888	in	Vo =	149.19	cm^3
			Lc=	7.335	cm
dVc = 3 Vo * (dLc/Lo)			dVc=	6.27	cm^3
			Vc =	142.92	cm^3
Sc =	0.376	cm^{-1}	Ac=	19.487	cm^2

1) Specimen Tested in :	x	Triaxial Cell or		Compaction Mold or			
	x	with stones or		Stones with filter paper or			top + bottom
2) Specimen orientation for:	x	Vertical or		Horizontal permeability determination			
3) During saturation: Water flushed up sides of specimen to remove ai			x	No		Yes	
4) During consolidation:	x	Top and bottom drainage or		Top		Bottom only	
5) Direction of permeant :	x	Up during or		Down during permeation			
6) Permeant: water used	x	Tap		Distilled			
or		Demineralized		0.005 N calcium sulfate (CaSO4)			

Equations Used

Kt = - 0.0000755 * Sc/dT(min) * ln (ho/hf)

RT = (-0.02452*(ave. temp in C) + 1.495)

K @ 20 ºC = RT * Kt TubeC= 1.3132

TEST SUMMARY

Final Specimen and Test Conditions

Lc =	7.335	cm	ε_{axial} =	1.4%	
Ac =	19.589	cm^2			
Vc=	143.68	cm^3	ε_{vol} =	3.7%	
Sc =	0.374	cm^{-1}	Sc = Lc / Ac , final		

	w (%)	γ_τ (pcf)	γ_d (pcf)	S (%)
Initial	26.43	123.8	97.9	98.0
PreTest	24.61	126.7	101.7	100.0

HYDRAULIC CONDUCTIVITY SUMMARY

Averages for trials: 1-4

ave K @ 20 ºC: **1.18E-07** cm/sec

(i_o)ave = 22.2

Tested By: DT Reviewed By: G. Thomas

Consol Stage-Trial No.	Temp. ° C	Date	Time hr	Time min	Time sec	Initial σ_c psi	Initial Ub psi	U-tube Reading Head (cm) (cc)	U-tube Reading Tail (cm) (cc)	Flow in/out gradient	Preliminary Final at 20ºC cm/sec Dev. from Ave.
initial	24.1	11/3/03	09	54	00	105.0	100.0	61.50	48.57	1.00	1.33E-07
final	24.4	11/3/03	10	32	00			59.90	49.07		1.19E-07
1	RT = 0.900	dT =		38.00 min		σ'_c =	0.7 ksf	0.120	0.119	io= 22.2	0%
initial	24.4	11/3/03	10	33	00	105.0	100.0	61.50	48.57	1.00	1.40E-07
final	24.6	11/3/03	11	02	00			60.19	48.98		1.24E-07
2	RT = 0.894	dT =		29.00 min		σ'_c =	0.7 ksf	0.098	0.098	io= 22.2	5%
initial	24.6	11/3/03	11	03	00	105.0	100.0	61.50	48.57	0.98	1.33E-07
final	25.0	11/3/03	11	48	00			59.63	49.17		1.17E-07
3	RT = 0.887	dT =		45.00 min		σ'_c =	0.7 ksf	0.140	0.143	io= 22.2	-1%
initial	25.0	11/3/03	11	49	00	105.0	100.0	61.50	48.57	0.99	1.29E-07
final	25.4	11/3/03	12	50	00			59.12	49.32		1.12E-07
4	RT = 0.877	dT =		61.00 min		σ'_c =	0.7 ksf	0.178	0.179	io= 22.2	-5%

PERMEABILITY TEST: FALLING HEAD - CONSTANT VOLUME U-TUBE

ASTM D 5084 - 90

Project No.: 31737767 BORING: 46SB1 Test No.: P6782

Project Name: Radford Army Ammunition Plant SAMPLE: DEPTH (ft): 14.5

Specimen - Apparatus set-up - Test Information Cell No. H-3 Apparatus No. 1 Stage No.: 2

Preliminary Length/Area Calculations

Lo =	2.881	in	Lo=	7.317	cm
dLc=	0.028	in	Ao =	20.14	cm^2
Lc=	2.853	in	Vo =	147.35	cm^3
			Lc=	7.246	cm
dVc = 3 Vo * (dLc/Lo)			dVc=	4.30	cm^3
			Vc =	143.05	cm^3
Sc =	0.367	cm^{-1}	Ac=	19.741	cm^2

1) Specimen Tested in :	x	Triaxial Cell or		Compaction Mold or					
	x	with stones or		Stones with filter paper or		top + bottom			
2) Specimen orientation for:	x	Vertical or		Horizontal permeability determination					
3) During saturation: Water flushed up sides of specimen to remove ai			x	No		Yes			
4) During consolidation:	x	Top and bottom drainage or		Top		Bottom only			
5) Direction of permeant :	x	Up during or		Down during permeation					
6) Permeant: water used	x	Tap		Distilled					
or		Demineralized		0.005 N calcium sulfate (CaSO4)					

Equations Used

Kt = - 0.0000757 * Sc/dT(min) * ln (ho/hf)

RT = (-0.02452*(ave. temp in C) + 1.495)

K @ 20 ºC = RT * Kt TubeC= 1.3127

Consol Stage-Trial No.	Temp. ºC	Date	Time hr	Time min	Time sec	Initial σ_c psi	Initial Ub psi	U-tube Reading Head (cm) (cc)	U-tube Reading Tail (cm) (cc)	Flow in/out gradient	Preliminary Final at 20ºC cm/sec Dev. from Ave.
initial	24.1	11/3/03	09	55	00	105.0	100.0	54.90	41.76	1.02	3.36E-08
final	25.0	11/3/03	11	50	00			53.60	42.16		2.92E-08
1	RT = 0.893	dT =	115.00 min			σ'_c =	0.7 ksf	0.097	0.096	io= 22.8	-1%
initial	25.0	11/3/03	11	52	00	105.0	100.0	54.90	41.76	1.00	3.38E-08
final	25.3	11/3/03	13	12	00			53.97	42.05		2.90E-08
2	RT = 0.878	dT =	80.00 min			σ'_c =	0.7 ksf	0.070	0.069	io= 22.8	-2%
initial	25.3	11/3/03	13	13	00	105.0	100.0	54.90	41.76	1.04	3.46E-08
final	24.0	11/3/03	14	34	00			53.94	42.05		3.00E-08
3	RT = 0.891	dT =	81.00 min			σ'_c =	0.7 ksf	0.072	0.069	io= 22.8	1%
initial	24.0	11/3/03	14	35	00	105.0	100.0	54.90	41.76	1.04	3.39E-08
final	23.4	11/3/03	16	13	00			53.77	42.10		3.02E-08
4	RT = 0.914	dT =	98.00 min			σ'_c =	0.7 ksf	0.085	0.081	io= 22.8	2%

TEST SUMMARY

Final Specimen and Test Conditions

Lc =	7.246	cm	ε_{axial} =	1.0%
Ac =	20.250	cm^2		
Vc=	146.73	cm^3	ε_{vol} =	0.4%
Sc =	0.358	cm^{-1}	Sc = Lc / Ac , final	

	w (%)	γ_τ (pcf)	γ_d (pcf)	S (%)
Initial	24.55	127.5	102.4	99.7
PreTest	24.38	127.8	102.8	100.0

HYDRAULIC CONDUCTIVITY SUMMARY

Averages for trials: 1-4

ave K @ 20 ºC: **2.96E-08** cm/sec

(i_o)ave = 22.8

Tested By: DT Reviewed By: G. Thomas

PERMEABILITY TEST: FALLING HEAD - CONSTANT VOLUME U-TUBE

ASTM D 5084 - 90

Project No.: 31737767 BORING: 57SB3 Test No.: P6783

Project Name: Radford Army Ammunition Plant SAMPLE: DEPTH (ft): 16.5-17

Specimen - Apparatus set-up - Test Information Cell No. 5 Apparatus No. 4 Stage No.: 2

Preliminary Length/Area Calculations

Lo = 2.691 in Lo= 6.836 cm

dLc= 0.058 in Ao = 20.16 cm^2

Lc= 2.633 in Vo = 137.79 cm^3

Lc= 6.688 cm

dVc = 3 Vo * (dLc/Lo) dVc= 8.91 cm^3

Vc = 128.88 cm^3

Sc = 0.347 cm^{-1} Ac= 19.269 cm^2

1) Specimen Tested in :	x	Triaxial Cell or		Compaction Mold or		
	x	with stones or		Stones with filter paper or		top + bottom
2) Specimen orientation for:	x	Vertical or		Horizontal permeability determination		
3) During saturation: Water flushed up sides of specimen to remove ai	x	No		Yes		
4) During consolidation:	x	Top and bottom drainage or		Top		Bottom only
5) Direction of permeant :	x	Up during or		Down during permeation		
6) Permeant: water used	x	Tap		Distilled		
or		Demineralized		0.005 N calcium sulfate (CaSO4)		

Equations Used

Kt = - 0.0000750 * Sc/dT(min) * ln (ho/hf)

RT = (-0.02452*(ave. temp in C) + 1.495)

K @ 20 ºC = RT * Kt TubeC= 1.3181

TEST SUMMARY

Final Specimen and Test Conditions

Lc = 6.688 cm ε_{axial} = 2.2%

Ac = 20.506 cm^2

Vc= 137.15 cm^3 ε_{vol} = 0.5%

Sc = 0.326 cm^{-1} Sc = Lc / Ac , final

	w (%)	γ_τ (pcf)	γ_d (pcf)	S (%)
Initial	46.36	106.4	72.7	95.1
PreTest	48.34	108.4	73.0	100.0

HYDRAULIC CONDUCTIVITY SUMMARY

Averages for trials: 1-4

ave K @ 20 ºC: **1.75E-07** cm/sec

(i_o)ave = 21.0

Tested By: DT Reviewed By: G. Thomas

Consol Stage-Trial No.	Temp. ° C	Date	Time hr	Time min	Time sec	Initial σ_c psi	Initial Ub psi	U-tube Reading Head (cm) (cc)	U-tube Reading Tail (cm) (cc)	Flow in/out gradient	Preliminary Final at 20ºC cm/sec Dev. from Ave.
initial	22.0	11/4/03	09	20	00	105.0	100.0	57.30	46.30	0.98	2.04E-07
final	22.0	11/4/03	09	49	00			55.60	46.85		1.83E-07
1	RT = 0.956	dT =		29.00 min		σ'_c =	0.7 ksf	0.127	0.129	io= 20.7	5%
initial	22.0	11/4/03	09	51	00	105.0	100.0	57.30	46.30	0.97	2.01E-07
final	22.4	11/4/03	10	23	00			55.47	46.90		1.80E-07
2	RT = 0.951	dT =		32.00 min		σ'_c =	0.7 ksf	0.136	0.141	io= 20.7	3%
initial	22.4	11/4/03	10	24	00	105.0	100.0	57.50	46.20	0.95	1.90E-07
final	22.7	11/4/03	10	56	00			55.71	46.80		1.69E-07
3	RT = 0.942	dT =		32.00 min		σ'_c =	0.7 ksf	0.133	0.141	io= 21.2	-4%
initial	22.7	11/4/03	10	57	00	105.0	100.0	57.50	46.20	0.98	1.91E-07
final	23.0	11/4/03	11	32	00			55.56	46.83		1.67E-07
4	RT = 0.935	dT =		35.00 min		σ'_c =	0.7 ksf	0.145	0.148	io= 21.2	-4%

PERMEABILITY TEST: FALLING HEAD - CONSTANT VOLUME U-TUBE

ASTM D 5084 - 90

Project No.: 31737767 BORING: FSB-1 Test No.: P6784

Project Name: Radford Army Ammunition Plant SAMPLE: DEPTH (ft): 18.5-19

Specimen - Apparatus set-up - Test Information Cell No. H-1 Apparatus No. 3 Stage No.: 2

Preliminary Length/Area Calculations

Lo =	1.845	in	Lo=	4.687	cm
dLc=	0.019	in	Ao =	20.16	cm^2
Lc=	1.826	in	Vo =	94.47	cm^3
			Lc=	4.639	cm
dVc = 3 Vo * (dLc/Lo)			dVc=	2.92	cm^3
			Vc =	91.55	cm^3
Sc =	0.235	cm^{-1}	Ac=	19.738	cm^2

1) Specimen Tested in :	x	Triaxial Cell or		Compaction Mold or			
	x	with stones or		Stones with filter paper or			top + bottom
2) Specimen orientation for:	x	Vertical or		Horizontal permeability determination			
3) During saturation: Water flushed up sides of specimen to remove ai			x	No		Yes	
4) During consolidation:	x	Top and bottom drainage or		Top		Bottom only	
5) Direction of permeant :	x	Up during or		Down during permeation			
6) Permeant: water used	x	Tap		Distilled			
or		Demineralized		0.005 N calcium sulfate (CaSO4)			Permeability

Equations Used

Kt = - 0.0000755 * Sc/dT(min) * ln (ho/hf)

RT = (-0.02452*(ave. temp in C) + 1.495)

K @ 20 ºC = RT * Kt TubeC= 1.3132

Consol Stage-Trial No.	Temp. ° C	Date	Time hr	Time min	Time sec	Initial σ_c psi	Initial Ub psi	U-tube Reading Head (cm) (cc)	U-tube Reading Tail (cm) (cc)	Flow in/out gradient	Preliminary Final at 20ºC cm/sec Dev. from Ave.
initial	21.6	11/4/03	09	22	00	105.0	100.0	58.00	49.60	0.92	9.18E-08
final	22.0	11/4/03	10	16	00			56.44	50.13		8.78E-08
1	RT = 0.960	dT =		54.00 min		σ'_c =	0.7 ksf	0.117	0.126	io= 22.8	2%
initial	22.0	11/4/03	10	17	00	105.0	100.0	58.00	49.60	0.90	9.18E-08
final	22.4	11/4/03	10	52	00			56.94	49.97		8.69E-08
2	RT = 0.951	dT =		35.00 min		σ'_c =	0.7 ksf	0.079	0.088	io= 22.8	1%
initial	22.4	11/4/03	10	53	00	105.0	100.0	58.00	49.60	0.97	9.10E-08
final	22.7	11/4/03	11	35	00			56.76	50.00		8.54E-08
3	RT = 0.942	dT =		42.00 min		σ'_c =	0.7 ksf	0.093	0.095	io= 22.8	-1%
initial	22.7	11/4/03	11	37	00	105.0	100.0	58.00	49.60	0.97	9.20E-08
final	23.0	11/4/03	12	39	00			56.24	50.17		8.57E-08
4	RT = 0.935	dT =		62.00 min		σ'_c =	0.7 ksf	0.132	0.136	io= 22.8	-1%

TEST SUMMARY

Final Specimen and Test Conditions

Lc =	4.639	cm	ε_{axial} =	1.0%
Ac =	19.813	cm^2		
Vc=	91.90	cm^3	ε_{vol} =	2.7%
Sc =	0.234	cm^{-1}	Sc = Lc / Ac , final	

	w (%)	γ_τ (pcf)	γ_d (pcf)	S (%)
Initial	30.63	119.2	91.2	99.7
PreTest	28.84	120.8	93.8	100.0

HYDRAULIC CONDUCTIVITY SUMMARY

Averages for trials: 1-4

ave K @ 20 ºC: **8.65E-08** cm/sec

(i_o)ave = 22.8

Tested By: DT Reviewed By: G. Thomas

CONSTANT HEAD HYDRAULIC CONDUCTIVITY TEST
ASTM D 5084 - 90

Project No. **31737767** BORING: 38SB2

Project Name: **Radford Army Ammunition Pla** SAMPLE: DEPTH (ft): 15.5 Test No.: **P6785**

Specimen - Apparatus set-up - Test Information Apparatus No. C-2 Cell No. H-7 Stage 2

1) Specimen Tested in :	x	Triaxial Cell or		Compaction Mold or	
		with stones or		Stones with filter paper or	top + bottom
2) Specimen orientation for:	x	Vertical or		Horizontal permeability determination	
3) During saturation: Water flushed up sides of specimen to remove air:			x	No	Yes
4) During consolidation:	x	Top and bottom drainage or		Top	Bottom only
5) Direction of permeant :	x	Up during or		Down during permeation	
6) Permeant: water used	x	Tap		Distilled	
		Demineralized		0.005 N calcium sulfate (CaSO4)	

Consol Stage- Trial No.	Temp. ° C	Date	Time hr	min	sec	Initial σ_c psi	Ub psi	Dial Indicator in	Pressure Head Reading Mercury (inch)	Gage (psi)	Flow Reading (cm)	Flow Vol (cm3) Rate (cm3/sec)	Fluid Head Reading Head (cm)	Tail (cm)	Total Head Uncorrected Correction Corrected (cm)	Gradient	Permeability Preliminary Final at 20°C cm/sec
initial	22.0	11/4/03	09	26	00	105.0	100.0				3.90	59.972	51.50	40.60	10.90		
final	22.0	11/4/03	09	51	48						6.80	0.0387	51.50	40.60	5.23		2.09E-03
1	RT = 0.952	dT =		25.80 min		σ'_c =	0.7 ksf						51.5	40.6	5.67	0.93	2.00E-03
initial	22.0	11/4/03	09	53	00	105.0	100.0				4.00	62.04	51.50	40.60	10.90		
final	22.4	11/4/03	10	19	36						7.00	0.0389	51.50	40.60	5.24		2.10E-03
2	RT = 0.947	dT =		26.60 min		σ'_c =	0.7 ksf						51.5	40.6	5.66	0.93	2.00E-03
initial	22.4	11/4/03	10	21	00	105.0	100.0				4.00	66.176	51.50	40.60	10.90		
final	22.5	11/4/03	10	49	06						7.20	0.0393	51.50	40.60	5.29		2.14E-03
3	RT = 0.942	dT =		28.10 min		σ'_c =	0.7 ksf						51.5	40.6	5.61	0.92	2.03E-03
initial	22.5	11/4/03	10	51	00	105.0	100.0				4.00	64.108	51.50	40.60	10.90		
final	22.7	11/4/03	11	18	06						7.10	0.0394	51.50	40.60	5.32		2.16E-03
4	RT = 0.938	dT =		27.10 min		σ'_c =	0.7 ksf						51.5	40.6	5.58	0.92	2.04E-03

Preliminary Length/Area Calculations

Lo =	2.405	in	Lo=	6.109	cm
Ao=	3.099	in^2	Ao =	20.00	cm^2
Vo=	7.454	in^3	Vo =	122.16	cm^3
Lc =	6.097	cm	Vc =	121.40	cm^3
Ac=	19.912	cm^2			

Tested By: DT Reviewed By: G. Thomas

TEST SUMMARY

Final Specimen and Test Conditions

Lc =	6.097	cm	ε_{axial} =	0.2%	
Ac =	19.819	cm^2			
Vc=	120.83	cm^3	ε_{vol} =	1.1%	

	w (%)	γ_τ (pcf)	γ_d (pcf)	S (%)
Initial	3.70	116.0	111.9	19.7
PreTest	18.19	133.7	113.1	100.0

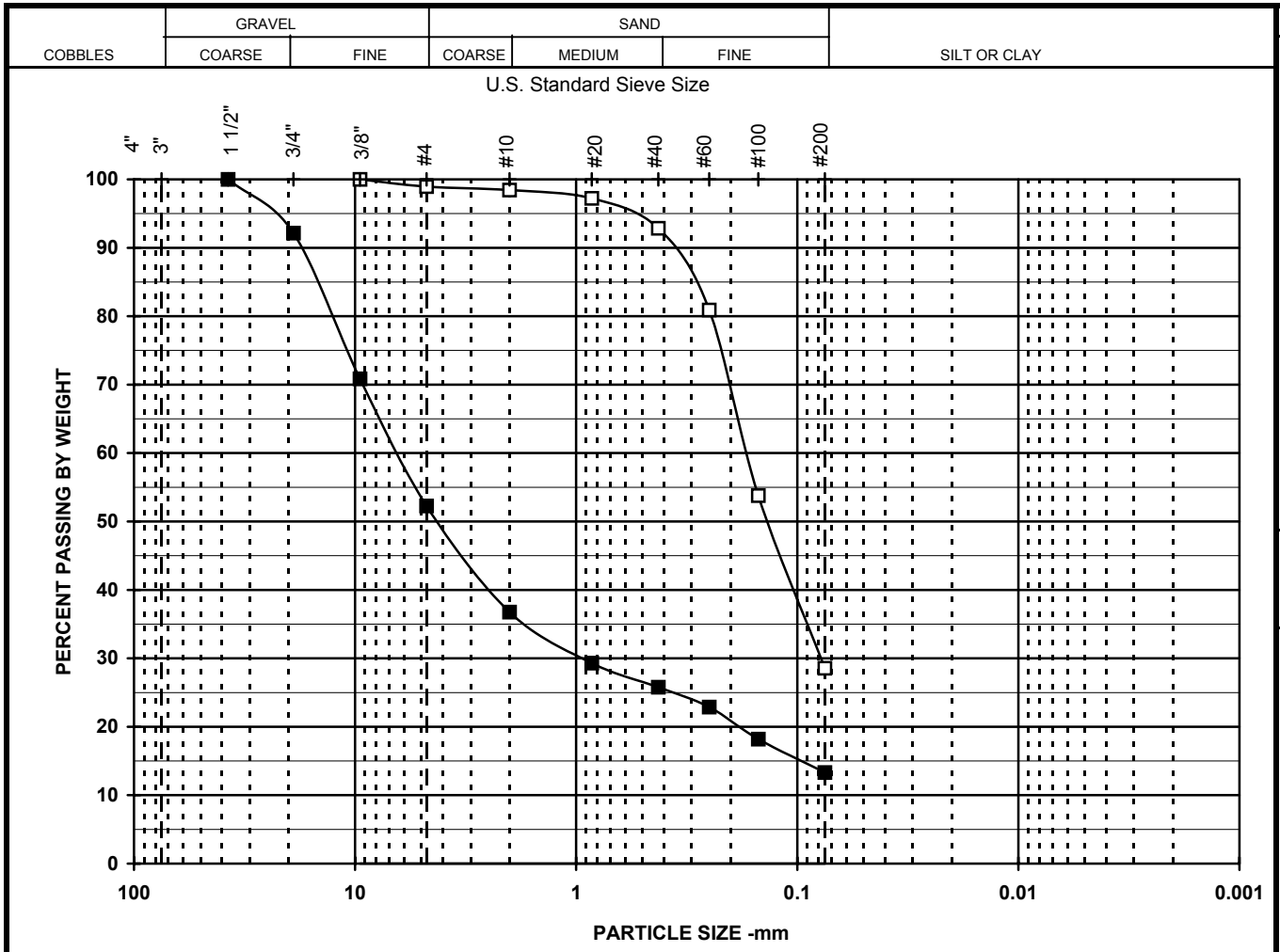
HYDRAULIC CONDUCTIVITY SUMMARY

Averages for trials: 1-4

ave K @ 20 °C: **2.02E-03** cm/sec

(i_o)ave = 0.92

HYDRAULIC CONDUCTIVITY TEST



SYMBOL	DESCRIPTION AND REMARKS
□	brown m-f SAND, some silt, trace f. gravel, c. sand.
■	brown c-f sandy GRAVEL, some clay.
○	

Symbol	□	■	○
Boring	13SB10	13SB7	
Sample			
Spec			
Depth	2-3	12.7	
% +3"			
% Gravel	1.1	47.7	
% SAND	70.3	39.0	
% FINES	28.6	13.3	
% -2μ			
Cc			
Cu			
LL			
PL	np		
PI			
USCS	SM	GC	
w (%)		16.0	

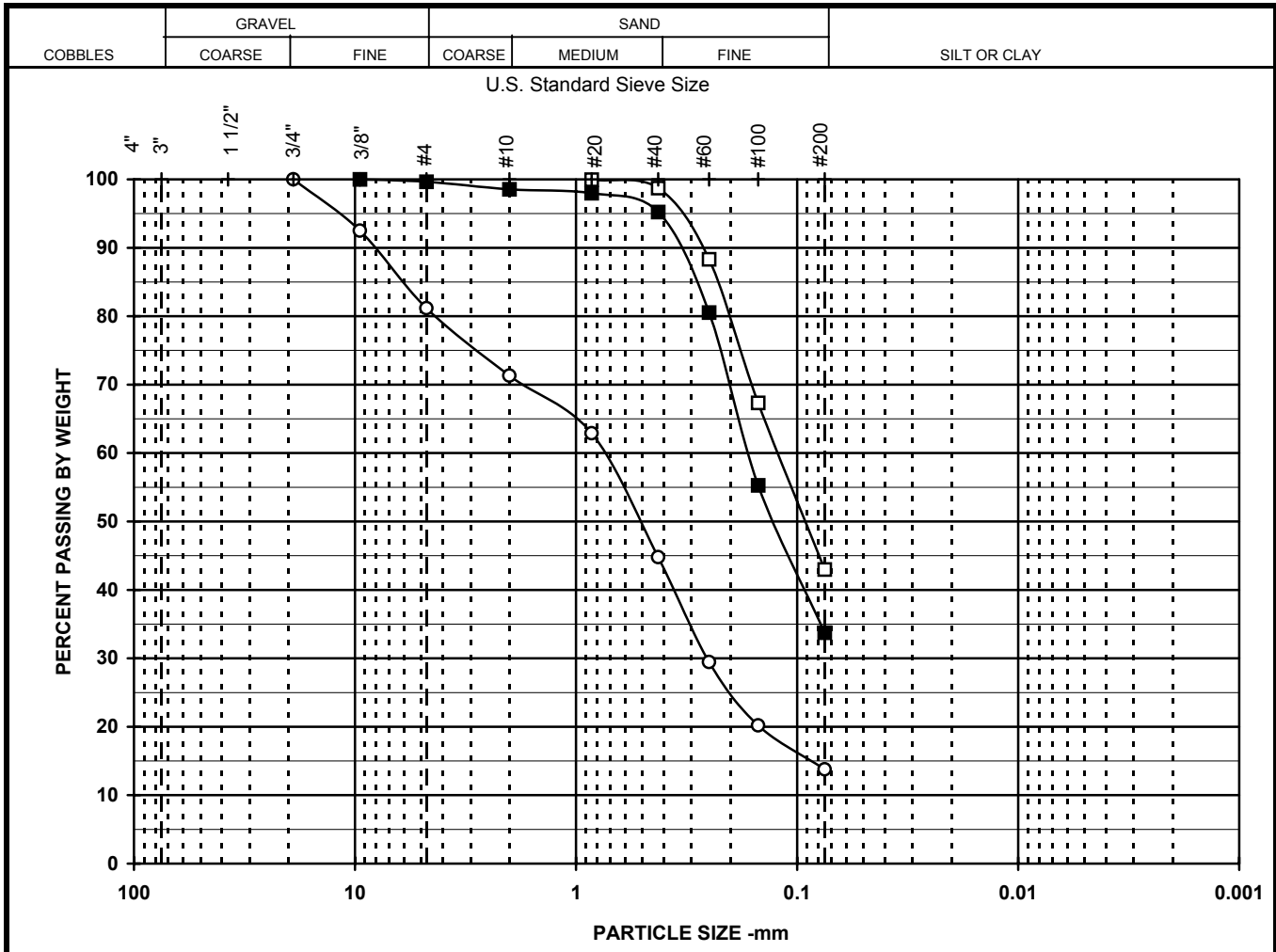
Particle Size	PERCENT FINER		
(Sieve #)	□	■	○
4"			
3"			
1 1/2"		100.0	
3/4"		92.1	
3/8"	100.0	70.9	
4	98.9	52.3	
10	98.4	36.7	
20	97.2	29.3	
40	92.9	25.8	
60	80.9	22.9	
100	53.8	18.2	
200	28.6	13.3	

PARTICLE SIZE DISTRIBUTION

Radford Army Ammunition Plant

Project No.		
31737767	December 2003	Figure

URS Corporation



SYMBOL	DESCRIPTION AND REMARKS
□	dark brown clayey f. SAND, trace m. sand.
■	brown silty f. SAND, trace c-m sand.
○	brown c-f SAND, some f. gravel, silt.

Symbol	□	■	○
Boring	37SB1	37SB2	38SB2
Sample			
Spec			
Depth	6-6.5	15.5-16	15.5
% +3"			
% Gravel		0.4	18.8
% SAND	57.0	65.9	67.4
% FINES	43.0	33.7	13.8
% -2μ			
Cc			
Cu			
LL	22		
PL	18		
PI	4		
USCS	SC-SM	SM	SM
w (%)			

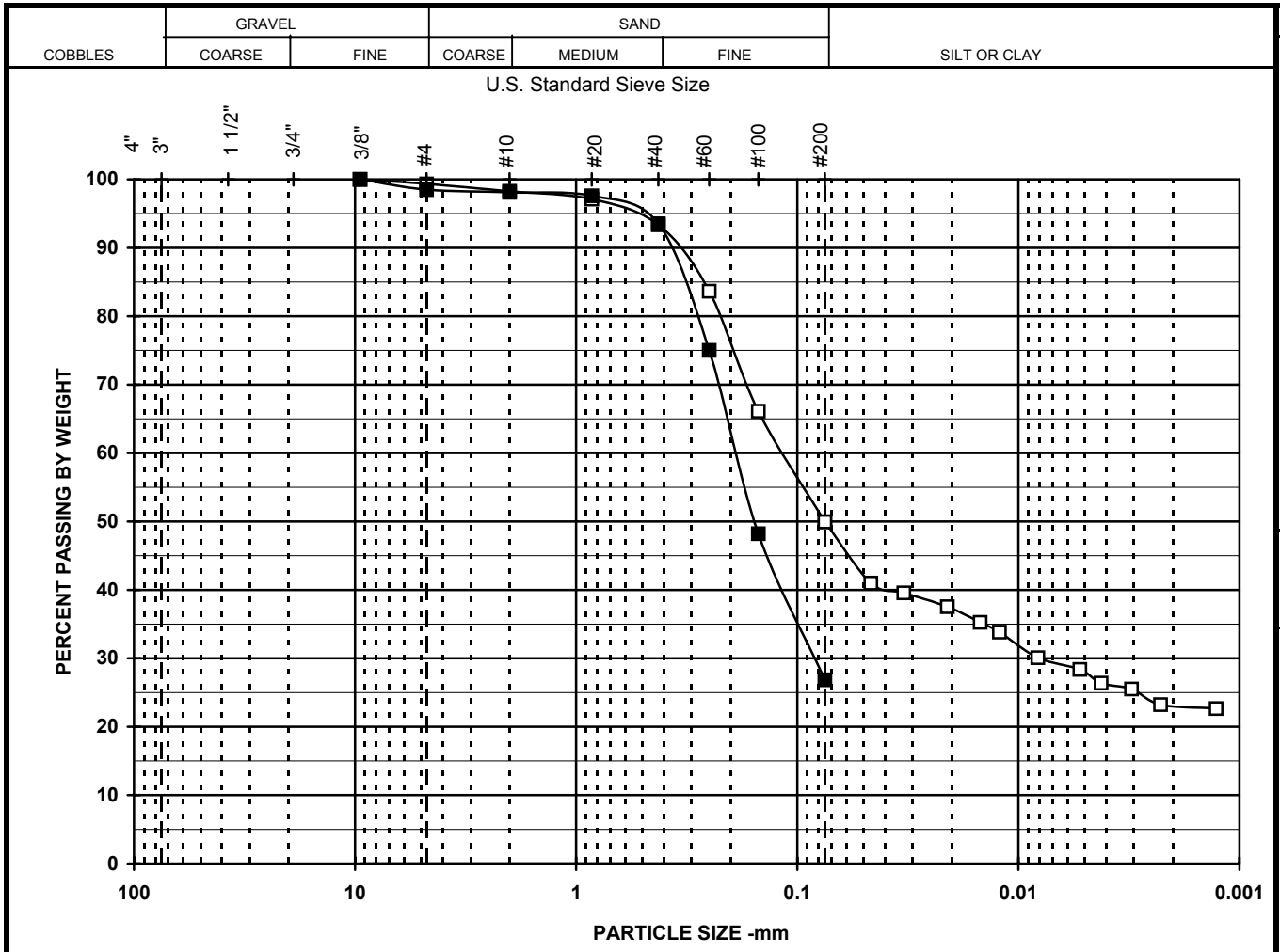
Particle Size	PERCENT FINER		
(Sieve #)	□	■	○
4"			
3"			
1 1/2"			
3/4"			100.0
3/8"		100.0	92.5
4		99.6	81.2
10		98.5	71.3
20	100.0	98.0	62.9
40	98.7	95.2	44.8
60	88.3	80.5	29.5
100	67.3	55.3	20.2
200	43.0	33.7	13.8

PARTICLE SIZE DISTRIBUTION

Radford Army Ammunition Plant

Project No.		
31737767	December 2003	Figure

URS Corporation



SYMBOL	DESCRIPTION AND REMARKS
□	brown silty clayey f. SAND, trace c-m sand.
■	brown f. SAND, some silt, trace f. gravel, c-m sand.
○	

Symbol	□	■	○
Boring	46SB1	46SB2	
Sample			
Spec			
Depth	14.5	9.5-10	
% +3"			
% Gravel	0.7	1.5	
% SAND	49.3	71.6	
% FINES	50.0	26.9	
% -2μ	23		
Cc			
Cu			
LL	32		
PL	18		
PI	14		
USCS	SC	SM	
w (%)		20.4	

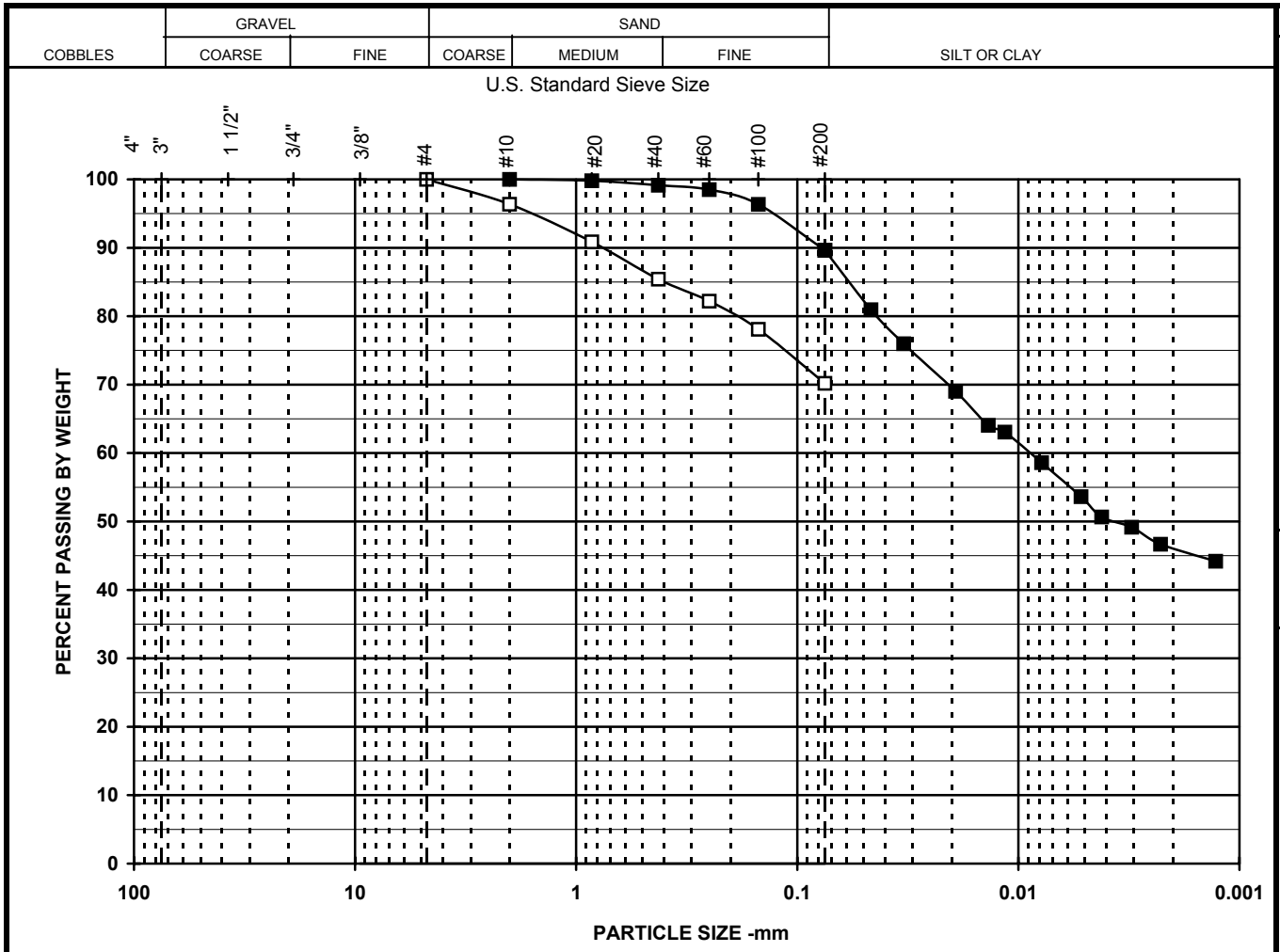
Particle Size	PERCENT FINER		
(Sieve #)	□	■	○
4"			
3"			
1 1/2"			
3/4"			
3/8"	100.0	100.0	
4	99.3	98.5	
10	98.3	98.1	
20	97.1	97.6	
40	93.4	93.5	
60	83.7	75.0	
100	66.1	48.2	
200	50.0	26.9	

PARTICLE SIZE DISTRIBUTION

Radford Army Ammunition Plant

Project No.		
31737767	December 2003	Figure

URS Corporation



SYMBOL	DESCRIPTION AND REMARKS
□	brown silty CLAY, some c-f sand.
■	yellowish brown CLAY, trace f. sand.
○	

Symbol	□	■	○
Boring	57SB2	57SB3	
Sample			
Spec			
Depth	7.5-8	16.5-17	
% +3"			
% Gravel			
% SAND	29.8	10.4	
% FINES	70.2	89.6	
% -2μ		46	
Cc			
Cu			
LL		83	
PL		29	
PI		54	
USCS	CL-ML	CH	
w (%)	28.4		

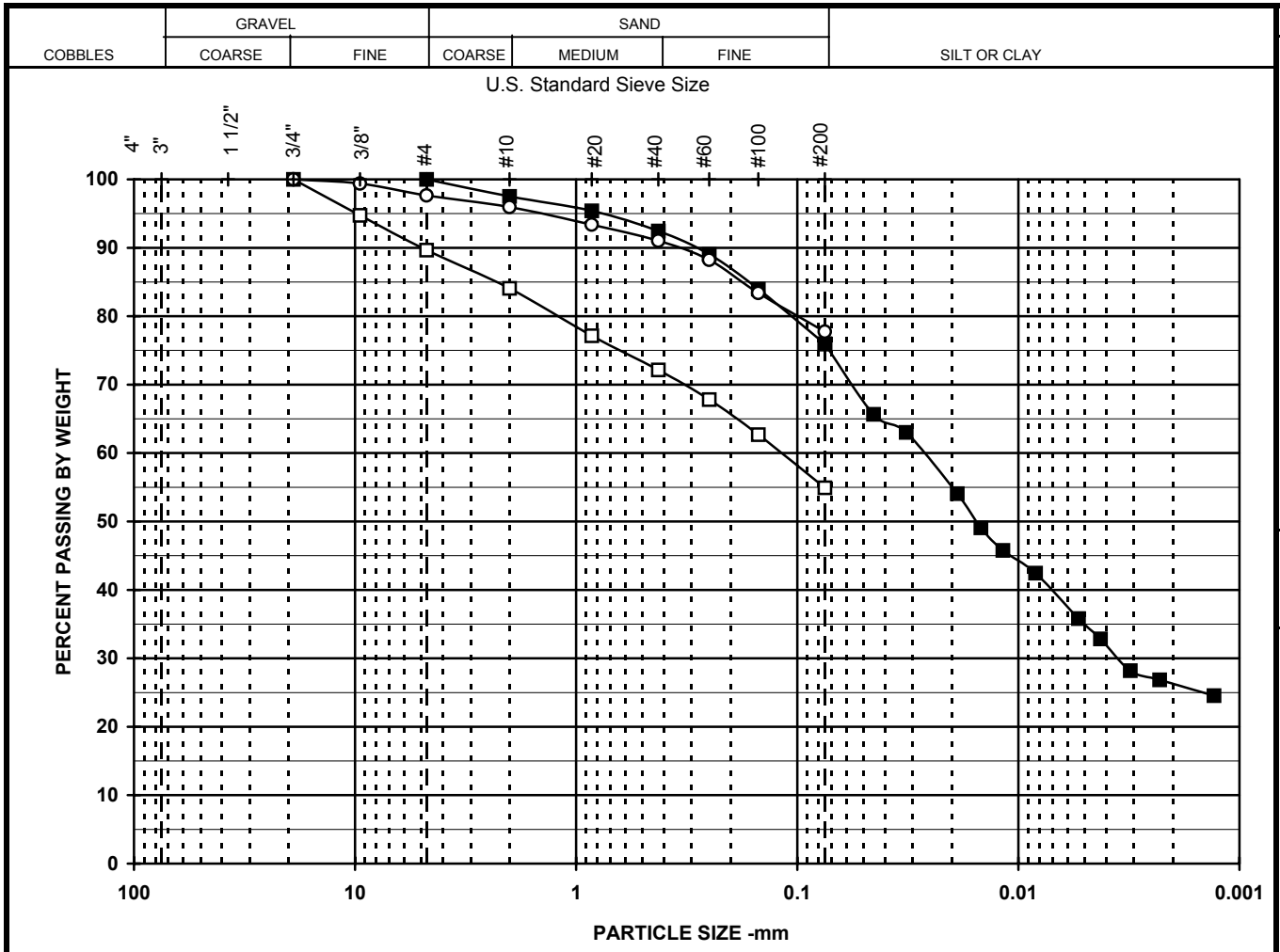
Particle Size	PERCENT FINER		
(Sieve #)	□	■	○
4"			
3"			
1 1/2"			
3/4"			
3/8"			
4	100.0		
10	96.4	100.0	
20	90.9	99.8	
40	85.4	99.1	
60	82.2	98.5	
100	78.1	96.3	
200	70.2	89.6	

PARTICLE SIZE DISTRIBUTION

Radford Army Ammunition Plant

Project No.		Figure
31737767	December 2003	

URS Corporation



SYMBOL	DESCRIPTION AND REMARKS
□	brown c-f sandy silty CLAY, trace f. gravel.
■	orange brown clayey SILT, some c-f sand.
○	brown silty CLAY, some c-f SAND, trace f. gravel.

Symbol	□	■	○
Boring	68SB2	68SB3	69SB3
Sample			
Spec			
Depth	18-18.5	7-7.5	7.5-8.5
% +3"			
% Gravel	10.3		2.4
% SAND	34.8	24.1	19.9
% FINES	54.9	75.9	77.7
% -2μ		26	
Cc			
Cu			
LL		49	
PL		29	
PI		20	
USCS	CL-ML	ML	CL
w (%)	30.4		

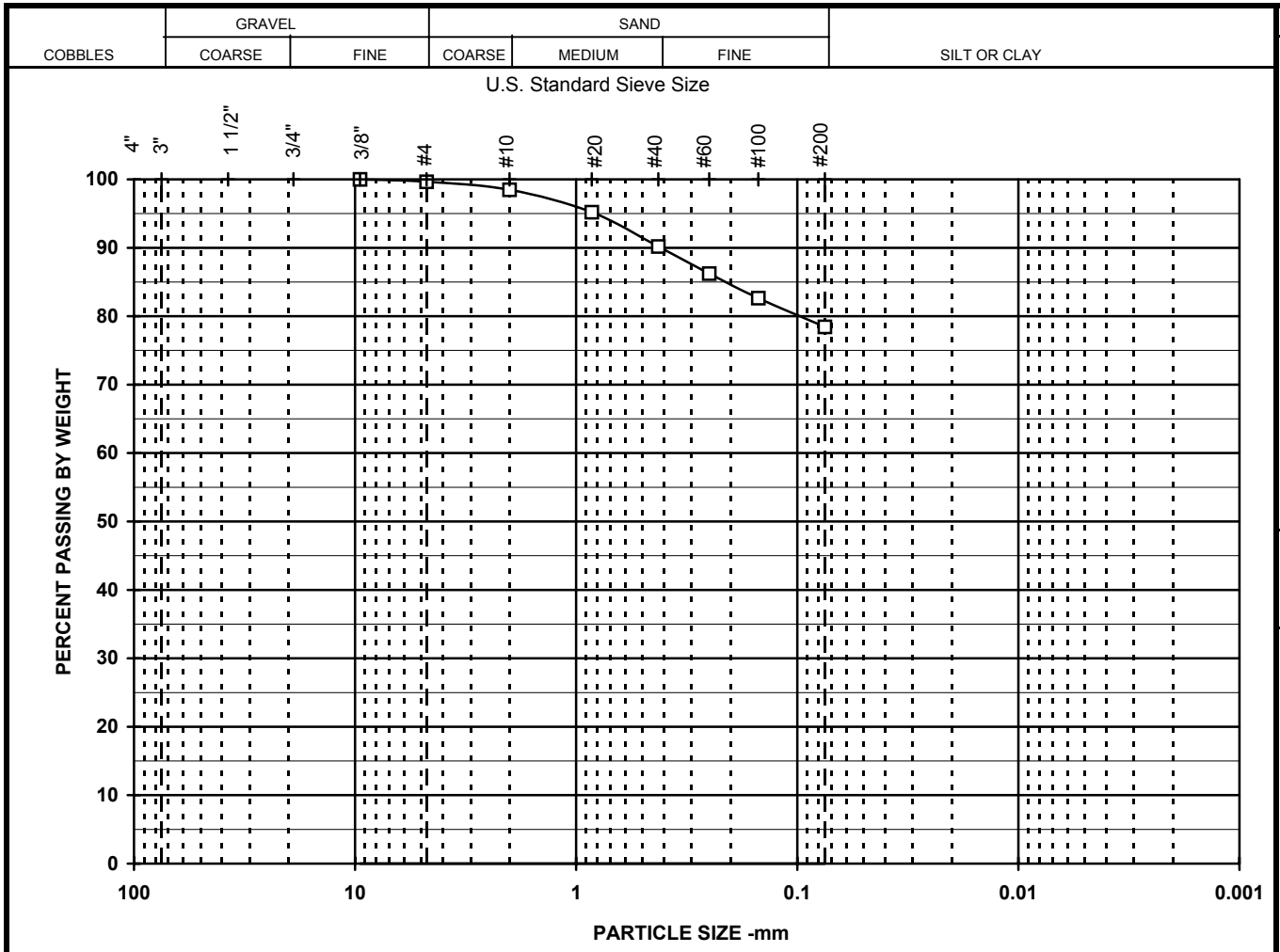
Particle Size	PERCENT FINER		
(Sieve #)	□	■	○
4"			
3"			
1 1/2"			
3/4"	100.0		100.0
3/8"	94.8		99.4
4	89.7	100.0	97.6
10	84.1	97.5	96.0
20	77.2	95.4	93.4
40	72.1	92.5	91.0
60	67.8	89.0	88.2
100	62.7	84.0	83.4
200	54.9	75.9	77.7

PARTICLE SIZE DISTRIBUTION

Radford Army Ammunition Plant

Project No.		
31737767	December 2003	Figure

URS Corporation



SYMBOL	DESCRIPTION AND REMARKS
□	brown clayey SILT, some m-f sand, trace f. gravel, c. sand.
■	
○	

Symbol	□	■	○
Boring	ASB2		
Sample			
Spec			
Depth	14-16		
% +3"			
% Gravel	0.4		
% SAND	21.2		
% FINES	78.4		
% -2μ			
Cc			
Cu			
LL	56		
PL	35		
PI	21		
USCS	MH		
w (%)	42.0		

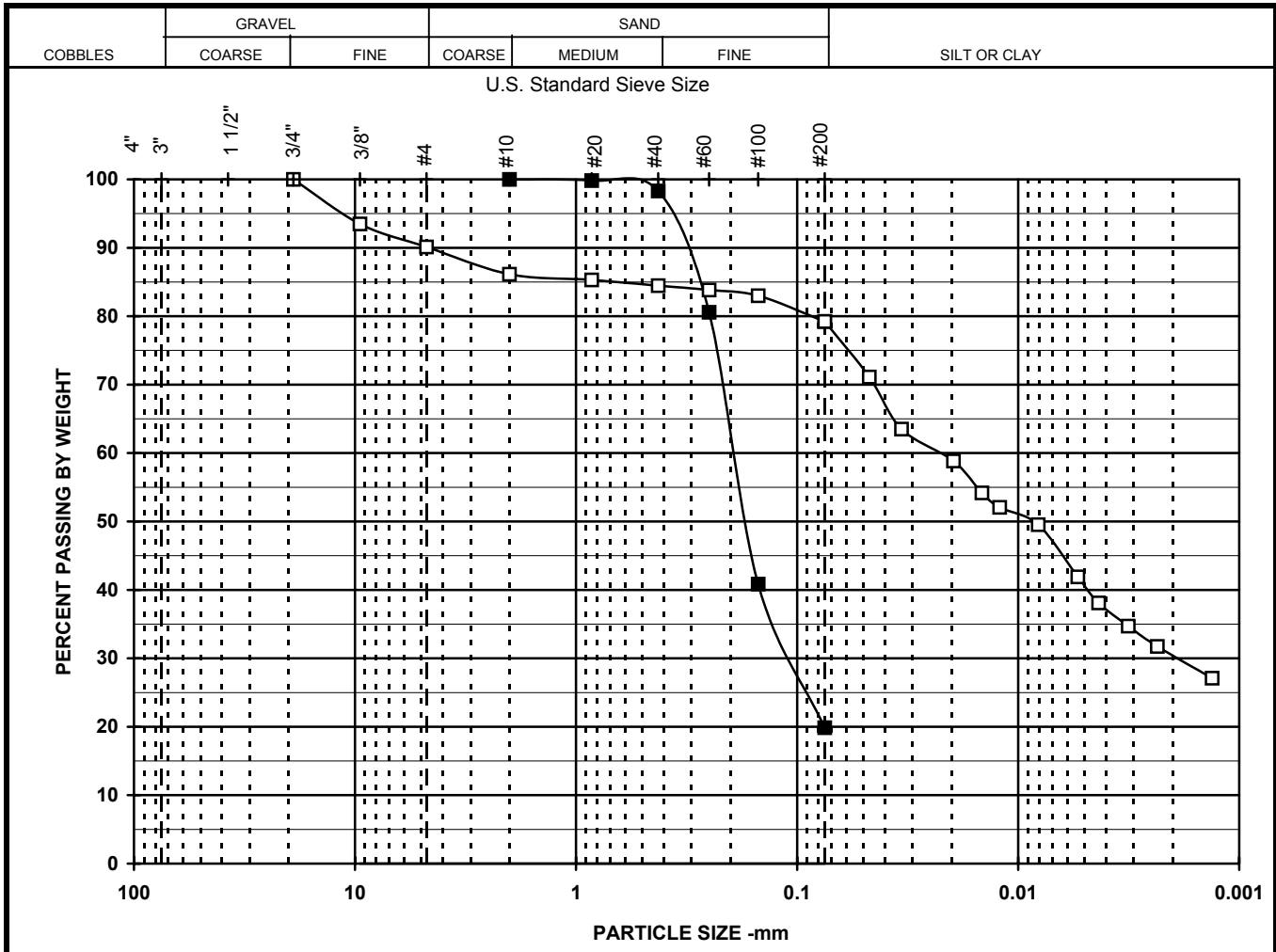
Particle Size	PERCENT FINER		
(Sieve #)	□	■	○
4"			
3"			
1 1/2"			
3/4"			
3/8"	100.0		
4	99.6		
10	98.5		
20	95.2		
40	90.2		
60	86.2		
100	82.6		
200	78.4		

PARTICLE SIZE DISTRIBUTION

Radford Army Ammunition Plant

Project No.		
31737767	December 2003	Figure

URS Corporation



SYMBOL	DESCRIPTION AND REMARKS
□	yellowish brown CLAY, trace f. gravel, c-f sand.
■	brown f. SAND, some silt, trace m. sand.
○	

Symbol	□	■	○
Boring	FSB1	FSB2	
Sample			
Spec			
Depth	18.5-19	7.5-8	
% +3"			
% Gravel	9.9		
% SAND	10.9	80.1	
% FINES	79.2	19.9	
% -2μ	30		
Cc			
Cu			
LL	47		
PL	20		
PI	27		
USCS	CL	SM	
w (%)		15.6	

Particle Size	PERCENT FINER		
(Sieve #)	□	■	○
4"			
3"			
1 1/2"			
3/4"	100.0		
3/8"	93.5		
4	90.1		
10	86.1	100.0	
20	85.3	99.8	
40	84.5	98.3	
60	83.8	80.6	
100	83.0	40.8	
200	79.2	19.9	

PARTICLE SIZE DISTRIBUTION

Radford Army Ammunition Plant

Project No.		Figure
31737767	December 2003	

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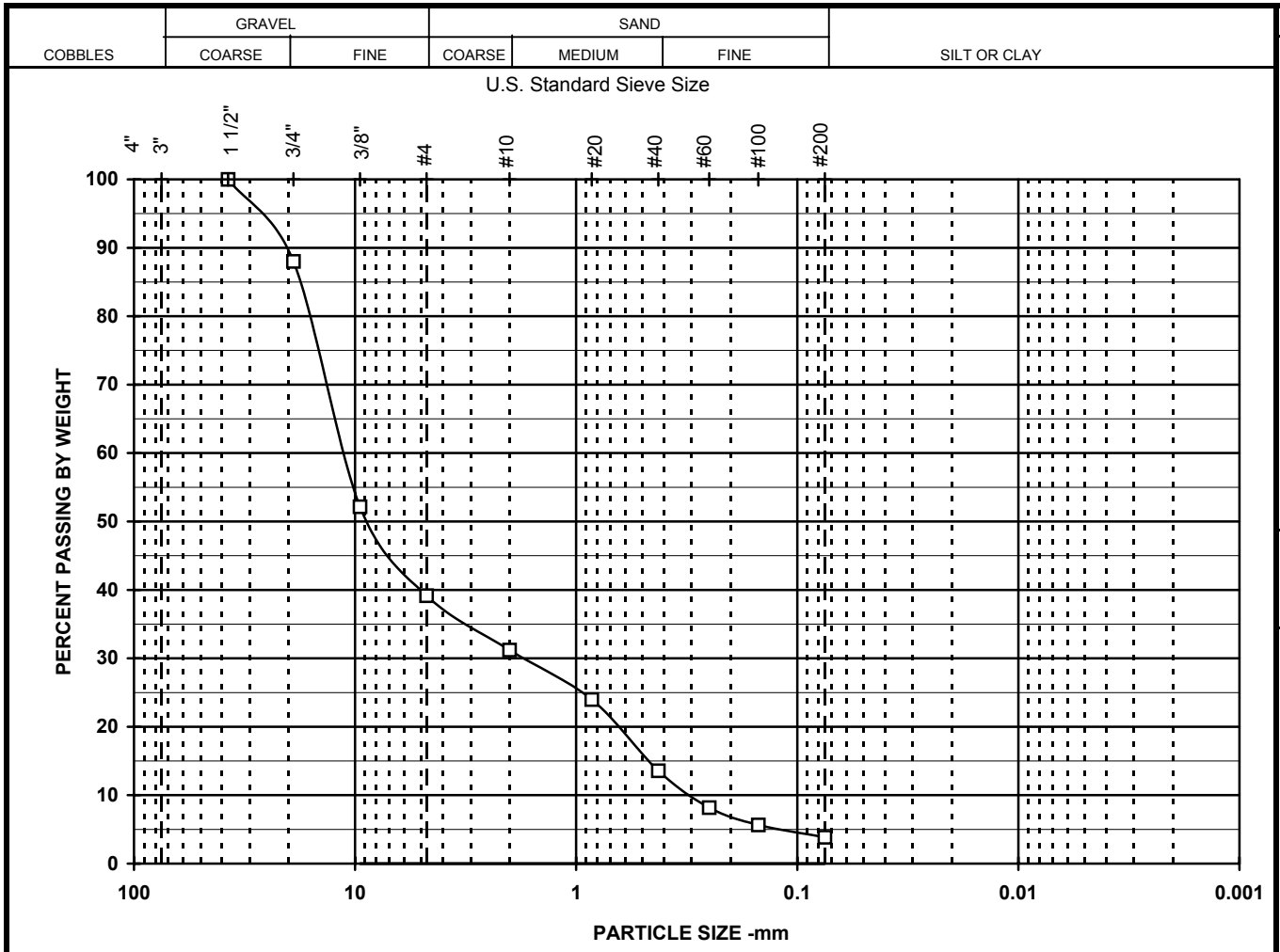


SYMBOL	DESCRIPTION AND REMARKS
□	brown c-f sandy GRAVEL, trace silt.
■	
○	

Symbol	□	■	○
Boring	QSB2		
Sample			
Spec			
Depth	24		
% +3"			
% Gravel	60.9		
% SAND	35.2		
% FINES	3.9		
% -2μ			
Cc	0.9		
Cu	37.4		
LL			
PL			
PI			
USCS	GP		
w (%)	6.2		

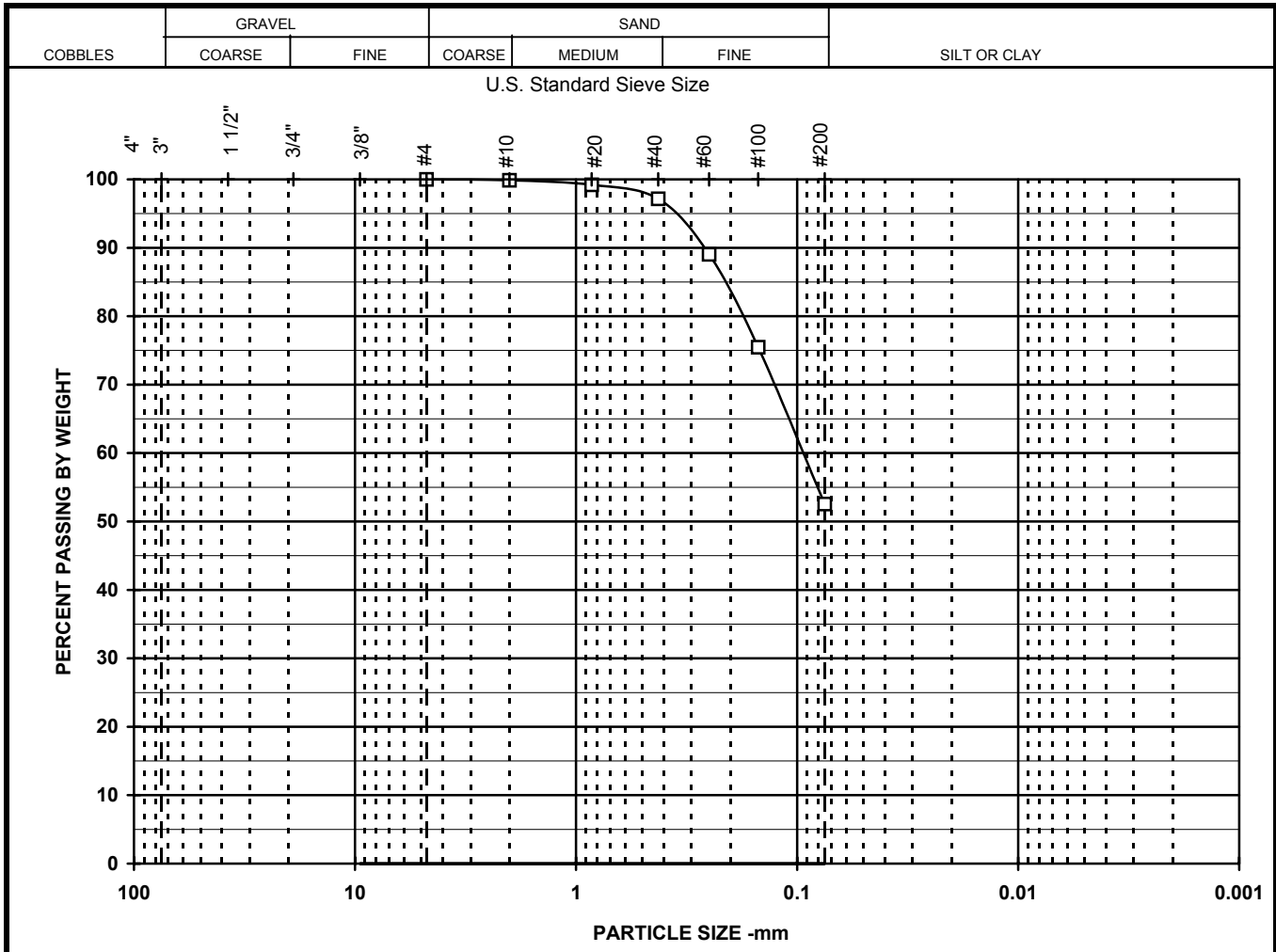
Particle Size	PERCENT FINER		
(Sieve #)	□	■	○
4"			
3"			
1 1/2"	100.0		
3/4"	88.0		
3/8"	52.2		
4	39.1		
10	31.2		
20	24.0		
40	13.6		
60	8.2		
100	5.7		
200	3.9		

PARTICLE SIZE DISTRIBUTION

Radford Army Ammunition Plant

Project No.		
31737767	December 2003	Figure

URS Corporation



SYMBOL	DESCRIPTION AND REMARKS
□	brown f. sandy silty CLAY, trace m. sand.
■	
○	

Symbol	□	■	○
Boring	QSB1		
Sample			
Spec			
Depth	9.5-10		
% +3"			
% Gravel			
% SAND	47.4		
% FINES	52.6		
% -2μ			
Cc			
Cu			
LL	31		
PL	21		
PI	10		
USCS	CL		
w (%)			

Particle Size	PERCENT FINER		
(Sieve #)	□	■	○
4"			
3"			
1 1/2"			
3/4"			
3/8"			
4	100.0		
10	99.9		
20	99.2		
40	97.2		
60	89.0		
100	75.5		
200	52.6		

PARTICLE SIZE DISTRIBUTION

Radford Army Ammunition Plant

Project No.		
31737767	December 2003	Figure

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APPENDIX F

SSL CALCULATIONS

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Summary Table for Site-Specific Soil Screening Levels
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Analyte	CAS Number	Ground Water Concentration (mg/L)	Groundwater Concentration Source	Fraction of Organic Carbon in Soil (unitless)	Site-specific Soil Screening Level (mg/kg)	MDC (mg/kg)
SWMU 13						
Trichloroethene	79016	2.6E-05	T-RBC	0.023	2.0E-03	**5.7E-02**
1,3 Dinitrobenzene	99650	3.7E-03	T-RBC	0.023	7.0E-2	**2.0E-01**
SWMU 37						
Dieldrin	60571	4.2E-06	T-RBC	0.0155	2.8E-02	1.1E-02
Trichloroethene	79016	2.6E-05	T-RBC	0.0155	1.5E-03	**6.3E-02**
SWMU 46						
Trichloroethene	79016	2.6E-05	T-RBC	0.02	1.8E-03	**3.4E-03**
SWMU 57						
Bromodichloromethane	75274	1.7E-04	T-RBC	0.031	6.0E-03	1.2E-03
Chloroform	67663	1.5E-04	T-RBC	0.031	4.0E-03	**2.4E-02**
SWMU 69						
Methylene Chloride	75092	4.1E-03	T-RBC	0.034	4.8E-02	4.2E-02
Area A						
Dieldrin	60571	4.2E-06	T-RBC	0.0305	5.5E-02	4.6E-03
Methylene Chloride	75092	4.1E-03	T-RBC	0.0305	4.5E-02	**1.1E-01**

NOTES:

SWMU = Solid Waste Management Unit
AOC = Area of Concern
CAS = Chemical Abstract System
mg/l = milligram per liter
mg/kg = milligram per kilogram
MDC = Maximum Detected Concentration
Bold = Indicates the MDC exceeds the calculated site-specific SSL

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Site-Specific SSL(s) for 1,3 Dinitrobenzene

SSP Report

Radford Army Ammunition Plant, Radford, VA

Input Parameters Averaged from All Soil-Sample Physical Test Results

			units
	Dilution Factor =	20	--
T-RBC	GW Concentration Source=	0.0037	mg/L
C_w =	Target Leachate Conc =	0.074	mg/L
θ_w =	Water-Filled Soil Porosity =	0.3	--
θ_a=	Air-Filled Soil Porosity =	0.134	--
H' =	Henry's Law Constant =	0.0000046	--
P_b =	Dry Soil Bulk Density =	1.5	kg/L
Koc=	Soil Organic Carbon/Water Partition Coefficient =	30	L/kg

SSL (mg/kg) = $C_w [K_d + (\theta_w + \theta_a H')/Pb]$

SWMU 13

foc =	Fraction Organic Carbon =	0.023	%
K_d =	Soil-Water Partition Coeff (K_{oc}*foc) =	0.69	L/kg
SSL =	**Site-specific SSL =**	**0.07**	**mg/kg**

Site-Specific SSL(s) for Dieldrin

SSP Report

Radford Army Ammunition Plant, Radford, VA

Input Parameters Averaged from All Soil-Sample Physical Test Results

			units
	Dilution Factor =	20	--
T-RBC	GW Concentration Source=	0.0000042	mg/L
C_w =	Target Leachate Conc =	0.000084	mg/L
θ_w =	Water-Filled Soil Porosity =	0.3	--
θ_a=	Air-Filled Soil Porosity =	0.134	--
H' =	Henry's Law Constant =	0.0006190	--
P_b =	Dry Soil Bulk Density =	1.5	kg/L
Koc=	Soil Organic Carbon/Water Partition Coefficient =	21400	L/kg

SSL (mg/kg) = $C_w [K_d + (\theta_w + \theta_a H')/Pb]$

SWMU 37

foc =	Fraction Organic Carbon =	0.0155	%
K_d =	Soil-Water Partition Coeff (K_{oc}*foc) =	331.7	L/kg
SSL =	**Site-specific SSL =**	**0.028**	**mg/kg**

AOC A

foc =	Fraction Organic Carbon =	0.0305	%
K_d =	Soil-Water Partition Coeff (K_{oc}*foc) =	652.7	L/kg
SSL =	**Site-specific SSL =**	**0.055**	**mg/kg**

Site-Specific SSL(s) for TCE

SSP Report

Radford Army Ammunition Plant, Radford, VA

Input Parameters Averaged from All Soil-Sample Physical Test Results

			units
	Dilution Factor =	20	--
T-RBC	GW Concentration Source=	0.000026	mg/L
C_w =	Target Leachate Conc =	0.00052	mg/L
θ_w =	Water-Filled Soil Porosity =	0.3	--
θ_a=	Air-Filled Soil Porosity =	0.134	--
H' =	Henry's Law Constant =	0.4220000	--
P_b =	Dry Soil Bulk Density =	1.5	kg/L
Koc=	Soil Organic Carbon/Water Partition Coefficient =	166	L/kg

SSL (mg/kg) = $C_w [K_d + (\theta_w + \theta_a H')/Pb]$

SWMU 13

foc =	Fraction Organic Carbon =	0.023	unitless
K_d =	Soil-Water Partition Coeff (K_{oc}*foc) =	3.818	L/kg
SSL =	**Site-specific SSL =**	**0.002**	**mg/kg**

SWMU 37

foc =	Fraction Organic Carbon =	0.0155	unitless
K_d =	Soil-Water Partition Coeff (K_{oc}*foc) =	2.573	L/kg
SSL =	**Site-specific SSL =**	**0.0015**	**mg/kg**

SWMU 46

foc =	Fraction Organic Carbon =	0.02	unitless
K_d =	Soil-Water Partition Coeff (K_{oc}*foc) =	3.32	L/kg
SSL =	**Site-specific SSL =**	**0.0019**	**mg/kg**

Site-Specific SSL(s) for Bromodichloromethane

SSP Report

Radford Army Ammunition Plant, Radford, VA

Input Parameters Averaged from All Soil-Sample Physical Test Results

			units
	Dilution Factor =	20	--
T-RBC	GW Concentration Source=	0.00017	mg/L
C_w =	Target Leachate Conc =	0.0034	mg/L
θ_w =	Water-Filled Soil Porosity =	0.3	--
θ_a=	Air-Filled Soil Porosity =	0.134	--
H' =	Henry's Law Constant =	0.0656000	--
P_b =	Dry Soil Bulk Density =	1.5	kg/L
Koc=	Soil Organic Carbon/Water Partition Coefficient =	55	L/kg

SSL (mg/kg) = $C_w [K_d + (\theta_w + \theta_a H')/Pb]$

SWMU 57

foc =	Fraction Organic Carbon =	0.031	%
K_d =	Soil-Water Partition Coeff (K_{oc}*foc) =	1.705	L/kg
SSL =	**Site-specific SSL =**	**0.006**	**mg/kg**

Site-Specific SSL(s) for Chloroform

SSP Report

Radford Army Ammunition Plant, Radford, VA

Input Parameters Averaged from All Soil-Sample Physical Test Results

			units
	Dilution Factor =	20	--
T-RBC	GW Concentration Source=	0.00015	mg/L
C_w =	Target Leachate Conc =	0.003	mg/L
θ_w =	Water-Filled Soil Porosity =	0.3	--
θ_a=	Air-Filled Soil Porosity =	0.13	--
H' =	Henry's Law Constant =	0.1500000	--
P_b =	Dry Soil Bulk Density =	1.5	kg/L
Koc=	Soil Organic Carbon/Water Partition Coefficient =	39.8	L/kg

SSL (mg/kg) = $C_w [K_d + (\theta_w + \theta_a H')/Pb]$

SWMU 57

foc =	Fraction Organic Carbon =	0.031	%
K_d =	Soil-Water Partition Coeff (K_{oc}*foc) =	1.2338	L/kg
SSL =	**Site-specific SSL =**	**0.004**	**mg/kg**

Site-Specific SSL(s) for Methylene Chloride

SSP Report

Radford Army Ammunition Plant, Radford, VA

Input Parameters Averaged from All Soil-Sample Physical Test Results

			units
	Dilution Factor =	20	--
T-RBC	GW Concentration Source=	0.004	mg/L
C_w =	Target Leachate Conc =	0.08	mg/L
θ_w =	Water-Filled Soil Porosity =	0.3	--
θ_a=	Air-Filled Soil Porosity =	0.13	--
H' =	Henry's Law Constant =	0.0898000	--
P_b =	Dry Soil Bulk Density =	1.5	kg/L
Koc=	Soil Organic Carbon/Water Partition Coefficient =	11.7	L/kg

SSL (mg/kg) = $C_w [K_d + (\theta_w + \theta_a H')/Pb]$

SWMU 69

foc =	Fraction Organic Carbon =	0.034	%
K_d =	Soil-Water Partition Coeff (K_{oc}*foc) =	0.3978	L/kg
SSL =	**Site-specific SSL =**	**0.048**	**mg/kg**

Area A

foc =	Fraction Organic Carbon =	0.0305	%
K_d =	Soil-Water Partition Coeff (K_{oc}*foc) =	0.35685	L/kg
SSL =	**Site-specific SSL =**	**0.045**	**mg/kg**

APPENDIX G

IEUBK MODEL RESULTS – SWMU 13

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LEAD MODEL FOR WINDOWS Version 1.0

==========

Model Version: 1.0 Build 261
User Name:
Date:
Site Name:
Operable Unit:
Run Mode: Research

==========

The time step used in this model run: 1 - Every 4 Hours (6 times a day).

****** Air ******

Indoor Air Pb Concentration: 30.000 percent of outdoor.
Other Air Parameters:

Age	Time Outdoors (hours)	Ventilation Rate (m^3/day)	Lung Absorption (%)	Outdoor Air Pb Conc (ug Pb/m^3)
.5-1	1.000	2.000	32.000	0.100
1-2	2.000	3.000	32.000	0.100
2-3	3.000	5.000	32.000	0.100
3-4	4.000	5.000	32.000	0.100
4-5	4.000	5.000	32.000	0.100
5-6	4.000	7.000	32.000	0.100
6-7	4.000	7.000	32.000	0.100

****** Diet ******

Age	Diet Intake(ug/day)
.5-1	5.530
1-2	5.780
2-3	6.490
3-4	6.240
4-5	6.010
5-6	6.340
6-7	7.000

****** Drinking Water ******

Water Consumption:

Age	Water (L/day)
.5-1	0.200
1-2	0.500
2-3	0.520
3-4	0.530
4-5	0.550
5-6	0.580
6-7	0.590

Drinking Water Concentration: 4.000 ug Pb/L

****** Soil & Dust ******

Multiple Source Analysis Used
Average multiple source concentration: 5792.000 ug/g

Mass fraction of outdoor soil to indoor dust conversion factor: 0.700
Outdoor airborne lead to indoor household dust lead concentration: 100.000
Use alternate indoor dust Pb sources? No

Age	Soil (ug Pb/g)	House Dust (ug Pb/g)
.5-1	8260.000	5792.000

1-2	8260.000	5792.000
2-3	8260.000	5792.000
3-4	8260.000	5792.000
4-5	8260.000	5792.000
5-6	8260.000	5792.000
6-7	8260.000	5792.000

****** Alternate Intake ******

Age	Alternate (ug Pb/day)
.5-1	0.000
1-2	0.000
2-3	0.000
3-4	0.000
4-5	0.000
5-6	0.000
6-7	0.000

****** Maternal Contribution: Infant Model ******

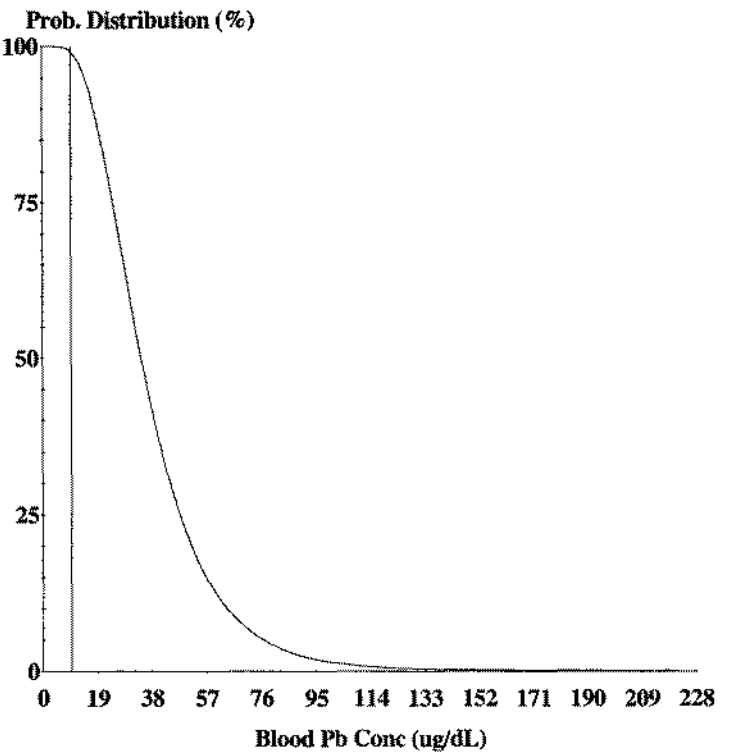
Maternal Blood Concentration: 2.500 ug Pb/dL

****
CALCULATED BLOOD LEAD AND LEAD UPTAKES:
****

Year	Air (ug/day)	Diet (ug/day)	Alternate (ug/day)	Water (ug/day)
.5-1	0.021	1.186	0.000	0.172
1-2	0.034	1.148	0.000	0.397
2-3	0.062	1.370	0.000	0.439
3-4	0.067	1.399	0.000	0.475
4-5	0.067	1.591	0.000	0.582
5-6	0.093	1.816	0.000	0.665
6-7	0.093	2.103	0.000	0.709

Year	Soil+Dust (ug/day)	Total (ug/day)	Blood (ug/dL)
.5-1	75.483	76.862	37.1
1-2	111.089	112.669	42.4
2-3	118.017	119.888	40.6
3-4	125.318	127.259	40.3
4-5	109.621	111.861	35.9
5-6	106.763	109.337	32.1
6-7	105.738	108.642	29.4

Environmental exposures associated with blood lead levels above 30 μg/dl are above the range of values that have been used in the calibration and empirical validation of this model. (Zaragoza, L. and Hogan, K. 1998. The Integrated Exposure Uptake Biokinetic Model for Lead In Children: Independent Validation and Verification. Environmental Health Perspectives 106 (supplement 6). p. 1555)



Cutoff = 10.000 ug/dl
Geo Mean = 35.994
GSD = 1.600
% Above = 99.679

Age Range = 0 to 84 months
Time Step = Every 4 Hours
Run Mode = Research

Environmental exposures associated with blood lead levels above 30 μg/dl are above the range of values that have been used in the calibration and empirical validation of this model. (Zaragoza, L. and Hogan, K. 1998. The Integrated Exposure Uptake Biokinetic Model for Lead In Children: Independent Validation and Verification. Environmental Health Perspectives 106 (supplement 6). p. 1555)

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APPENDIX H

IRON "MARGIN OF EXPOSURE" EVALUATION

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Table H.1
Iron "Margin of Exposure" Evaluation
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Surface Soil - Child Resident					
	Iron MDC (mg/kg)	Child Daily Intake Estimate* (mg/day)	RDA for Child 6 mths to 4 years Old	Child Daily Intake ** (mg/kg-day)	Provisional RfD (mg/kg-day)
SWMU 13 (soil)	36,200	7.0	10 mg/day	0.46	0.66
SWMU 13 (sediment)	34,600	6.6	10 mg/day	0.44	0.66
SWMU 37	19,500	3.7	10 mg/day	0.25	0.66
SWMU 38	30,700	5.9	10 mg/day	0.39	0.66
AOC Q	21,000	4.0	10 mg/day	0.27	0.66
SWMU 46	35,900	6.9	10 mg/day	0.46	0.66
SWMU 57	78,700	**15.1**	10 mg/day	**1.01**	0.66
SWMU 68	33,100	6.4	10 mg/day	0.42	0.66
SWMU 69	34,600	6.6	10 mg/day	0.44	0.66
AOC A	53,000	**10.2**	10 mg/day	**0.68**	0.66
AOC F	37,200	7.1	10 mg/day	0.48	0.66
Background Estimate	50,962	9.8	10 mg/day	0.65	0.66

Table H.1
Iron "Margin of Exposure" Evaluation
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Total Soil - Child Resident					
	Iron EPC (mg/kg)	Child Daily Intake Estimate* (mg/day)	RDA for Child 6 mths to 4 years Old	Child Daily Intake (mg/kg-day)	Provisional RfD (mg/kg-day)
SWMU 13 (soil)	33,700	6.5	10 mg/day	0.43	0.66
SWMU 13 (sediment)	--	**--**	10 mg/day	**--**	0.66
SWMU 37	24,500	4.7	10 mg/day	0.31	0.66
SWMU 38	30,100	5.8	10 mg/day	0.39	0.66
AOC Q	18,000	3.5	10 mg/day	0.23	0.66
SWMU 46	38,200	7.3	10 mg/day	0.49	0.66
SWMU 57	52,500	**10.1**	10 mg/day	**0.67**	0.66
SWMU 68	44,600	8.6	10 mg/day	0.57	0.66
SWMU 69	39,500	7.6	10 mg/day	0.51	0.66
AOC A	43,825	8.4	10 mg/day	0.56	0.66
AOC F	35,418	6.8	10 mg/day	0.45	0.66

* See Table H-2 for equations used to calculated daily intake estimates.

** Default weight of 15 kg used for child

Table H.2
Iron "Margin of Exposure" Evaluation
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation
Ingestion-Total Soil	Resident	Child	SWMU 40/71	AT-NC	Averaging Time (Non-Cancer)	2,190	days	USEPA, 1991a	
				CF1	Conversion Factor 1	1.00E-06	kg/mg	unit conversion	Chronic Daily Intake (mg/day) = $\frac{CS*IRS*EF*ED*FI*CF1}{BW*AT}$
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	MDC or EPC	
				ED	Exposure Duration	6	years	USEPA, 1991a	
				EF	Exposure Frequency	350	days/year	USEPA, 1991a	
				FI	Fraction Ingested	1	(unitless)		
				IRS	Ingestion Rate of Soil	200	mg/day	USEPA, 1991a	

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APPENDIX I

PRELIMINARY ECOLOGICAL EFFECTS EVALUATION

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APPENDIX I
PRELIMINARY ECOLOGICAL EFFECTS EVALUATION
SSP REPORT

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Table I-3 TRV-Based Soil Concentration Preliminary Ecological Effects Evaluation – Meadow Vole (*Microtus pennsylvanicus*)

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LIST OF ABBREVIATIONS AND ACRONYMS

%	Percent
ADD	Average Daily Dose
AF	Area Use Factor
BAF	Bioaccumulation Factor
BEF	Bioaccumulation Equivalency Factor
BSAF	Biota-Sediment Accumulation Factor
BW	Body Weight
C_{TRV}	NOAEL- or LOAEL-based TRV concentration
COPC	Chemical of Potential Concern
COPEC	Chemical of Potential Ecological Concern
DW:WW	Dry weight to wet weight
EF	Extrapolation Factor
HQ	Hazard Quotient
kg	Kilogram
LD_{50}	Lethal Dose to 50% of the test population
LOAEL	Low Observable Adverse Effects Level
mg	Milligram
mg/kg	Milligrams Per Kilogram
NOAEL	No Observable Adverse Effects Level
PAH	Polynuclear Aromatic Hydrocarbon
SLERA	Screening Level Ecological Risk Assessment
TCDD	2,3,7,8-tetrachlorodibenzo-p-dioxin
TEF	Toxicity Equivalence Factor
TEQ	Toxicity Equivalent
TOC	Total Organic Carbon
TRV	Toxicity Reference Value
UF	Uncertainty Factor
UF_{plant}	Plant Uptake Factor
USACHPPM	U.S. Army Center for Health Promotion and Preventive Medicine
USEPA	U.S. Environmental Protection Agency

1.0 INTRODUCTION

The purpose of this appendix is to present and describe development of exposure assessment models for the receptors presented in the Preliminary Ecological Effects Evaluation at the Radford Site. The following sections provide a detailed description of the dose rate modeling approach used in the report, methods used to verify dose rate model calculations, and parameters used in the models.

2.0 DOSE RATE MODELING APPROACH

A simplified food web model is utilized to calculate Toxicity Reference Values (TRVs) for each chemical and wildlife receptor. TRVs quantify COPC concentrations in exposure media that may result in no observable adverse effects levels (NOAELs) or low observable adverse effects levels (LOAELs). The NOAEL corresponds to the greatest exposure associated with no observed adverse effects on growth, reproduction, or survival. The LOAEL corresponds to the smallest exposure associated with observed adverse effects on growth, reproduction or survival. TRVs developed by dose rate models are used to evaluate ecological effects associated with COPEC concentrations in exposure media. The NOAEL- and LOAEL- based substrate concentrations are presented in Tables I-1 through I-8. Derivations of the refined values, using less conservative assumptions, are presented in Tables I-9 through I-15.

2.1 Dose Rate Model

The simplified food web model considers the ingestion of prey and the incidental ingestion of media, the primary routes of exposure to wildlife receptors. Chemical concentrations in prey are expressed as a function of chemical concentrations in exposure media using bioaccumulation factors (BAFs) for terrestrial prey items and biota-sediment accumulation factors (BSAF) for aquatic prey items. Other important parameters in the model include, receptor body weight and an estimate of receptor use. As shown in the equation below, literature-derived NOAEL and LOAEL values are input into the model as the average daily dose (ADD) variable to calculate the concentration in exposure media (C_{TRV}) that would result in a dose equivalent to a NOAEL or LOAEL.

$$C_{TRV} = \frac{(ADD_i) \times BW_i}{(IR_{food} \sum (B[S]AF_{food_i} \times DF) + (IR_s)) \times AF}$$

where:

C_{TRV}	= NOAEL- or LOAEL-based TRV concentration, dry weight (mg/kg)
ADD_i	= NOAEL or LOAEL (mg COPC/kg body weight-day)
BW	= Body Weight of the receptor, wet weight (kg)
IR_{food}	= Ingestion Rate of food (kg food ingested per day, wet weight)
$B(S)AF_{foodi}$	= Bioaccumulation Factor (BAF) or Biota-Sediment Accumulation Factor (BSAF), specific to prey type and COPC (ratio of mg of COPC/kg fauna, wet weight to mg COPC/ kg substrate, dry weight)
DF_i	= Dietary Fraction (proportion of food type in the diet)

IR_s = Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)

AF = Area Use Factor includes seasonal use rates, area use rates, COPC assimilation rate

2.2 Model Verification

The model was verified by transforming the above equation to solve for ADD_i and substituting the NOAEL and LOAEL-based TRVs derived above. The transformed equation is follows:

$$ADD_i = \frac{(IR_s \times C_{TRV} \times AF) + IR_{food} \sum (C_{food_i} \times df_i \times AF)}{BW}$$

The model was verified if the resulting dose (ADD_i) was equal to the literature-derived NOAEL or LOAEL used in the model. An HQ equal to 1.0 indicates a verified model.

2.3 Model Parameters

The model includes parameters relating to receptor-specific exposure, COPC toxicity, and bioaccumulation rates. The following sections describe the estimation of these parameters and major assumptions of parameterization.

2.3.1 Receptor-Specific Exposure Parameters

Wildlife receptors selected to characterize exposure from the Radford site include:

- Herbivorous mammals: meadow vole (*Microtus pennsylvanicus*);
- Invertivorous mammals: short-tailed shrew (*Blarina brevicauda*);
- Invertivorous birds: American robin (*Turdus migratorius*);
- Carnivorous birds: red-tailed hawk (*Buteo jamaicensis*);
- Aquatic omnivorous birds: mallard duck (*Anas platyrhynchos*);
- Carnivorous mammals: red fox (*Vulpes vulpes*);
- Semi-aquatic omnivorous mammals: raccoon (*Procyon lotor*); and
- Piscivorous birds: belted kingfisher (*Ceryle alcyon*).

Exposure parameters used to derive TRV-based substrate concentrations for each receptor include body weight (kg, wet weight), food ingestion rate (kg wet weight/day), diet composition, incidental substrate ingestion rate (kg dry weight/day), and area use factor. Both preliminary and refinement level exposure parameters are presented in Table I-16.

2.3.2 Literature-Based NOAEL and LOAEL Values

The dose-response relationships for chemicals of potential interest are expressed as NOAELs and LOAELs for wildlife receptors, which are defined as a daily ingested amount (mg/kg body weight-day) that is associated with a specified effect. This process involves the determination of a "test species dose" for a critical endpoint from a particular experimental combination of exposure concentration, exposure duration, test species, and chemical. Endpoints may be based on growth, reproductive, developmental, and survival effects. Such effects are important because they may affect the abundance or reproductive success of receptor populations. The

test-species dose from the selected study is then modified using extrapolation and uncertainty factors (EFs and UFs).

For this evaluation, EFs and UFs are used to modify laboratory study results, based on the methodology of Sample et al. (1996). This process involves the determination of a "test species dose" for a critical endpoint from a particular experimental combination of exposure concentration, exposure duration, test species, and chemical. The test-species dose from the selected study is then modified to account for the various extrapolations and uncertainties inherent in applying results from a controlled setting to an ecologically relevant setting, as in:

$$\text{NOAEL or LOAEL} = \frac{\text{Test-Species Dose}}{\text{Duration UF} \times \text{Endpoint UF}} \times \text{Body-Weight EF}$$

Extrapolation and uncertainty factors are based on: (1) the duration of exposure, (2) the endpoint measured, and (3) differences in body weights among test and receptor species (Calabrese and Baldwin 1993, Ford et al. 1992, Opresko et al. 1994, Sample et al. 1996, USEPA 1996, Wentsel et al. 1994). Extrapolation and uncertainty factors derivation and use is described in the following subsections. The use of surrogate chemical data is also discussed. NOAEL and LOAELs for COPCs are summarized in Table I-17.

The Test-Species Dose

Critical toxicological values are identified from carefully qualified primary and secondary literature references. The selection of particular studies and endpoints used for the derivation of NOAELs and LOAELs is based on the evaluation of the applicable studies and the dose-response data contained therein. In cases where preferred toxicological endpoints are not available, other toxicity values are used, but additional uncertainty factors may be incorporated. All toxicological values chosen for NOAEL and LOAEL derivation are presented on a mg chemical per kg body weight per day (mg/kg BW-day) basis. These units allow comparisons among organisms of different body sizes (Sample et al. 1996).

Duration Uncertainty Factors

Exposure durations of interest include (1) chronic, (2) subchronic, and (3) acute. Chronic studies occur over the lifetime or a majority of the lifespan of the test organism, generally longer than one year for mammals and 10 weeks for birds. Additionally, studies in which the test organism is dosed during a critical life stage (e.g., gestation) are included with chronic duration studies. Subchronic studies include exposures of two weeks to one year in duration that do not occur during a critical life stage. Acute studies typically have exposures of less than two weeks. NOAELs and LOAELs are usually reported from chronic and subchronic studies, with acute studies often reporting LD_{50} levels (LD_{50}; doses corresponding to the overt expression of a serious adverse effect such as mortality in 50% of test animals). Test-species doses from chronic studies are used preferentially over data from acute and subchronic studies. In cases where chronic data are not available as test-species doses, studies involving less-than-chronic exposures are used to in NOAEL and LOAEL derivation with the addition of a duration uncertainty factor.

For this study, duration uncertainty factors are applied according to USACHPPM (2000):

- Subchronic NOAEL to Chronic NOAEL: 10
- Subchronic LOAEL to Chronic NOAEL: 20
- Subchronic LOAEL to Chronic LOAEL: 4

- Acute NOAEL to Chronic NOAEL: 30
- Acute LOAEL to Chronic NOAEL: 50
- Acute LOAEL to Chronic LOAEL: 10

Endpoint Uncertainty Factors

Additional uncertainty factors are used to account for uncertainties in extrapolation between effect- and no-effect levels. Specifically, a NOAEL test-species dose may be estimated from a LOAEL (or LD_{50}) value, or a LOAEL may be estimated from a LD_{50}.

Extrapolation from a LOAEL or LD_{50t} to a NOAEL: Consistent with USACHPPM (2000), an uncertainty factor of 10 is used with chronic LOAEL values to estimate the chronic NOAEL, which is considered conservative (Sample et al. 1996, USEPA 1996). When a LOAEL value is not available, a LD_{50} is used, although chronic NOAELs may range from 1/10 to 1/10,000 of the corresponding acute LD_{50} value (Opresko et al. 1994). For this report, an uncertainty factor of 100 is used to estimate a NOAEL value from a LD_{50} value (USACHPPM 2000).

Extrapolation from an LD_{50} to a LOAEL: Consistent with USACHPPM (2000), an UF of 20 is used conservatively to estimate a LOAEL value from a LD_{50} value (USACHPPM 2000).

Body-Weight Extrapolation Factor

This extrapolation is accomplished using a body weight-scaling factor to account for differences in body size (Sample et al. 1996). Numerous studies have shown that many physiological functions such as metabolic rates and responses to chemicals are a function of body size for mammals. Smaller mammals have higher metabolic rates and are usually more resistant to chemicals because of more rapid rates of detoxification. It has been shown that the best measure of body size is one based on body surface-area, which can be expressed in terms of body weight raised to a fractional power (Opresko et al. 1994, Sample et al. 1996, USEPA 1980). Dosimetric differences between the mammalian test species and wildlife receptors are accounted for using:

$$NOAEL_w = NOAEL_t \times \left(\frac{BW_t}{BW_w} \right)^{0.25}$$

where:

$NOAEL_w$ = NOAEL for the mammalian wildlife receptor (mg/kg BW-day)

$NOAEL_t$ = NOAEL for the mammalian test species (mg/kg BW-day)

BW_t = Test species body weight (kg)

BW_w = Wildlife receptor body weight (kg)

Scaling factors may not be appropriate for avian interspecies extrapolations. Information has shown that adjustment factors based on body size for interspecies extrapolation among avian species range from 0.63 to 1.55 (Sample et al. 1996). Therefore, a body-weight extrapolation factor is not used to derive avian NOAELs and LOAELs.

Mammalian wildlife receptor body weights, laboratory test species body weights, and body-weight extrapolation factors are presented in Table I-18.

2.3.3 Bioaccumulation Factors (BAFs)

BAFs provide quantitative indicators of the tendency for a chemical to partition into terrestrial organisms, relative to the concentrations present in terrestrial exposure media. Exposure-point concentrations of chemicals in terrestrial prey (soil invertebrates and small mammals) and terrestrial plants are estimated using BAFs derived from the literature. The derivation of BAFs is described for organic and inorganic chemicals in the following subsections.

Terrestrial Prey

Organic Chemicals: BAFs for estimating concentrations of organic chemicals in prey tissues are derived from linear regression equations presented in Travis and Arms (1998) and Beyer and Stafford (1993). The dry weight to wet weight (DW:WW) conversion factor is 0.2 for soil invertebrates (kg soil invertebrate dry weight per soil invertebrate wet weight; assumes invertebrates are 80% water), based on data reported in USEPA (1993). No DW:WW conversion factor was applied for small mammals. The BAF values used in to estimate concentrations of organic chemicals in soil invertebrates and small mammals are shown in Table I-19.

Inorganic Chemicals: Inorganic bioaccumulation factors for terrestrial prey (Table I-19) are wet-weight-based and are used to predict concentrations in invertebrates and small mammals according to:

$$C_{si} = BAF_{si} \times C_{soil}$$

where:

C_{si} = Chemical concentration predicted in soil invertebrates (mg chemical / kg soil invertebrate, wet weight)

BAF_{si} = Soil invertebrate uptake factor for inorganic chemicals (kg soil, dry weight / kg soil invertebrate, wet weight)

C_{soil} = Concentration of inorganic chemical in soil (mg chemical / kg soil, dry weight)

Terrestrial Plants

Exposure-point concentrations of chemicals in terrestrial plants are estimated using soil-to-plant bioaccumulation factors (uptake factors for plants, UF_{plant}) derived from the literature. UF_{plant} values are used to estimate wet-weight chemical concentrations in terrestrial plants using the same equation for invertebrates and a dry weight to wet weight conversion factor assuming plants are 80% water (Salisbury and Ross 1992). Table I-19 presents the uptake factors for plants.

Organic Chemicals: Organic chemicals may enter the plant by partitioning from contaminated soil to the roots and then translocating throughout the plant via the xylem tissue. Most bioaccumulative, lipophilic organic chemicals partition to the epidermis of the root or adhere to soil particles and are not drawn into the inner root or xylem (Paterson et al. 1990). Uptake factors for estimating concentrations of organic chemicals in plant tissues are derived from the following equation:

$$UF_{plant} = 10^{[1.588-(0.578\times \log K_{ow})]}$$

where:

UF_{plant} = Plant uptake factor (kg soil, dry weight / kg plant, dry weight)

Log K_{ow} = Logarithm of the octanol:water partition coefficient

This relationship is based on a linear regression of bioaccumulation factors for 29 organic chemicals (Travis and Arms 1988). The correlation coefficient for the regression is 0.73, indicating that a majority of the variability in bioaccumulation is explained by the log K_{ow}. UF_{plant} values are derived for organic chemicals using this equation.

Inorganic Chemicals: Concentrations of inorganic chemicals in plant tissues are estimated based on generalized soil-to-plant transfer coefficients reported in a literature review. The soil-to-plant transfer factors for inorganic chemicals are equivalent to UF_{plant} values for organic chemicals and represent the ratio of the dry weight concentrations in plant tissue to the dry weight concentration of the element in root-zone soils.

2.3.4 Biota-Sediment Accumulation Factors (BSAFs)

Exposure-point concentrations in aquatic prey are estimated using biota–sediment accumulation factors (BSAFs). BSAFs provide quantitative indicators of the tendency for a chemical to partition into organisms, relative to the concentrations present in sediment. In the process of developing sediment quality criteria for the protection of benthic organisms, the USEPA evaluated potential differences in chemical exposure in benthic invertebrates and benthically-coupled fish of dissimilar habitats and feeding guilds. The USEPA concluded that estimated BSAF values for various species both within and among various habitat were similar, and that total exposure is similar across species (Tracey and Hansen 1996; USEPA 1997).

As described in the text portion of the document, site-specific BSAFs were derived for benthic invertebrates and forage fish. They were used to estimate chemical concentrations in these organisms, which are potential food for aquatic invertivorous and piscivorous wildlife receptors. Table I-20 present the data and BSAFs used in the model.

The derivation of BSAFs is described for inorganic chemicals in the following subsection.

Organic Chemicals

The partitioning of hydrophobic organic chemicals between sediment and aquatic organisms is controlled primarily by the organic carbon content of the sediment, the lipid content of the organism, and chemical-specific factors. Where possible, empirical data from the scientific literature are used to account for chemical-specific factors that influence partitioning between organic carbon in sediment and lipids in aquatic organisms. BSAFs are normalized to organic carbon content and to lipid content, to allow comparisons among different types of sediments and organisms. A 1% TOC was used as a default value. Specifically, BSAFs are expressed as the ratio of the lipid-normalized concentration in organisms to the organic-carbon-normalized concentration in sediment:

$$BSAF = \frac{C_{organism} / f_{lipid}}{C_{sediment} / f_{oc}}$$

where:

BSAF = Biota–sediment accumulation factor for aquatic biota (kg organic carbon / kg lipid)

$C_{organism}$ = Concentration of chemical in aquatic biota (mg chemical / kg organism, dry weight)

f_{lipid} = Fraction of lipid in an organism (kg lipid / kg benthic invertebrate or fish, dry weight)

$C_{sediment}$ = Concentration of chemical in sediment (mg chemical / kg sediment, dry weight)

f_{oc} = Fraction organic carbon in sediment (kg organic carbon / kg sediment, dry weight)

The literature was reviewed to identify studies that measured chemical accumulation from field-collected sediment, and reported the organic carbon and lipid concentrations necessary for BSAF normalization. Studies measuring accumulation from "spiked" sediment were not used, as these studies may overestimate chemical bioavailability by failing to allow sufficient time for equilibration between the dissolved and sediment-adsorbed fractions of the chemical (McFarland et al. 1994).

Tracey and Hansen (1996) reviewed the literature related to the bioaccumulation of PAHs in benthic invertebrates (Ankley et al., 1990; Ferraro et al., 1990, 1991; NOAA, 1989, 1991; USEPA, 1990). Tracey and Hansen (1996) developed a distribution of BSAFs based on 843 values for six freshwater and saltwater species (*Crassostrea virginica, Lumbriculus variagatus, Macoma nasuta, Mercenaria mercenaria, Mytilus edulis,* and *Rangia cuneata*). The median value for all PAHs (0.29 kg organic carbon / kg lipid) is used to predict the concentration of PAHs in benthic invertebrates and fish (USEPA, 1997).

Organic carbon- and lipid-normalized BSAFs may be used to predict wet-weight concentrations in benthic invertebrates or fish by applying an assumed dry-weight organic carbon concentration of 14.3%, estimated lipid concentrations, and dry-weight-to-wet-weight conversion factors according to:

$$C_{organism} = BSAF \times \frac{C_{sediment}}{f_{oc}} \times f_{lipid} \times (DW:WW)$$

where:

$C_{organism}$ = Chemical concentration predicted in aquatic biota (mg chemical / kg benthic invertebrate or fish, wet weight)

BSAF = Organic carbon- and lipid-normalized BSAF (kg organic carbon / kg lipid)

f_{lipid} = Fraction of lipid in an organism (kg lipid per kg benthic invertebrate or fish, dry weight)

f_{oc} = Site-specific fraction of organic carbon in sediment (kg organic carbon/ kg sediment, dry weight)

(DW:WW) = Dry-weight-to-wet-weight conversion factor (kg organism dry weight per kg organism wet weight)

Estimated dry-weight lipid content is assumed to be 1% for benthic invertebrates (Connell et al., 1988; Markwell et al., 1989; Oliver, 1984, 1987) and 6.3% for prey fish (USEPA 1997). The DW:WW conversion factor is 0.13 for benthic invertebrates (kg benthic invertebrate dry weight per kg benthic invertebrate wet weight; =87% moisture) and 0.25 for forage fish (kg fish dry weight per kg fish wet weight; =75% moisture), based on data reported in Markwell et al. (1989) and USEPA (1993). The wet-weight BSAF values used in to estimate concentrations of organic chemicals in benthic invertebrates and fish are shown in Table I-20.

Inorganic Chemicals

BSAF values for the estimation of concentrations of inorganic chemicals in benthic invertebrates and fish/amphibians were obtained from published scientific literature. A study conducted in Lake Ontario derived BSAF values for the freshwater shrimp *Mysis relicta* (Song and Breslin 1999). The shrimp is omnivorous, feeding on a wide range of foods including detritus, plants and invertebrates, as well as sediment particles. The BSAFs derived for the shrimp are applied in this assessment due to the study type, study location and food web applications. Normalizing factors to facilitate the comparability of these BSAFs to the wetland area are not available for inorganic chemicals, as the factors that interact to determine bioavailability are more complex for inorganic chemicals than for hydrophobic organic chemicals (Anderson et al. 1987). Therefore, BSAF values derived for the shrimp are directly applied to all aquatic prey. If BSAFs are not available from the literature, the BSAF value is conservatively assumed to be equivalent to cadmium or zinc.

3.0 TOXICITY EQUIVALENTS APPROACH

Dioxin/Furan COPECs represent a group of 17 polychlorinated dioxin/furan congeners of 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD). These congeners induce toxicity by binding to the aryl hydrocarbon (Ah) receptor, a cellular protein. All congeners are not equally toxic relative to TCDD (USEPA 1999). Therefore, the toxicity of each congener relative to TCDD is expressed in terms of a Toxicity Equivalency Factor (TEFs) established for mammals, birds, and fish (Appendix C; Van den Berg 1998). The aggregate toxicity of a mixture of dioxins/furans in an exposure medium is expressed as TCDD-equivalents ($TEQ_{2,3,7,8\ TCCD}$), which are calculated as the TEF-weighted sum of the average daily dose (ADD_i) of the 17 congeners. $TEQ_{2,3,7,8\ TCCD}$ is calculated as follows:

$$TEQ_{2,3,7,8TCDD} = \sum_{i=1}^{17} ADD_i \times TEF_i$$

ADD_i represents the daily amount of the *i*th congener ingested by a wildlife receptor. ADDs are calculated in dose rate models using (1) exposure-point concentrations for prey and media, and (2) receptor-specific exposure parameters. The ADD is calculated, for "n" food types, as follows (Sample et al. 1996):

$$ADD_i = \frac{(IR_s \times AF \times C_{TRV}) + IR_{food} \sum (C_{food_n} \times AF \times DF_n)}{BW}$$

where:

ADD_i = Average daily dose of the *i*th congener to a receptor (pg of the *i*th congener ingested per kg body weight per day);

IR_s = Ingestion rate of substrate (kg substrate dry weight ingested per day);
C_{TRV} = Concentration of the *i*th congener in soil (pg of the *i*th congener/kg soil dry weight);
AF = Area Use Factor;
IR_{food} = Ingestion rate of food (kg food wet weight ingested per day);
C_{food_n} = Concentration of the *i*th congener in food type "n" (pg of the *i*th congener/kg food wet weight);
DF = Dietary fraction (proportion in the diet) of food type "n" (unitless); and
BW = Body weight of the receptor (kg, wet weight).

The concentration of the *i*th congener in food (C_{food_n}) is estimated using a bioaccumulation factor (BAF) representing observed or predicted ratios between chemical concentrations in prey and soil. BAFs of individual dioxin/furan congeners vary relative to the bioaccumulation potential of TCDD. To account for this variation in the dose rate model, bioaccumulation equivalency factors (BEFs) are multiplied to the bioaccumulation factor (BAF) established for TCDD (Table I-21; USEPA 1999). The concentration of the *i*th congener in food is calculated as follows:

$$C_{food_n} = (BAF_{2,3,7,8\ TCDD} \times BEF_i) \times C_s$$

where:

C_{food_n} = Concentration of the *i*th congener predicted in prey (pg of the *i*th/kg food, wet weight);

$BAF_{2,3,7,8\ TCDD}$ = Bioaccumulation factor, specific to prey type (plant, invertebrate, or small mammal) and the *i*th congener (kg soil, dry weight/kg food, wet weight);

BEF_i = Bioaccumulation equivalency factor for the *i*th congener; and

C_s = Maximum concentration of the *i*th congener in soil (pg of the *i*th congener/kg soil, dry weight).

Other model parameters used in the preliminary exposure estimate of $TEQ_{2,3,7,8\ TCCD}$ were based on the following conservative assumptions:

- Receptors consume the maximum concentrations of each individual congener detected in prey and soil from each SWMU without regard to sample location;
- Receptors assimilate 100% of the maximum concentrations of each congener detected in prey and soil; and
- Receptors forage 100% of the time on terrestrial prey within each SWMU.

Determining the aggregate toxicity of the 17 dioxin/furan congeners in terms of $TEQ_{2,3,7,8\ TCCD}$ enables direct comparison to toxicological benchmarks developed for 2,3,7,8 TCDD (USEPA 1999). Therefore, NOAELs and LOAELs derived in the literature are used for direct evaluation of ecological effects resulting from $TEQ_{2,3,7,8\ TCCD}$ exposure.

The $TEQ_{2,3,7,8\ TCCD}$ determined for each wildlife receptor is provided in Table I-22.

4.0 SUMMARY

This appendix describes the dose rate modeling approach used to evaluate the potential mobility of COPCs through varying trophic associations. The simplified food web model considers the ingestion of prey and the incidental ingestion of media, the primary route of exposure to wildlife receptors. COPC concentrations in prey and media, receptor-specific exposure parameters, literature-based NOAEL and LOAEL values, and bioaccumulation factors are used in the model to calculate the concentration in exposure media (C_{TRV}) that would result in a dose equivalent to a NOAEL or LOAEL.

Receptor-specific exposure parameters are obtained from life history studies found in the literature. Important receptor-specific exposure parameters input into the model include: body weight, food ingestion rate, diet composition, incidental substrate ingestion rate, and area use factor.

The dose-response relationships for chemicals of potential interest are expressed as NOAELs and LOAELs for wildlife receptors, which are defined as a daily ingested amount (mg COPC/kg body weight-day) that is associated with a specified growth, reproductive, developmental, or survival effect. Extrapolation and uncertainty factors are applied to literature-based toxicological endpoints to account for differences in a controlled laboratory setting and an ecologically relevant setting. Extrapolation and uncertainty factors are based on: (1) the duration of exposure, (2) the endpoint measured, and (3) differences in body weights among test and receptor species.

Bioaccumulation and Biota-sediment accumulation factors (BAFs and BSAFs) provide quantitative indicators of the tendency for a chemical to partition into organisms, relative to the concentrations present in exposure media. Exposure-point concentrations of chemicals in terrestrial prey (soil invertebrates and small mammals) are estimated using several BAFs derived from the literature. BSAFs are used to calculated exposure point concentrations of chemicals in aquatic prey.

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Table I-1
TRV-Based Soil Concentration
Preliminary Ecological Effects Evaluation
American Robin (*Turdus migratorius*)
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	NOAEL						LOAEL					
	Calculated NOAEL-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b] (mg/kg bw-day)			NOAEL (mg/kg bw-day)	HQ[c]	Calculated TRV-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b] (mg/kg bw-day)			LOAEL (mg/kg bw-day)	HQ[c]
		Food	Substrate	Total Dose				Food	Substrate	Total Dose		
Metals												
ARSENIC	1.39E+01	4.80E+00	3.42E-01	5.14E+00	5.14E+00	1.00	3.46E+01	1.20E+01	8.55E-01	1.28E+01	1.28E+01	1.00
CADMIUM	6.75E-01	1.43E+00	1.70E-02	1.45E+00	1.45E+00	1.00	9.31E+00	1.98E+01	2.30E-01	2.00E+01	2.00E+01	1.00
CHROMIUM	5.27E+00	8.70E-01	1.30E-01	1.00E+00	1.00E+00	1.00	2.64E+01	4.35E+00	6.50E-01	5.00E+00	5.00E+00	1.00
COPPER	1.38E+02	4.36E+01	3.42E+00	4.70E+01	4.70E+01	1.00	1.82E+02	5.72E+01	4.49E+00	6.17E+01	6.17E+01	1.00
LEAD	5.18E+00	1.00E+00	1.28E-01	1.13E+00	1.13E+00	1.00	5.18E+01	1.00E+01	1.28E+00	1.13E+01	1.13E+01	1.00
MERCURY	6.08E-01	4.35E-01	1.50E-02	4.50E-01	4.50E-01	1.00	1.22E+00	8.70E-01	3.00E-02	9.00E-01	9.00E-01	1.00
NICKEL	3.86E+02	6.79E+01	9.52E+00	7.74E+01	7.74E+01	1.00	5.33E+02	9.38E+01	1.32E+01	1.07E+02	1.07E+02	1.00
SELENIUM	3.13E-01	3.92E-01	8.00E-03	4.00E-01	4.00E-01	1.00	6.27E-01	7.85E-01	1.50E-02	8.00E-01	8.00E-01	1.00
SILVER	2.31E+01	1.60E+01	5.70E-01	1.66E+01	1.66E+01	1.00	1.73E+02	1.20E+02	4.28E+00	1.24E+02	1.24E+02	1.00
ZINC	1.40E+01	1.42E+01	3.45E-01	1.45E+01	1.45E+01	1.00	1.26E+02	1.28E+02	3.12E+00	1.31E+02	1.31E+02	1.00
Pesticides												
ALDRIN	NC	NC	NC	NC	--	--	NC	NC	NC	NC	--	--
DELTA-BHC	2.85E-01	5.53E-01	7.04E-03	5.60E-01	5.60E-01	1.00	1.15E+00	2.22E+00	2.83E-02	2.25E+00	2.25E+00	1.00
DIELDRIN	4.39E-02	7.59E-02	1.08E-03	7.70E-02	7.70E-02	1.00	4.39E-01	7.59E-01	1.08E-02	7.70E-01	7.70E-01	1.00
PCBs												
AROCLOR 1254	8.69E-03	1.80E-01	2.14E-04	1.80E-01	1.80E-01	1.00	8.69E-02	1.80E+00	2.14E-03	1.80E+00	1.80E+00	1.00
SVOCs/PAHs												
ACENAPHTHENE	5.84E+00	8.66E-01	1.44E-01	1.01E+00	1.01E+00	1.00	2.92E+01	4.33E+00	7.21E-01	5.05E+00	5.05E+00	1.00
ACENAPHTHYLENE	NC	NC	NC	NC	--	--	NC	NC	NC	NC	--	--
ANTHRACENE	NC	NC	NC	NC	--	--	NC	NC	NC	NC	--	--
BENZO(A)ANTHRACENE	NC	NC	NC	NC	--	--	NC	NC	NC	NC	--	--
BENZO(A)PYRENE	3.56E+00	4.12E-01	8.77E-02	5.00E-01	5.00E-01	1.00	1.78E+01	2.06E+00	4.39E-01	2.50E+00	2.50E+00	1.00
BENZO(B)FLUORANTHENE	NC	NC	NC	NC	--	--	NC	NC	NC	NC	--	--
BENZO(G,H,I)PERYLENE	NC	NC	NC	NC	--	--	NC	NC	NC	NC	--	--
BENZO(K)FLUORANTHENE	NC	NC	NC	NC	--	--	NC	NC	NC	NC	--	--
CHRYSENE	NC	NC	NC	NC	--	--	NC	NC	NC	NC	--	--
DIBENZO(A,H)ANTHRACENE	NC	NC	NC	NC	--	--	NC	NC	NC	NC	--	--
FLUORANTHENE	NC	NC	NC	NC	--	--	NC	NC	NC	NC	--	--
FLUORENE	6.55E+00	8.48E-01	1.62E-01	1.01E+00	1.01E+00	1.00	3.28E+01	4.24E+00	8.08E-01	5.05E+00	5.05E+00	1.00
INDENO(1,2,3-CD)PYRENE	NC	NC	NC	NC	--	--	NC	NC	NC	NC	--	--
NAPHTHALENE	4.07E+02	6.99E+01	1.01E+01	8.00E+01	8.00E+01	1.00	4.07E+03	6.99E+02	1.01E+02	8.00E+02	8.00E+02	1.00
PENTACHLOROPHENOL	NC	NC	NC	NC	--	--	NC	NC	NC	NC	--	--
PHENANTHRENE	8.17E+00	9.28E-01	2.02E-01	1.13E+00	1.13E+00	1.00	4.08E+01	4.64E+00	1.01E+00	5.65E+00	5.65E+00	1.00
PYRENE	NC	NC	NC	NC	--	--	NC	NC	NC	NC	--	--

Notes:

[a] = The following equation was used to calculate NOAEL- and LOAEL-based soil concentrations:

$$C_{TRV} = \frac{(ADD_i) \times BW_i}{(IR_{food} \sum (BAF_{food_i} \times DF) + (IR_s)) \times AF}$$

C_{TRV}-Based Sediment Concentration (mg chemical / kg sediment, dry weight);
ADD= NOAEL or LOAEL (mg chemical/kg body weight-day);
BW = Body Weight of the receptor (kg);
IR_{food} = Ingestion Rate of food (kg food ingested per day, wet weight);
BAF_{foodi} = Bioconcentration factor, specific to prey type and chemical (ratio of mg of chemical/kg fauna, wet weight to mg chemical/ kg sediment, dry weight);
DF_i = Dietary fraction (proportion of food type in the diet);
IR_s = Incidental Ingestion Rate of sediment (kg sediment ingested per day, dry weight); and
AF = 100% Area Use Factor includes season use rates, area use rates, chemical assimilation rate.

NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
mg/kg = Milligram Per Kilogram
bw - day = Body Weight - Day
HQ = Hazard Quotient
TRV = Toxicity Reference Value
SVOC = Semivolatile Organic Compound
PCB = Polychlorinated Biphenyls
NC = Not Calculated

[b] = Receptor doses were determined in order to verify equation calculations for the TRV-Based soil concentrations.
Receptor doses were calculated using species information (Table C-15).
Food dose = (COPEC concentration in prey * % of food type ingested * seasonal and area use factor * receptor ingestion rate for food) / receptor body weight
Receptors prey are based on conservative diet assumptions in Table C-15.
Substrate Dose = (COPEC concentration in soil * receptor ingestion rate for substrate) / receptor body weight
Total Dose = Food Dose + Substrate Dose

[c] = HQ = Total Dose / TRV is used to verify equation calculations.

Table I-2
TRV-Based Soil Concentration
Preliminary Ecological Effects Evaluation
Red-tailed Hawk (*Buteo jamaicensis*)
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	NOAEL						LOAEL					
	Calculated NOAEL-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b] (mg/kg bw-day)			NOAEL (mg/kg bw-day)	HQ[c]	Calculated TRV-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b] (mg/kg bw-day)			LOAEL (mg/kg bw-day)	HQ[c]
		Food	Substrate	Total Dose				Food	Substrate	Total Dose		
Metals												
ARSENIC	3.89E+02	5.14E+00	0.00E+00	5.14E+00	5.14E+00	1.00	9.71E+02	1.28E+01	0.00E+00	1.28E+01	1.28E+01	1.00
CADMIUM	3.91E+02	1.45E+00	0.00E+00	1.45E+00	1.45E+00	1.00	5.40E+03	2.00E+01	0.00E+00	2.00E+01	2.00E+01	1.00
CHROMIUM	2.70E+01	1.00E+00	0.00E+00	1.00E+00	1.00E+00	1.00	1.35E+02	5.00E+00	0.00E+00	5.00E+00	5.00E+00	1.00
COPPER	7.11E+02	4.70E+01	0.00E+00	4.70E+01	4.70E+01	1.00	9.33E+02	6.17E+01	0.00E+00	6.17E+01	6.17E+01	1.00
LEAD	5.69E+02	1.13E+00	0.00E+00	1.13E+00	1.13E+00	1.00	5.69E+03	1.13E+01	0.00E+00	1.13E+01	1.13E+01	1.00
MERCURY	2.62E-01	4.50E-01	0.00E+00	4.50E-01	4.50E-01	1.00	5.23E-01	9.00E-01	0.00E+00	9.00E-01	9.00E-01	1.00
NICKEL	1.95E+03	7.74E+01	0.00E+00	7.74E+01	7.74E+01	1.00	2.70E+03	1.07E+02	0.00E+00	1.07E+02	1.07E+02	1.00
SELENIUM	4.03E+00	4.00E-01	0.00E+00	4.00E-01	4.00E-01	1.00	8.06E+00	8.00E-01	0.00E+00	8.00E-01	8.00E-01	1.00
SILVER	8.34E+02	1.66E+01	0.00E+00	1.66E+01	1.66E+01	1.00	6.26E+03	1.24E+02	0.00E+00	1.24E+02	1.24E+02	1.00
ZINC	2.19E+01	1.45E+01	0.00E+00	1.45E+01	1.45E+01	1.00	1.98E+02	1.31E+02	0.00E+00	1.31E+02	1.31E+02	1.00
Pesticides												
ALDRIN	NC	NC	NC	NC	--	--	NC	NC	NC	NC	--	--
DELTA-BHC	2.23E+04	5.60E-01	0.00E+00	5.60E-01	5.60E-01	1.00	8.94E+04	2.25E+00	0.00E+00	2.25E+00	2.25E+00	1.00
DIELDRIN	8.24E+00	7.70E-02	0.00E+00	7.70E-02	7.70E-02	1.00	8.24E+01	7.70E-01	0.00E+00	7.70E-01	7.70E-01	1.00
PCBs												
AROCLOR 1254	1.53E+00	1.80E-01	0.00E+00	1.80E-01	1.80E-01	1.00	1.53E+01	1.80E+00	0.00E+00	1.80E+00	1.80E+00	1.00
SVOCs/PAHs												
ACENAPHTHENE	3.05E+03	1.01E+00	0.00E+00	1.01E+00	1.01E+00	1.00	1.52E+04	5.05E+00	0.00E+00	5.05E+00	5.05E+00	1.00
ACENAPHTHYLENE	NC	NC	NC	NC	--	--	NC	NC	NC	NC	--	--
ANTHRACENE	NC	NC	NC	NC	--	--	NC	NC	NC	NC	--	--
BENZO(A)ANTHRACENE	NC	NC	NC	NC	--	--	NC	NC	NC	NC	--	--
BENZO(A)PYRENE	9.73E+00	5.00E-01	0.00E+00	5.00E-01	5.00E-01	1.00	4.87E+01	2.50E+00	0.00E+00	2.50E+00	2.50E+00	1.00
BENZO(B)FLUORANTHENE	NC	NC	NC	NC	--	--	NC	NC	NC	NC	--	--
BENZO(G,H,I)PERYLENE	NC	NC	NC	NC	--	--	NC	NC	NC	NC	--	--
BENZO(K)FLUORANTHENE	NC	NC	NC	NC	--	--	NC	NC	NC	NC	--	--
CHRYSENE	NC	NC	NC	NC	--	--	NC	NC	NC	NC	--	--
DIBENZO(A,H)ANTHRACENE	NC	NC	NC	NC	--	--	NC	NC	NC	NC	--	--
FLUORANTHENE	NC	NC	NC	NC	--	--	NC	NC	NC	NC	--	--
FLUORENE	1.56E+03	1.01E+00	0.00E+00	1.01E+00	1.01E+00	1.00	7.81E+03	5.05E+00	0.00E+00	5.05E+00	5.05E+00	1.00
INDENO(1,2,3-CD)PYRENE	NC	NC	NC	NC	--	--	NC	NC	NC	NC	--	--
NAPHTHALENE	8.76E+05	8.00E+01	0.00E+00	8.00E+01	8.00E+01	1.00	8.76E+06	8.00E+02	0.00E+00	8.00E+02	8.00E+02	1.00
PENTACHLOROPHENOL	NC	NC	NC	NC	--	--	NC	NC	NC	NC	--	--
PHENANTHRENE	7.63E+02	1.13E+00	0.00E+00	1.13E+00	1.13E+00	1.00	3.81E+03	5.65E+00	0.00E+00	5.65E+00	5.65E+00	1.00
PYRENE	NC	NC	NC	NC	--	--	NC	NC	NC	NC	--	--

Notes:

[a] = The following equation was used to calculate NOAEL- and LOAEL-based soil concentrations:

$$C_{TRV} = \frac{(ADD_i) \times BW_i}{(IR_{food} \sum (BAF_{food_i} \times DF) + (IR_s)) \times AF}$$

C_{TRV}-Based Sediment Concentration (mg chemical / kg sediment, dry weight);
ADD= NOAEL or LOAEL (mg chemical/kg body weight-day);
BW = Body Weight of the receptor (kg);
IR_{food} = Ingestion Rate of food (kg food ingested per day, wet weight);
BAF_{foodi} = Bioconcentration factor, specific to prey type and chemical (ratio of mg of chemical/kg fauna, wet weight to mg chemical/ kg sediment, dry weight);
DF_i = Dietary fraction (proportion of food type in the diet);
IR_s = Incidental Ingestion Rate of sediment (kg sediment ingested per day, dry weight); and
AF = 100% Area Use Factor includes season use rates, area use rates, chemical assimilation rate.

NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
mg/kg = Milligram Per Kilogram
bw - day = Body Weight - Day
HQ = Hazard Quotient
TRV = Toxicity Reference Value
SVOC = Semivolatile Organic Compound
PCB = Polychlorinated Biphenyls
NC = Not Calculated

[b] = Receptor doses were determined in order to verify equation calculations for the TRV-Based soil concentrations.
Receptor doses were calculated using species information (Table C-15).
Food dose = (COPEC concentration in prey * % of food type ingested * seasonal and area use factor * receptor ingestion rate for food) / receptor body weight
Receptors prey are based on conservative diet assumptions in Table C-15.
Substrate Dose = (COPEC concentration in soil * receptor ingestion rate for substrate) / receptor body weight
Total Dose = Food Dose + Substrate Dose

[c] = HQ = Total Dose / TRV is used to verify equation calculations.

Table I-3
TRV-Based Soil Concentration
Preliminary Ecological Effects Evaluation
Meadow Vole (*Microtus pennsylvanicus*)
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	NOAEL						LOAEL					
	Calculated NOAEL-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b] (mg/kg bw-day)			NOAEL (mg/kg bw-day)	HQ[c]	Calculated TRV-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b] (mg/kg bw-day)			LOAEL (mg/kg bw-day)	HQ[c]
		Food	Substrate	Total Dose				Food	Substrate	Total Dose		
Metals												
ARSENIC	8.99E+00	6.95E-02	4.50E-02	1.15E-01	1.14E-01	1.00	8.99E+01	6.95E-01	4.50E-01	1.15E+00	1.14E+00	1.00
CADMIUM	1.50E+01	1.60E+00	7.50E-02	1.68E+00	1.68E+00	1.00	1.50E+02	1.60E+01	7.49E-01	1.68E+01	1.68E+01	1.00
CHROMIUM	8.65E+05	2.70E+02	4.33E+03	4.60E+03	4.60E+03	1.00	8.65E+06	2.70E+03	4.33E+04	4.60E+04	4.60E+04	1.00
COPPER	8.34E+02	2.14E+01	4.17E+00	2.55E+01	2.55E+01	1.00	1.10E+03	2.81E+01	5.49E+00	3.36E+01	3.36E+01	1.00
LEAD	1.05E+03	8.21E+00	5.23E+00	1.34E+01	1.34E+01	1.00	1.05E+04	8.21E+01	5.23E+01	1.34E+02	1.34E+02	1.00
MERCURY	4.27E-01	3.06E-02	2.00E-03	3.26E-02	3.28E-02	1.00	1.74E+00	1.25E-01	9.00E-03	1.34E-01	1.34E-01	1.00
NICKEL	5.54E+03	3.95E+01	2.77E+01	6.72E+01	6.72E+01	1.00	1.11E+04	7.89E+01	5.54E+01	1.34E+02	1.34E+02	1.00
SELENIUM	2.73E+00	3.22E-01	1.40E-02	3.36E-01	3.36E-01	1.00	4.50E+00	5.32E-01	2.30E-02	5.55E-01	5.54E-01	1.00
SILVER	1.72E+03	2.87E+01	8.60E+00	3.73E+01	3.73E+01	1.00	1.72E+04	2.87E+02	8.60E+01	3.73E+02	3.73E+02	1.00
ZINC	3.38E+03	2.52E+02	1.69E+01	2.69E+02	2.69E+02	1.00	6.75E+03	5.04E+02	3.38E+01	5.37E+02	5.37E+02	1.00
Pesticides												
ALDRIN	6.36E+01	1.80E-02	3.18E-01	3.36E-01	3.36E-01	1.00	3.18E+02	8.98E-02	1.59E+00	1.68E+00	1.68E+00	1.00
DELTA-BHC	6.97E-01	2.71E-02	3.00E-03	3.01E-02	3.06E-02	0.98	6.97E+00	2.71E-01	3.50E-02	3.06E-01	3.06E-01	1.00
DIELDRIN	5.36E+00	6.80E-03	2.70E-02	3.38E-02	3.36E-02	1.01	5.36E+01	6.80E-02	2.68E-01	3.36E-01	3.36E-01	1.00
PCBs												
AROCLOR 1254	1.17E+01	3.43E-03	5.80E-02	6.14E-02	6.18E-02	0.99	1.17E+02	3.43E-02	5.84E-01	6.18E-01	6.18E-01	1.00
SVOCs/PAHs												
ACENAPHTHENE	1.16E+03	1.01E+01	5.78E+00	1.59E+01	1.59E+01	1.00	5.78E+03	5.06E+01	2.89E+01	7.95E+01	7.95E+01	1.00
ACENAPHTHYLENE	1.38E+04	9.89E+01	6.90E+01	1.68E+02	1.68E+02	1.00	6.90E+04	4.95E+02	3.45E+02	8.40E+02	8.40E+02	1.00
ANTHRACENE	5.23E+04	1.98E+02	2.61E+02	4.59E+02	4.59E+02	1.00	5.23E+05	1.98E+03	2.61E+03	4.59E+03	4.59E+03	1.00
BENZO(A)ANTHRACENE	4.78E+01	3.92E-02	2.39E-01	2.78E-01	2.78E-01	1.00	4.78E+02	3.92E-01	2.39E+00	2.78E+00	2.78E+00	1.00
BENZO(A)PYRENE	1.66E+02	7.88E-02	8.30E-01	9.09E-01	9.09E-01	1.00	1.66E+03	7.88E-01	8.30E+00	9.09E+00	9.09E+00	1.00
BENZO(B)FLUORANTHENE	1.68E+02	7.06E-02	8.38E-01	9.09E-01	9.09E-01	1.00	1.68E+03	7.06E-01	8.38E+00	9.09E+00	9.09E+00	1.00
BENZO(G,H,I)PERYLENE	8.86E+01	1.13E-02	4.43E-01	4.54E-01	4.54E-01	1.00	4.43E+02	5.63E-02	2.22E+00	2.27E+00	2.27E+00	1.00
BENZO(K)FLUORANTHENE	1.85E+03	7.78E-01	9.24E+00	1.00E+01	1.00E+01	1.00	1.85E+04	7.78E+00	9.24E+01	1.00E+02	1.00E+02	1.00
CHRYSENE	2.37E+03	1.94E+00	1.18E+01	1.38E+01	1.38E+01	1.00	2.37E+04	1.94E+01	1.18E+02	1.38E+02	1.38E+02	1.00
DIBENZO(A,H)ANTHRACENE	3.55E+02	7.79E-02	1.78E+00	1.85E+00	1.85E+00	1.00	3.55E+03	7.79E-01	1.78E+01	1.85E+01	1.85E+01	1.00
FLUORANTHENE	4.11E+03	7.28E+00	2.05E+01	2.78E+01	2.78E+01	1.00	2.05E+04	3.64E+01	1.03E+02	1.39E+02	1.39E+02	1.00
FLUORENE	4.15E+01	2.47E-01	2.07E-01	4.54E-01	4.54E-01	1.00	2.07E+02	1.23E+00	1.04E+00	2.27E+00	2.27E+00	1.00
INDENO(1,2,3-CD)PYRENE	1.92E+03	4.43E-01	9.58E+00	1.00E+01	1.00E+01	1.00	1.92E+04	4.43E+00	9.58E+01	1.00E+02	1.00E+02	1.00
NAPHTHALENE	3.58E+02	6.61E+00	1.79E+00	8.40E+00	8.40E+00	1.00	3.58E+03	6.61E+01	1.79E+01	8.40E+01	8.40E+01	1.00
PENTACHLOROPHENOL	5.72E+01	1.17E-01	2.86E-01	4.03E-01	4.03E-01	1.00	5.72E+02	1.17E+00	2.86E+00	4.03E+00	4.03E+00	1.00
PHENANTHRENE	7.32E+02	2.70E+00	3.66E+00	6.36E+00	6.36E+00	1.00	3.66E+03	1.35E+01	1.83E+01	3.18E+01	3.18E+01	1.00
PYRENE	1.07E+03	1.92E+00	5.35E+00	7.27E+00	7.27E+00	1.00	5.35E+03	9.60E+00	2.67E+01	3.63E+01	3.63E+01	1.00

Notes:

[a] = The following equation was used to calculate NOAEL- and LOAEL-based soil concentrations:

$$C_{TRV} = \frac{(ADD_i) \times BW_i}{(IR_{food} \sum (BAF_{food_i} \times DF) + (IR_s)) \times AF}$$

C_{TRV}-Based Sediment Concentration (mg chemical / kg sediment, dry weight);
ADD= NOAEL or LOAEL (mg chemical/kg body weight-day);
BW = Body Weight of the receptor (kg);
IR_{food} = Ingestion Rate of food (kg food ingested per day, wet weight);
BAF_{foodi} = Bioconcentration factor, specific to prey type and chemical (ratio of mg of chemical/kg fauna, wet weight to mg chemical/ kg sediment, dry weight);
DF_i = Dietary fraction (proportion of food type in the diet);
IR_s = Incidental Ingestion Rate of sediment (kg sediment ingested per day, dry weight); and
AF = 100% Area Use Factor includes season use rates, area use rates, chemical assimilation rate.

NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
mg/kg = Milligram Per Kilogram
bw - day = Body Weight - Day
HQ = Hazard Quotient
TRV = Toxicity Reference Value
SVOC = Semivolatile Organic Compound
PCB = Polychlorinated Biphenyls
NC = Not Calculated

[b] = Receptor doses were determined in order to verify equation calculations for the TRV-Based soil concentrations.
Receptor doses were calculated using species information (Table C-15).
Food dose = (COPEC concentration in prey * % of food type ingested * seasonal and area use factor * receptor ingestion rate for food) / receptor body weight
Receptors prey are based on conservative diet assumptions in Table C-15.
Substrate Dose = (COPEC concentration in soil * receptor ingestion rate for substrate) / receptor body weight
Total Dose = Food Dose + Substrate Dose

[c] = HQ = Total Dose / TRV is used to verify equation calculations.

Table I-4
TRV-Based Soil Concentration
Preliminary Ecological Effects Evaluation
Red Fox (*Vulpes vulpes*)
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	NOAEL						LOAEL					
	Calculated NOAEL-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b] (mg/kg bw-day)			NOAEL (mg/kg bw-day)	HQ[c]	Calculated TRV-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b] (mg/kg bw-day)			LOAEL (mg/kg bw-day)	HQ[c]
		Food	Substrate	Total Dose				Food	Substrate	Total Dose		
Metals												
ARSENIC	1.34E+00	3.17E-02	4.28E-03	3.60E-02	3.60E-02	1.00	1.34E+01	3.17E-01	4.30E-02	3.60E-01	3.60E-01	1.00
CADMIUM	1.48E+01	4.81E-01	4.75E-02	5.28E-01	5.28E-01	1.00	1.48E+02	4.81E+00	4.75E-01	5.28E+00	5.28E+00	1.00
CHROMIUM	2.38E+04	1.37E+03	7.60E+01	1.45E+03	1.45E+03	1.00	2.38E+05	1.37E+04	7.60E+02	1.45E+04	1.45E+04	1.00
COPPER	7.43E+01	7.80E+00	2.38E-01	8.03E+00	8.03E+00	1.00	9.78E+01	1.03E+01	3.13E-01	1.06E+01	1.06E+01	1.00
LEAD	4.97E+02	2.64E+00	1.59E+00	4.22E+00	4.22E+00	1.00	4.97E+03	2.64E+01	1.59E+01	4.22E+01	4.22E+01	1.00
MERCURY	3.93E-03	1.03E-02	1.30E-05	1.03E-02	1.03E-02	1.00	1.60E-02	4.20E-02	0.00E+00	4.20E-02	4.21E-02	1.00
NICKEL	3.23E+02	2.01E+01	1.03E+00	2.11E+01	2.11E+01	1.00	6.46E+02	4.02E+01	2.07E+00	4.22E+01	4.22E+01	1.00
SELENIUM	6.09E-01	1.04E-01	1.95E-03	1.06E-01	1.06E-01	1.00	1.00E+00	1.71E-01	3.00E-03	1.74E-01	1.74E-01	1.00
SILVER	2.89E+02	1.08E+01	9.23E-01	1.17E+01	1.17E+01	1.00	2.89E+03	1.08E+02	9.23E+00	1.17E+02	1.17E+02	1.00
ZINC	8.28E+01	8.42E+01	2.65E-01	8.45E+01	8.45E+01	1.00	1.66E+02	1.68E+02	5.30E-01	1.69E+02	1.69E+02	1.00
Pesticides												
ALDRIN	5.04E-01	1.04E-01	1.61E-03	1.06E-01	1.06E-01	1.00	2.52E+00	5.20E-01	8.00E-03	5.28E-01	5.28E-01	1.00
DELTA-BHC	4.13E-01	8.29E-03	1.32E-03	9.61E-03	9.61E-03	1.00	4.13E+00	8.29E-02	1.30E-02	9.59E-02	9.61E-02	1.00
DIELDRIN	3.22E-01	9.53E-03	1.03E-03	1.06E-02	1.06E-02	1.00	3.22E+00	9.53E-02	1.00E-02	1.05E-01	1.06E-01	1.00
PCBs												
AROCLOR 1254	5.33E-02	1.93E-02	1.71E-04	1.94E-02	1.94E-02	1.00	5.33E-01	1.93E-01	2.00E-03	1.95E-01	1.94E-01	1.00
SVOCs/PAHs												
ACENAPHTHENE	8.83E+02	2.18E+00	2.82E+00	5.00E+00	5.00E+00	1.00	4.41E+03	1.09E+01	1.41E+01	2.50E+01	2.50E+01	1.00
ACENAPHTHYLENE	9.71E+03	2.18E+01	3.10E+01	5.28E+01	5.28E+01	1.00	4.85E+04	1.09E+02	1.55E+02	2.64E+02	2.64E+02	1.00
ANTHRACENE	2.14E+04	7.60E+01	6.84E+01	1.44E+02	1.44E+02	1.00	2.14E+05	7.60E+02	6.84E+02	1.44E+03	1.44E+03	1.00
BENZO(A)ANTHRACENE	2.55E+00	7.94E-02	8.14E-03	8.75E-02	8.75E-02	1.00	2.55E+01	7.94E-01	8.10E-02	8.75E-01	8.75E-01	1.00
BENZO(A)PYRENE	3.48E+00	2.75E-01	1.11E-02	2.86E-01	2.86E-01	1.00	3.48E+01	2.75E+00	1.11E-01	2.86E+00	2.86E+00	1.00
BENZO(B)FLUORANTHENE	2.87E+00	2.77E-01	9.17E-03	2.86E-01	2.86E-01	1.00	2.87E+01	2.77E+00	9.20E-02	2.86E+00	2.86E+00	1.00
BENZO(G,H,I)PERYLENE	1.87E-01	1.42E-01	5.98E-04	1.43E-01	1.43E-01	1.00	9.34E-01	7.11E-01	3.00E-03	7.14E-01	7.14E-01	1.00
BENZO(K)FLUORANTHENE	3.16E+01	3.05E+00	1.01E-01	3.15E+00	3.15E+00	1.00	3.16E+02	3.05E+01	1.01E+00	3.15E+01	3.15E+01	1.00
CHRYSENE	1.24E+02	3.94E+00	3.97E-01	4.33E+00	4.33E+00	1.00	1.24E+03	3.94E+01	3.97E+00	4.33E+01	4.33E+01	1.00
DIBENZO(A,H)ANTHRACENE	1.94E+00	5.77E-01	6.20E-03	5.83E-01	5.83E-01	1.00	1.94E+01	5.77E+00	6.20E-02	5.83E+00	5.83E+00	1.00
FLUORANTHENE	7.02E+02	6.51E+00	2.24E+00	8.75E+00	8.75E+00	1.00	3.51E+03	3.25E+01	1.12E+01	4.38E+01	4.38E+01	1.00
FLUORENE	2.48E+01	6.36E-02	7.92E-02	1.43E-01	1.43E-01	1.00	1.24E+02	3.18E-01	3.96E-01	7.14E-01	7.14E-01	1.00
INDENO(1,2,3-CD)PYRENE	1.15E+01	3.11E+00	3.67E-02	3.15E+00	3.15E+00	1.00	1.15E+02	3.11E+01	3.67E-01	3.15E+01	3.15E+01	1.00
NAPHTHALENE	4.24E+02	1.29E+00	1.36E+00	2.64E+00	2.64E+00	1.00	4.24E+03	1.29E+01	1.36E+01	2.64E+01	2.64E+01	1.00
PENTACHLOROPHENOL	1.20E+01	8.82E-02	3.85E-02	1.27E-01	1.27E-01	1.00	1.20E+02	8.82E-01	3.85E-01	1.27E+00	1.27E+00	1.00
PHENANTHRENE	2.98E+02	1.05E+00	9.52E-01	2.00E+00	2.00E+00	1.00	1.49E+03	5.24E+00	4.76E+00	1.00E+01	1.00E+01	1.00
PYRENE	1.85E+02	1.69E+00	5.92E-01	2.29E+00	2.29E+00	1.00	9.25E+02	8.47E+00	2.96E+00	1.14E+01	1.14E+01	1.00

Notes:

[a] = The following equation was used to calculate NOAEL- and LOAEL-based soil concentrations:

$$C_{TRV} = \frac{(ADD_i) \times BW_i}{(IR_{food} \sum (BAF_{food_i} \times DF) + (IR_s)) \times AF}$$

C_{TRV}-Based Sediment Concentration (mg chemical / kg sediment, dry weight);
ADD= NOAEL or LOAEL (mg chemical/kg body weight-day);
BW = Body Weight of the receptor (kg);
IR_{food} = Ingestion Rate of food (kg food ingested per day, wet weight);
BAF_{foodi} = Bioconcentration factor, specific to prey type and chemical (ratio of mg of chemical/kg fauna, wet weight to mg chemical/ kg sediment, dry weight);
DF_i = Dietary fraction (proportion of food type in the diet);
IR_s = Incidental Ingestion Rate of sediment (kg sediment ingested per day, dry weight); and
AF = 100% Area Use Factor includes season use rates, area use rates, chemical assimilation rate.

NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
mg/kg = Milligram Per Kilogram
bw - day = Body Weight - Day
HQ = Hazard Quotient
TRV = Toxicity Reference Value
SVOC = Semivolatile Organic Compound
PCB = Polychlorinated Biphenyls
NC = Not Calculated

[b] = Receptor doses were determined in order to verify equation calculations for the TRV-Based soil concentrations.
Receptor doses were calculated using species information (Table C-15).
Food dose = (COPEC concentration in prey * % of food type ingested * seasonal and area use factor * receptor ingestion rate for food) / receptor body weight
Receptors prey are based on conservative diet assumptions in Table C-15.
Substrate Dose = (COPEC concentration in soil * receptor ingestion rate for substrate) / receptor body weight
Total Dose = Food Dose + Substrate Dose

[c] = HQ = Total Dose / TRV is used to verify equation calculations.

Table I-5
TRV-Based Soil Concentration
Preliminary Ecological Effects Evaluation
Short-tailed Shrew (*Blarina brevicauda*)
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	NOAEL						LOAEL					
	Calculated NOAEL-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b] (mg/kg bw-day)			NOAEL (mg/kg bw-day)	HQ[c]	Calculated TRV-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b] (mg/kg bw-day)			LOAEL (mg/kg bw-day)	HQ[c]
		Food	Substrate	Total Dose				Food	Substrate	Total Dose		
Metals												
ARSENIC	3.02E-01	5.30E-02	2.35E-02	7.65E-02	7.66E-02	1.00	3.02E+00	5.30E-01	2.35E-01	7.65E-01	7.66E-01	1.00
CADMIUM	1.16E+00	1.03E+00	9.06E-02	1.12E+00	1.12E+00	1.00	1.16E+01	1.03E+01	9.06E-01	1.12E+01	1.12E+01	1.00
CHROMIUM	1.78E+04	1.69E+03	1.39E+03	3.07E+03	3.07E+03	1.00	1.78E+05	1.69E+04	1.39E+04	3.07E+04	3.07E+04	1.00
COPPER	9.57E+01	9.62E+00	7.46E+00	1.71E+01	1.71E+01	1.00	1.26E+02	1.27E+01	9.82E+00	2.25E+01	2.25E+01	1.00
LEAD	5.45E+01	4.74E+00	4.25E+00	8.98E+00	8.98E+00	1.00	5.45E+02	4.74E+01	4.25E+01	8.98E+01	8.98E+01	1.00
MERCURY	8.31E-02	1.54E-02	6.50E-03	2.19E-02	2.19E-02	1.00	3.39E-01	6.30E-02	2.60E-02	8.90E-02	8.94E-02	0.99
NICKEL	2.86E+02	2.26E+01	2.23E+01	4.49E+01	4.49E+01	1.00	5.71E+02	4.53E+01	4.46E+01	8.98E+01	8.98E+01	1.00
SELENIUM	5.27E-01	1.83E-01	4.11E-02	2.25E-01	2.25E-01	1.00	8.70E-01	3.03E-01	6.80E-02	3.71E-01	3.71E-01	1.00
SILVER	5.85E+01	2.04E+01	4.57E+00	2.49E+01	2.49E+01	1.00	5.85E+02	2.04E+02	4.57E+01	2.49E+02	2.49E+02	1.00
ZINC	4.22E+02	1.47E+02	3.29E+01	1.80E+02	1.80E+02	1.00	8.44E+02	2.94E+02	6.58E+01	3.59E+02	3.59E+02	1.00
Pesticides												
ALDRIN	2.08E-01	2.08E-01	1.63E-02	2.25E-01	2.25E-01	1.00	1.04E+00	1.04E+00	8.10E-02	1.12E+00	1.12E+00	1.00
DELTA-BHC	1.90E-02	1.90E-02	1.50E-03	2.05E-02	2.04E-02	1.00	1.90E-01	1.90E-01	1.50E-02	2.05E-01	2.04E-01	1.00
DIELDRIN	2.08E-02	2.08E-02	1.60E-03	2.24E-02	2.25E-02	1.00	2.08E-01	2.08E-01	1.60E-02	2.24E-01	2.25E-01	1.00
PCBs												
AROCLOR 1254	3.42E-03	4.11E-02	3.00E-04	4.14E-02	4.13E-02	1.00	3.42E-02	4.11E-01	3.00E-03	4.14E-01	4.13E-01	1.00
SVOCs/PAHs												
ACENAPHTHENE	7.82E+01	4.54E+00	6.10E+00	1.06E+01	1.06E+01	1.00	3.91E+02	2.27E+01	3.05E+01	5.32E+01	5.32E+01	1.00
ACENAPHTHYLENE	9.32E+02	3.96E+01	7.27E+01	1.12E+02	1.12E+02	1.00	4.66E+03	1.98E+02	3.63E+02	5.62E+02	5.62E+02	1.00
ANTHRACENE	2.20E+03	1.36E+02	1.71E+02	3.07E+02	3.07E+02	1.00	2.20E+04	1.36E+03	1.71E+03	3.07E+03	3.07E+03	1.00
BENZO(A)ANTHRACENE	1.43E+00	7.46E-02	1.12E-01	1.86E-01	1.86E-01	1.00	1.43E+01	7.46E-01	1.12E+00	1.86E+00	1.86E+00	1.00
BENZO(A)PYRENE	4.23E+00	2.78E-01	3.30E-01	6.08E-01	6.08E-01	1.00	4.23E+01	2.78E+00	3.30E+00	6.08E+00	6.08E+00	1.00
BENZO(B)FLUORANTHENE	5.12E+00	2.08E-01	4.00E-01	6.08E-01	6.08E-01	1.00	5.12E+01	2.08E+00	4.00E+00	6.08E+00	6.08E+00	1.00
BENZO(G,H,I)PERYLENE	2.84E+00	8.23E-02	2.22E-01	3.04E-01	3.04E-01	1.00	1.42E+01	4.12E-01	1.11E+00	1.52E+00	1.52E+00	1.00
BENZO(K)FLUORANTHENE	5.65E+01	2.29E+00	4.41E+00	6.70E+00	6.70E+00	1.00	5.65E+02	2.29E+01	4.41E+01	6.70E+01	6.70E+01	1.00
CHRYSENE	5.65E+01	4.81E+00	4.41E+00	9.21E+00	9.21E+00	1.00	5.65E+02	4.81E+01	4.41E+01	9.21E+01	9.21E+01	1.00
DIBENZO(A,H)ANTHRACENE	7.18E+00	6.80E-01	5.60E-01	1.24E+00	1.24E+00	1.00	7.18E+01	6.80E+00	5.60E+00	1.24E+01	1.24E+01	1.00
FLUORANTHENE	1.24E+02	8.90E+00	9.71E+00	1.86E+01	1.86E+01	1.00	6.22E+02	4.45E+01	4.85E+01	9.31E+01	9.31E+01	1.00
FLUORENE	2.27E+00	1.27E-01	1.77E-01	3.04E-01	3.04E-01	1.00	1.13E+01	6.35E-01	8.84E-01	1.52E+00	1.52E+00	1.00
INDENO(1,2,3-CD)PYRENE	4.26E+01	3.38E+00	3.32E+00	6.70E+00	6.70E+00	1.00	4.26E+02	3.38E+01	3.32E+01	6.70E+01	6.70E+01	1.00
NAPHTHALENE	4.73E+01	1.92E+00	3.69E+00	5.62E+00	5.62E+00	1.00	4.73E+02	1.92E+01	3.69E+01	5.62E+01	5.62E+01	1.00
PENTACHLOROPHENOL	1.98E+00	1.15E-01	1.55E-01	2.70E-01	2.70E-01	1.00	1.98E+01	1.15E+00	1.55E+00	2.70E+00	2.70E+00	1.00
PHENANTHRENE	3.22E+01	1.74E+00	2.51E+00	4.25E+00	4.25E+00	1.00	1.61E+02	8.71E+00	1.26E+01	2.13E+01	2.13E+01	1.00
PYRENE	3.17E+01	2.39E+00	2.47E+00	4.86E+00	4.86E+00	1.00	1.58E+02	1.19E+01	1.24E+01	2.43E+01	2.43E+01	1.00

Notes:

[a] = The following equation was used to calculate NOAEL- and LOAEL-based soil concentrations:

$$C_{TRV} = \frac{(ADD_i) \times BW_i}{(IR_{food} \sum (BAF_{food_i} \times DF) + (IR_s)) \times AF}$$

C_{TRV}-Based Sediment Concentration (mg chemical / kg sediment, dry weight);
ADD= NOAEL or LOAEL (mg chemical/kg body weight-day);
BW = Body Weight of the receptor (kg);
IR_{food} = Ingestion Rate of food (kg food ingested per day, wet weight);
BAF_{foodi} = Bioconcentration factor, specific to prey type and chemical (ratio of mg of chemical/kg fauna, wet weight to mg chemical/ kg sediment, dry weight);
DF_i = Dietary fraction (proportion of food type in the diet);
IR_s = Incidental Ingestion Rate of sediment (kg sediment ingested per day, dry weight); and
AF = 100% Area Use Factor includes season use rates, area use rates, chemical assimilation rate.

NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
mg/kg = Milligram Per Kilogram
bw - day = Body Weight - Day
HQ = Hazard Quotient
TRV = Toxicity Reference Value
SVOC = Semivolatile Organic Compound
PCB = Polychlorinated Biphenyls
NC = Not Calculated

[b] = Receptor doses were determined in order to verify equation calculations for the TRV-Based soil concentrations.
Receptor doses were calculated using species information (Table C-15).
Food dose = (COPEC concentration in prey * % of food type ingested * seasonal and area use factor * receptor ingestion rate for food) / receptor body weight
Receptors prey are based on conservative diet assumptions in Table C-15.
Substrate Dose = (COPEC concentration in soil * receptor ingestion rate for substrate) / receptor body weight
Total Dose = Food Dose + Substrate Dose

[c] = HQ = Total Dose / TRV is used to verify equation calculations.

Table I-6
TRV-Based Soil Concentration
Preliminary Ecological Effects Evaluation
Mallard Duck (*Anas platyrhynchos*)
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	NOAEL						LOAEL					
	Calculated NOAEL-Based Sediment Concentration[a] (mg/kg)	Receptor Dose[b] (mg/kg bw-day)			NOAEL (mg/kg bw-day)	HQ[c]	Calculated TRV-Based Sediment Concentration[a] (mg/kg)	Receptor Dose[b] (mg/kg bw-day)			LOAEL (mg/kg bw-day)	HQ[c]
		Food	Substrate	Total Dose				Food	Substrate	Total Dose		
Metals												
Arsenic	8.56E+02	4.11E+00	1.03E+00	5.14E+00	5.14E+00	1.00	2.14E+03	1.03E+01	2.57E+00	1.28E+01	1.28E+01	1.00
Cadmium	5.94E+01	1.38E+00	7.10E-02	1.45E+00	1.45E+00	1.00	8.19E+02	1.90E+01	9.82E-01	2.00E+01	2.00E+01	1.00
Chromium	1.89E+02	7.73E-01	2.27E-01	1.00E+00	1.00E+00	1.00	9.46E+02	3.86E+00	1.14E+00	5.00E+00	5.00E+00	1.00
Copper	7.40E+02	4.61E+01	8.88E-01	4.70E+01	4.70E+01	1.00	9.72E+02	6.05E+01	1.17E+00	6.17E+01	6.17E+01	1.00
Lead	3.06E+02	7.63E-01	3.67E-01	1.13E+00	1.13E+00	1.00	3.06E+03	7.63E+00	3.67E+00	1.13E+01	1.13E+01	1.00
Mercury	1.07E+01	4.37E-01	1.30E-02	4.50E-01	4.50E-01	1.00	2.14E+01	8.74E-01	2.57E-02	9.00E-01	9.00E-01	1.00
Nickel	2.41E+03	7.45E+01	2.89E+00	7.74E+01	7.74E+01	1.00	3.33E+03	1.03E+02	3.99E+00	1.07E+02	1.07E+02	1.00
Selenium	4.48E+00	3.95E-01	5.00E-03	4.00E-01	4.00E-01	1.00	8.95E+00	7.89E-01	1.07E-02	8.00E-01	8.00E-01	1.00
Silver	5.15E+02	1.59E+01	6.18E-01	1.66E+01	1.66E+01	1.00	3.86E+03	1.20E+02	4.64E+00	1.24E+02	1.24E+02	1.00
Zinc	1.62E+02	1.43E+01	1.95E-01	1.45E+01	1.45E+01	1.00	1.47E+03	1.29E+02	1.76E+00	1.31E+02	1.31E+02	1.00
PAHs												
Acenaphthene	1.80E+02	7.94E-01	2.16E-01	1.01E+00	1.01E+00	1.00	8.98E+02	3.97E+00	1.08E+00	5.05E+00	5.05E+00	1.00
Acenaphthylene	NC	NC	NC	NC	--	--	NC	NC	NC	NC	--	--
Anthracene	NC	NC	NC	NC	--	--	NC	NC	NC	NC	--	--
Benzo(a)anthracene	NC	NC	NC	NC	--	--	NC	NC	NC	NC	--	--
Benzo(a)pyrene	8.89E+01	3.93E-01	1.07E-01	5.00E-01	5.00E-01	1.00	4.45E+02	1.97E+00	5.33E-01	2.50E+00	2.50E+00	1.00
Benzo(b)fluoranthene	NC	NC	NC	NC	--	--	NC	NC	NC	NC	--	--
Benzo(g,h,i)perylene	NC	NC	NC	NC	--	--	NC	NC	NC	NC	--	--
Benzo(k)fluoranthene	NC	NC	NC	NC	--	--	NC	NC	NC	NC	--	--
Chrysene	NC	NC	NC	NC	--	--	NC	NC	NC	NC	--	--
Dibenzo(a,h)anthracene	NC	NC	NC	NC	--	--	NC	NC	NC	NC	--	--
Fluoranthene	NC	NC	NC	NC	--	--	NC	NC	NC	NC	--	--
Fluorene	1.80E+02	7.94E-01	2.16E-01	1.01E+00	1.01E+00	1.00	8.98E+02	3.97E+00	1.08E+00	5.05E+00	5.05E+00	1.00
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	--	--	NC	NC	NC	NC	--	--
Phenanthrene	2.01E+02	8.89E-01	2.41E-01	1.13E+00	1.13E+00	1.00	1.00E+03	4.44E+00	1.21E+00	5.65E+00	5.65E+00	1.00
Pyrene	NC	NC	NC	NC	--	--	NC	NC	NC	NC	--	--

Notes:

[a] = The following equation was used to calculate NOAEL- and LOAEL-based soil concentrations:

$$C_{TRV} = \frac{(ADD_i) \times BW}{(IR_{food} \sum (BSAF_{food} \times DF) + (IR_s)) \times AF}$$

C_{TRV}-Based Sediment Concentration (mg chemical / kg sediment, dry weight);
ADD= NOAEL or LOAEL (mg chemical/kg body weight-day);
BW = Body Weight of the receptor (kg);
IR_{food} = Ingestion Rate of food (kg food ingested per day, wet weight);
BAF_{foodi} = Bioconcentration factor, specific to prey type and chemical (ratio of mg of chemical/kg fauna, wet weight to mg chemical/ kg sediment, dry weight);
DF_i = Dietary fraction (proportion of food type in the diet);
IR_s = Incidental Ingestion Rate of sediment (kg sediment ingested per day, dry weight); and
AF = 100% Area Use Factor includes season use rates, area use rates, chemical assimilation rate.

NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
mg/kg = Milligram Per Kilogram
bw - day = Body Weight - Day
HQ = Hazard Quotient
TRV = Toxicity Reference Value
SVOC = Semivolatile Organic Compound
PCB = Polychlorinated Biphenyls
NC = Not Calculated

[b] = Receptor doses were determined in order to verify equation calculations for the TRV-Based soil concentrations.
Receptor doses were calculated using species information (Table C-15).
Food dose = (COPEC concentration in prey * % of food type ingested * seasonal and area use factor * receptor ingestion rate for food) / receptor body weight
Receptors prey are based on conservative diet assumptions in Table C-15.
Substrate Dose = (COPEC concentration in soil * receptor ingestion rate for substrate) / receptor body weight
Total Dose = Food Dose + Substrate Dose

[c] = HQ = Total Dose / TRV is used to verify equation calculations.

Table I-7
TRV-Based Soil Concentration
Preliminary Ecological Effects Evaluation
Belted Kingfisher (*Ceryle alcyon*)
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	NOAEL						LOAEL					
	Calculated NOAEL-Based Sediment Concentration[a] (mg/kg)	Receptor Dose[b] (mg/kg bw-day)			NOAEL (mg/kg bw-day)	HQ[c]	Calculated TRV-Based Sediment Concentration[a] (mg/kg)	Receptor Dose[b] (mg/kg bw-day)			LOAEL (mg/kg bw-day)	HQ[c]
		Food	Substrate	Total Dose				Food	Substrate	Total Dose		
Metals												
Arsenic	6.68E+01	5.14E+00	0.00E+00	5.14E+00	5.14E+00	1.00	1.67E+02	1.28E+01	0.00E+00	1.28E+01	1.28E+01	1.00
Cadmium	7.84E+01	1.45E+00	0.00E+00	1.45E+00	1.45E+00	1.00	1.08E+03	2.00E+01	0.00E+00	2.00E+01	2.00E+01	1.00
Chromium	2.22E+02	1.00E+00	0.00E+00	1.00E+00	1.00E+00	1.00	1.11E+03	5.00E+00	0.00E+00	5.00E+00	5.00E+00	1.00
Copper	1.88E+03	4.70E+01	0.00E+00	4.70E+01	4.70E+01	1.00	2.47E+03	6.17E+01	0.00E+00	6.17E+01	6.17E+01	1.00
Lead	9.52E+00	1.13E+00	0.00E+00	1.13E+00	1.13E+00	1.00	9.52E+01	1.13E+01	0.00E+00	1.13E+01	1.13E+01	1.00
Mercury	8.33E-01	4.50E-01	0.00E+00	4.50E-01	4.50E-01	1.00	1.67E+00	9.00E-01	0.00E+00	9.00E-01	9.00E-01	1.00
Nickel	9.68E+03	7.74E+01	0.00E+00	7.74E+01	7.74E+01	1.00	1.34E+04	1.07E+02	0.00E+00	1.07E+02	1.07E+02	1.00
Selenium	3.78E-01	4.00E-01	0.00E+00	4.00E-01	4.00E-01	1.00	7.56E-01	8.00E-01	0.00E+00	8.00E-01	8.00E-01	1.00
Silver	4.21E+01	1.66E+01	0.00E+00	1.66E+01	1.66E+01	1.00	3.15E+02	1.24E+02	0.00E+00	1.24E+02	1.24E+02	1.00
Zinc	1.34E+02	1.45E+01	0.00E+00	1.45E+01	1.45E+01	1.00	1.21E+03	1.31E+02	0.00E+00	1.31E+02	1.31E+02	1.00
PAHs												
Acenaphthene	1.10E+01	1.01E+00	0.00E+00	1.01E+00	1.01E+00	1.00	5.48E+01	5.05E+00	0.00E+00	5.05E+00	5.05E+00	1.00
Anthracene	NC	NC	NC	NC	--	--	NC	NC	NC	NC	--	--
Acenaphthylene	NC	NC	NC	NC	--	--	NC	NC	NC	NC	--	--
Benzo(a)anthracene	NC	NC	NC	NC	--	--	NC	NC	NC	NC	--	--
Benzo(a)pyrene	5.43E+00	5.00E-01	0.00E+00	5.00E-01	5.00E-01	1.00	2.71E+01	2.50E+00	0.00E+00	2.50E+00	2.50E+00	1.00
Benzo(b)fluoranthene	NC	NC	NC	NC	--	--	NC	NC	NC	NC	--	--
Benzo(g,h,i)perylene	NC	NC	NC	NC	--	--	NC	NC	NC	NC	--	--
Benzo(k)fluoranthene	NC	NC	NC	NC	--	--	NC	NC	NC	NC	--	--
Chrysene	NC	NC	NC	NC	--	--	NC	NC	NC	NC	--	--
Dibenzo(a,h)anthracene	NC	NC	NC	NC	--	--	NC	NC	NC	NC	--	--
Fluoranthene	NC	NC	NC	NC	--	--	NC	NC	NC	NC	--	--
Fluorene	1.10E+01	1.01E+00	0.00E+00	1.01E+00	1.01E+00	1.00	5.48E+01	5.05E+00	0.00E+00	5.05E+00	5.05E+00	1.00
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	--	--	NC	NC	NC	NC	--	--
Phenanthrene	1.23E+01	1.13E+00	0.00E+00	1.13E+00	1.13E+00	1.00	6.14E+01	5.65E+00	0.00E+00	5.65E+00	5.65E+00	1.00
Pyrene	NC	NC	NC	NC	--	--	NC	NC	NC	NC	--	--

Notes:

[a] = The following equation was used to calculate NOAEL- and LOAEL-based soil concentrations:

$$C_{TRV} = \frac{(ADD_i) \times BW}{(IR_{food} \sum (BSAF_{food} \times DF) + (IR_s)) \times AF}$$

C_{TRV}-Based Sediment Concentration (mg chemical / kg sediment, dry weight);
ADD= NOAEL or LOAEL (mg chemical/kg body weight-day);
BW = Body Weight of the receptor (kg);
IR_{food} = Ingestion Rate of food (kg food ingested per day, wet weight);
BAF_{foodi} = Bioconcentration factor, specific to prey type and chemical (ratio of mg of chemical/kg fauna, wet weight to mg chemical/ kg sediment, dry weight);
DF_i = Dietary fraction (proportion of food type in the diet);
IR_s = Incidental Ingestion Rate of sediment (kg sediment ingested per day, dry weight); and
AF = 100% Area Use Factor includes season use rates, area use rates, chemical assimilation rate.

NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
mg/kg = Milligram Per Kilogram
bw - day = Body Weight - Day
HQ = Hazard Quotient
TRV = Toxicity Reference Value
SVOC = Semivolatile Organic Compound
PCB = Polychlorinated Biphenyls
NC = Not Calculated

[b] = Receptor doses were determined in order to verify equation calculations for the TRV-Based soil concentrations.
Receptor doses were calculated using species information (Table C-15).
Food dose = (COPEC concentration in prey * % of food type ingested * seasonal and area use factor * receptor ingestion rate for food) / receptor body weight
Receptors prey are based on conservative diet assumptions in Table C-15.
Substrate Dose = (COPEC concentration in soil * receptor ingestion rate for substrate) / receptor body weight
Total Dose = Food Dose + Substrate Dose

[c] = HQ = Total Dose / TRV is used to verify equation calculations.

Table I-8
TRV-Based Soil Concentration
Preliminary Ecological Effects Evaluation
Raccoon (*Procyon lotor*)
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	NOAEL						LOAEL					
	Calculated NOAEL-Based Sediment Concentration[a] (mg/kg)	Receptor Dose[b] (mg/kg bw-day)			NOAEL (mg/kg bw-day)	HQ[c]	Calculated TRV-Based Sediment Concentration[a] (mg/kg)	Receptor Dose[b] (mg/kg bw-day)			LOAEL (mg/kg bw-day)	HQ[c]
		Food	Substrate	Total Dose				Food	Substrate	Total Dose		
Metals												
Arsenic	2.73E+00	6.31E-03	2.75E-02	3.38E-02	3.38E-02	1.00	2.73E+01	6.31E-02	2.75E-01	3.38E-01	3.38E-01	1.00
Cadmium	2.33E+01	2.61E-01	2.35E-01	4.95E-01	4.95E-01	1.00	2.33E+02	2.61E+00	2.35E+00	4.95E+00	4.95E+00	1.00
Chromium	1.13E+05	2.21E+02	1.13E+03	1.36E+03	1.36E+03	1.00	1.13E+06	2.21E+03	1.13E+04	1.36E+04	1.36E+04	1.00
Copper	1.88E+02	5.64E+00	1.89E+00	7.54E+00	7.54E+00	1.00	2.48E+02	7.43E+00	2.49E+00	9.92E+00	9.92E+00	1.00
Lead	3.52E+02	4.22E-01	3.54E+00	3.96E+00	3.96E+00	1.00	3.52E+03	4.22E+00	3.54E+01	3.96E+01	3.96E+01	1.00
Nickel	7.94E+02	1.18E+01	7.99E+00	1.98E+01	1.98E+01	1.00	1.59E+03	2.36E+01	1.60E+01	3.96E+01	3.96E+01	1.00
Mercury	3.25E-01	6.39E-03	3.27E-03	9.66E-03	9.66E-03	1.00	1.33E+00	2.61E-02	1.34E-02	3.95E-02	3.95E-02	1.00
Selenium	1.89E+00	8.01E-02	1.90E-02	9.91E-02	9.91E-02	1.00	3.12E+00	1.32E-01	3.14E-02	1.63E-01	1.63E-01	1.00
Silver	4.41E+02	6.56E+00	4.44E+00	1.10E+01	1.10E+01	1.00	4.41E+03	6.56E+01	4.44E+01	1.10E+02	1.10E+02	1.00
Zinc	1.51E+03	6.41E+01	1.52E+01	7.93E+01	7.93E+01	1.00	3.02E+03	1.28E+02	3.04E+01	1.59E+02	1.59E+02	1.00
PAHs												
Acenaphthene	3.85E+02	8.19E-01	3.87E+00	4.69E+00	4.69E+00	1.00	1.92E+03	4.09E+00	1.94E+01	2.35E+01	2.35E+01	1.00
Anthracene	1.11E+04	2.36E+01	1.12E+02	1.35E+02	1.35E+02	1.00	1.11E+05	2.36E+02	1.12E+03	1.35E+03	1.35E+03	1.00
Acenaphthylene	4.06E+03	8.65E+00	4.09E+01	4.95E+01	4.95E+01	1.00	2.03E+04	4.32E+01	2.04E+02	2.48E+02	2.48E+02	1.00
Benzo(a)anthracene	6.74E+00	1.43E-02	6.78E-02	8.21E-02	8.21E-02	1.00	6.74E+01	1.43E-01	6.78E-01	8.21E-01	8.21E-01	1.00
Benzo(a)pyrene	2.20E+01	4.68E-02	2.21E-01	2.68E-01	2.68E-01	1.00	2.20E+02	4.68E-01	2.21E+00	2.68E+00	2.68E+00	1.00
Benzo(b)fluoranthene	2.20E+01	4.68E-02	2.21E-01	2.68E-01	2.68E-01	1.00	2.20E+02	4.68E-01	2.21E+00	2.68E+00	2.68E+00	1.00
Benzo(g,h,i)perylene	1.10E+01	2.34E-02	1.11E-01	1.34E-01	1.34E-01	1.00	5.50E+01	1.17E-01	5.53E-01	6.70E-01	6.70E-01	1.00
Benzo(k)fluoranthene	2.42E+02	5.16E-01	2.44E+00	2.96E+00	2.96E+00	1.00	2.42E+03	5.16E+00	2.44E+01	2.96E+01	2.96E+01	1.00
Chrysene	3.33E+02	7.09E-01	3.35E+00	4.06E+00	4.06E+00	1.00	3.33E+03	7.09E+00	3.35E+01	4.06E+01	4.06E+01	1.00
Dibenzo(a,h)anthracene	4.49E+01	9.55E-02	4.52E-01	5.47E-01	5.47E-01	1.00	4.49E+02	9.55E-01	4.52E+00	5.47E+00	5.47E+00	1.00
Fluoranthene	6.74E+02	1.43E+00	6.78E+00	8.21E+00	8.21E+00	1.00	3.37E+03	7.16E+00	3.39E+01	4.11E+01	4.11E+01	1.00
Fluorene	1.10E+01	2.34E-02	1.11E-01	1.34E-01	1.34E-01	1.00	5.50E+01	1.17E-01	5.53E-01	6.70E-01	6.70E-01	1.00
Indeno(1,2,3-cd)pyrene	2.42E+02	5.16E-01	2.44E+00	2.96E+00	2.96E+00	1.00	2.42E+03	5.16E+00	2.44E+01	2.96E+01	2.96E+01	1.00
Phenanthrene	1.54E+02	3.27E-01	1.55E+00	1.88E+00	1.88E+00	1.00	7.70E+02	1.64E+00	7.74E+00	9.38E+00	9.38E+00	1.00
Pyrene	NC	NC	NC	NC	--	--	NC	NC	NC	NC	--	--

Notes:

[a] = The following equation was used to calculate NOAEL- and LOAEL-based soil concentrations:

$$C_{TRV} = \frac{(ADD_i) \times BW_i}{(IR_{food} \sum (BSAF_{food} \times DF) + (IR_s)) \times AF}$$

C_{TRV}-Based Sediment Concentration (mg chemical / kg sediment, dry weight);
ADD= NOAEL or LOAEL (mg chemical/kg body weight-day);
BW = Body Weight of the receptor (kg);
IR_{food} = Ingestion Rate of food (kg food ingested per day, wet weight);
BAF_{foodi} = Bioconcentration factor, specific to prey type and chemical (ratio of mg of chemical/kg fauna, wet weight to mg chemical/ kg sediment, dry weight);
DF_i = Dietary fraction (proportion of food type in the diet);
IR_s = Incidental Ingestion Rate of sediment (kg sediment ingested per day, dry weight); and
AF = 100% Area Use Factor includes season use rates, area use rates, chemical assimilation rate.

NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
mg/kg = Milligram Per Kilogram
bw - day = Body Weight - Day
HQ = Hazard Quotient
TRV = Toxicity Reference Value
SVOC = Semivolatile Organic Compound
PCB = Polychlorinated Biphenyls
NC = Not Calculated

[b] = Receptor doses were determined in order to verify equation calculations for the TRV-Based soil concentrations.
Receptor doses were calculated using species information (Table C-15).
Food dose = (COPEC concentration in prey * % of food type ingested * seasonal and area use factor * receptor ingestion rate for food) / receptor body weight
Receptors prey are based on conservative diet assumptions in Table C-15.
Substrate Dose = (COPEC concentration in soil * receptor ingestion rate for substrate) / receptor body weight
Total Dose = Food Dose + Substrate Dose

[c] = HQ = Total Dose / TRV is used to verify equation calculations.

Table I-9A
TRV-Based Soil Concentration
Refined Ecological Effects Evaluation
American Robin (*Turdus migratorius*)
SSP Report - SWMUs 37, 38, and Area Q
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	NOAEL						LOAEL					
	Calculated NOAEL-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			NOAEL	HQ[c]	Calculated TRV-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			LOAEL	HQ[c]
		Food	Substrate	Total Dose				Food	Substrate	Total Dose		
Metals												
ARSENIC	2.94E+01	4.53E+00	6.14E-01	5.14E+00	5.14E+00	1.00	7.34E+01	1.13E+01	1.54E+00	1.28E+01	1.28E+01	1.00
CADMIUM	1.50E+00	1.42E+00	3.10E-02	1.45E+00	1.45E+00	1.00	2.07E+01	1.96E+01	4.33E-01	2.00E+01	2.00E+01	1.00
CHROMIUM	1.06E+01	7.78E-01	2.22E-01	1.00E+00	1.00E+00	1.00	5.29E+01	3.89E+00	1.11E+00	5.00E+00	5.00E+00	1.00
COPPER	2.92E+02	4.09E+01	6.10E+00	4.70E+01	4.70E+01	1.00	3.83E+02	5.37E+01	8.01E+00	6.17E+01	6.17E+01	1.00
LEAD	1.06E+01	9.09E-01	2.21E-01	1.13E+00	1.13E+00	1.00	1.06E+02	9.09E+00	2.21E+00	1.13E+01	1.13E+01	1.00
MERCURY	1.32E+00	4.22E-01	2.80E-02	4.50E-01	4.50E-01	1.00	2.65E+00	8.45E-01	5.50E-02	9.00E-01	9.00E-01	1.00
SELENIUM	6.91E-01	3.86E-01	1.40E-02	4.00E-01	4.00E-01	1.00	1.38E+00	7.71E-01	2.90E-02	8.00E-01	8.00E-01	1.00
ZINC	3.08E+01	1.39E+01	6.43E-01	1.45E+01	1.45E+01	1.00	2.78E+02	1.25E+02	5.81E+00	1.31E+02	1.31E+02	1.00
PCBs												
AROCLOR 1254	1.95E-02	1.80E-01	0.00E+00	1.80E-01	1.80E-01	1.00	1.95E-01	1.80E+00	4.00E-03	1.80E+00	1.80E+00	1.00

Notes:

[a] = The following equation was used to calculate NOAEL- and LOAEL-based soil concentrations:

$$C_{TRV} = \frac{(ADD_i) \times BW_i}{(IR_{food} \sum (BAF_{food_i} \times DF) + (IR_s)) \times AF}$$

C_{TRV}-Based Sediment Concentration (mg chemical / kg sediment, dry weight);
ADD= NOAEL or LOAEL (mg chemical/kg body weight-day);
BW = Body Weight of the receptor (kg);
IR_{food} = Ingestion Rate of food (kg food ingested per day, wet weight);
BAF_{foodi} = Bioconcentration factor, specific to prey type and chemical (ratio of mg of chemical/kg fauna, wet weight to mg chemical/ kg sediment, dry weight);
DF_i = Dietary fraction (proportion of food type in the diet);
IR_s = Incidental Ingestion Rate of sediment (kg sediment ingested per day, dry weight); and
AF = 100% Area Use Factor includes season use rates, area use rates, chemical assimilation rate.

NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
mg/kg = Milligram Per Kilogram
bw - day = Body Weight - Day
HQ = Hazard Quotient
TRV = Toxicity Reference Value
PCB = Polychlorinated Biphenyls

[b] = Receptor doses were determined in order to verify equation calculations for the TRV-Based soil concentrations.
Receptor doses were calculated using species information (Table C-15).
Food dose = (COPEC concentration in prey * % of food type ingested * seasonal and area use factor * receptor ingestion rate for food) / receptor body weight
Receptors prey are based on conservative diet assumptions in Table C-15.
Substrate Dose = (COPEC concentration in soil * receptor ingestion rate for substrate) / receptor body weight
Total Dose = Food Dose + Substrate Dose

[c] = HQ = Total Dose / TRV is used to verify equation calculations.

Table I-9B
TRV-Based Soil Concentration
Refined Ecological Effects Evaluation
Red-tailed Hawk (*Buteo jamaicensis*)
SSP Report - SWMUs 37, 38, and Area Q
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	NOAEL						LOAEL					
	Calculated NOAEL-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			NOAEL	HQ[c]	Calculated TRV-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			LOAEL	HQ[c]
		Food	Substrate	Total Dose				Food	Substrate	Total Dose		
Metals												
ARSENIC	3.93E+05	5.14E+00	0.00E+00	5.14E+00	5.14E+00	1.00	9.83E+05	1.28E+01	0.00E+00	1.28E+01	1.28E+01	1.00
CADMIUM	3.96E+05	1.45E+00	0.00E+00	1.45E+00	1.45E+00	1.00	5.47E+06	2.00E+01	0.00E+00	2.00E+01	2.00E+01	1.00
CHROMIUM	2.73E+04	1.00E+00	0.00E+00	1.00E+00	1.00E+00	1.00	1.37E+05	5.00E+00	0.00E+00	5.00E+00	5.00E+00	1.00
COPPER	7.20E+05	4.70E+01	0.00E+00	4.70E+01	4.70E+01	1.00	9.45E+05	6.17E+01	0.00E+00	6.17E+01	6.17E+01	1.00
LEAD	5.77E+05	1.13E+00	0.00E+00	1.13E+00	1.13E+00	1.00	5.77E+06	1.13E+01	0.00E+00	1.13E+01	1.13E+01	1.00
MERCURY	2.65E+02	4.50E-01	0.00E+00	4.50E-01	4.50E-01	1.00	5.30E+02	9.00E-01	0.00E+00	9.00E-01	9.00E-01	1.00
SELENIUM	4.08E+03	4.00E-01	0.00E+00	4.00E-01	4.00E-01	1.00	8.17E+03	8.00E-01	0.00E+00	8.00E-01	8.00E-01	1.00
ZINC	2.22E+04	1.45E+01	0.00E+00	1.45E+01	1.45E+01	1.00	2.01E+05	1.31E+02	0.00E+00	1.31E+02	1.31E+02	1.00
PCBs												
AROCLOR 1254	1.55E+03	1.80E-01	0.00E+00	1.80E-01	1.80E-01	1.00	1.55E+04	1.80E+00	0.00E+00	1.80E+00	1.80E+00	1.00

Notes:

[a] = The following equation was used to calculate NOAEL- and LOAEL-based soil concentrations:

$$C_{TRV} = \frac{(ADD_i) \times BW_i}{(IR_{food} \sum (BAF_{food_i} \times DF) + (IR_s)) \times AF}$$

C_{TRV}-Based Sediment Concentration (mg chemical / kg sediment, dry weight);
ADD= NOAEL or LOAEL (mg chemical/kg body weight-day);
BW = Body Weight of the receptor (kg);
IR_{food} = Ingestion Rate of food (kg food ingested per day, wet weight);
BAF_{foodi} = Bioconcentration factor, specific to prey type and chemical (ratio of mg of chemical/kg fauna, wet weight to mg chemical/ kg sediment, dry weight);
DF_i = Dietary fraction (proportion of food type in the diet);
IR_s = Incidental Ingestion Rate of sediment (kg sediment ingested per day, dry weight); and
AF = 100% Area Use Factor includes season use rates, area use rates, chemical assimilation rate.

NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
mg/kg = Milligram Per Kilogram
bw - day = Body Weight - Day
HQ = Hazard Quotient
TRV = Toxicity Reference Value

[b] = Receptor doses were determined in order to verify equation calculations for the TRV-Based soil concentrations.
Receptor doses were calculated using species information (Table C-15).
Food dose = (COPEC concentration in prey * % of food type ingested * seasonal and area use factor * receptor ingestion rate for food) / receptor body weight
Receptors prey are based on conservative diet assumptions in Table C-15.
Substrate Dose = (COPEC concentration in soil * receptor ingestion rate for substrate) / receptor body weight
Total Dose = Food Dose + Substrate Dose

[c] = HQ = Total Dose / TRV is used to verify equation calculations.

Table I-9C
TRV-Based Soil Concentration
Refined Ecological Effects Evaluation
Meadow Vole (*Microtus pennsylvanicus*)
SSP Report - SWMUs 37, 38, and Area Q
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	NOAEL						LOAEL					
	Calculated NOAEL-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			NOAEL	HQ[c]	Calculated TRV-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			LOAEL	HQ[c]
		Food	Substrate	Total Dose				Food	Substrate	Total Dose		
Metals												
ARSENIC	1.65E+01	6.95E-02	4.50E-02	1.15E-01	1.14E-01	1.00	1.65E+02	6.95E-01	4.50E-01	1.15E+00	1.14E+00	1.00
CADMIUM	2.75E+01	1.60E+00	7.50E-02	1.68E+00	1.68E+00	1.00	2.75E+02	1.60E+01	7.49E-01	1.68E+01	1.68E+01	1.00
CHROMIUM	1.59E+06	2.70E+02	4.33E+03	4.60E+03	4.60E+03	1.00	1.59E+07	2.70E+03	4.33E+04	4.60E+04	4.60E+04	1.00
COPPER	1.53E+03	2.14E+01	4.17E+00	2.55E+01	2.55E+01	1.00	2.01E+03	2.81E+01	5.49E+00	3.36E+01	3.36E+01	1.00
LEAD	1.92E+03	8.21E+00	5.23E+00	1.34E+01	1.34E+01	1.00	1.92E+04	8.21E+01	5.23E+01	1.34E+02	1.34E+02	1.00
MERCURY	7.83E-01	3.06E-02	2.00E-03	3.26E-02	3.28E-02	1.00	3.20E+00	1.25E-01	9.00E-03	1.34E-01	1.34E-01	1.00
SELENIUM	5.00E+00	3.22E-01	1.40E-02	3.36E-01	3.36E-01	1.00	8.25E+00	5.32E-01	2.30E-02	5.55E-01	5.54E-01	1.00
ZINC	6.19E+03	2.52E+02	1.69E+01	2.69E+02	2.69E+02	1.00	1.24E+04	5.04E+02	3.38E+01	5.37E+02	5.37E+02	1.00
PCBs												
AROCLOR 1254	2.14E+01	3.43E-03	5.80E-02	6.14E-02	6.18E-02	0.99	2.14E+02	3.43E-02	5.84E-01	6.18E-01	6.18E-01	1.00

Notes:

[a] = The following equation was used to calculate NOAEL- and LOAEL-based soil concentrations:

$$C_{TRV} = \frac{(ADD_i) \times BW_i}{(IR_{food} \sum (BAF_{food_i} \times DF) + (IR_s)) \times AF}$$

C_{TRV}-Based Sediment Concentration (mg chemical / kg sediment, dry weight);
ADD= NOAEL or LOAEL (mg chemical/kg body weight-day);
BW = Body Weight of the receptor (kg);
IR_{food} = Ingestion Rate of food (kg food ingested per day, wet weight);
BAF_{foodi} = Bioconcentration factor, specific to prey type and chemical (ratio of mg of chemical/kg fauna, wet weight to mg chemical/ kg sediment, dry weight);
DF_i = Dietary fraction (proportion of food type in the diet);
IR_s = Incidental Ingestion Rate of sediment (kg sediment ingested per day, dry weight); and
AF = 100% Area Use Factor includes season use rates, area use rates, chemical assimilation rate.

NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
mg/kg = Milligram Per Kilogram
bw - day = Body Weight - Day
HQ = Hazard Quotient
TRV = Toxicity Reference Value

[b] = Receptor doses were determined in order to verify equation calculations for the TRV-Based soil concentrations.
Receptor doses were calculated using species information (Table C-15).
Food dose = (COPEC concentration in prey * % of food type ingested * seasonal and area use factor * receptor ingestion rate for food) / receptor body weight
Receptors prey are based on conservative diet assumptions in Table C-15.
Substrate Dose = (COPEC concentration in soil * receptor ingestion rate for substrate) / receptor body weight
Total Dose = Food Dose + Substrate Dose

[c] = HQ = Total Dose / TRV is used to verify equation calculations.

Table I-9D
TRV-Based Soil Concentration
Refined Ecological Effects Evaluation
Red Fox (*Vulpes vulpes*)
SSP Report - SWMUs 37, 38, and Area Q
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	NOAEL						LOAEL					
	Calculated NOAEL-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			NOAEL	HQ[c]	Calculated TRV-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			LOAEL	HQ[c]
		Food	Substrate	Total Dose				Food	Substrate	Total Dose		
Metals												
ARSENIC	4.00E+02	3.17E-02	4.30E-03	3.60E-02	3.60E-02	1.00	4.00E+03	3.17E-01	4.30E-02	3.60E-01	3.60E-01	1.00
CADMIUM	4.84E+03	4.76E-01	5.22E-02	5.28E-01	5.28E-01	1.00	4.84E+04	4.76E+00	5.22E-01	5.28E+00	5.28E+00	1.00
CHROMIUM	7.04E+06	1.37E+03	7.60E+01	1.45E+03	1.45E+03	1.00	7.04E+07	1.37E+04	7.60E+02	1.45E+04	1.45E+04	1.00
COPPER	2.22E+04	7.79E+00	2.39E-01	8.03E+00	8.03E+00	1.00	2.92E+04	1.03E+01	3.15E-01	1.06E+01	1.06E+01	1.00
LEAD	1.52E+05	2.59E+00	1.64E+00	4.22E+00	4.22E+00	1.00	1.52E+06	2.59E+01	1.64E+01	4.22E+01	4.22E+01	1.00
MERCURY	1.17E+00	1.03E-02	0.00E+00	1.03E-02	1.03E-02	1.00	4.76E+00	4.20E-02	0.00E+00	4.20E-02	4.21E-02	1.00
SELENIUM	1.84E+02	1.04E-01	2.00E-03	1.06E-01	1.06E-01	1.00	3.04E+02	1.71E-01	3.00E-03	1.74E-01	1.74E-01	1.00
ZINC	2.46E+04	8.42E+01	2.65E-01	8.45E+01	8.45E+01	1.00	4.92E+04	1.68E+02	5.31E-01	1.69E+02	1.69E+02	1.00
PCBs												
AROCLOR 1254	1.58E+01	1.93E-02	2.00E-04	1.95E-02	1.94E-02	1.00	1.58E+02	1.93E-01	2.00E-03	1.95E-01	1.94E-01	1.00

Notes:

[a] = The following equation was used to calculate NOAEL- and LOAEL-based soil concentrations:

$$C_{TRV} = \frac{(ADD_i) \times BW_i}{(IR_{food} \sum (BAF_{food_i} \times DF) + (IR_s)) \times AF}$$

C_{TRV}-Based Sediment Concentration (mg chemical / kg sediment, dry weight);
ADD= NOAEL or LOAEL (mg chemical/kg body weight-day);
BW = Body Weight of the receptor (kg);
IR_{food} = Ingestion Rate of food (kg food ingested per day, wet weight);
BAF_{foodi} = Bioconcentration factor, specific to prey type and chemical (ratio of mg of chemical/kg fauna, wet weight to mg chemical/ kg sediment, dry weight);
DF_i = Dietary fraction (proportion of food type in the diet);
IR_s = Incidental Ingestion Rate of sediment (kg sediment ingested per day, dry weight); and
AF = 100% Area Use Factor includes season use rates, area use rates, chemical assimilation rate.

[b] = Receptor doses were determined in order to verify equation calculations for the TRV-Based soil concentrations.
Receptor doses were calculated using species information (Table C-15).
Food dose = (COPEC concentration in prey * % of food type ingested * seasonal and area use factor * receptor ingestion rate for food) / receptor body weight
Receptors prey are based on conservative diet assumptions in Table C-15.
Substrate Dose = (COPEC concentration in soil * receptor ingestion rate for substrate) / receptor body weight
Total Dose = Food Dose + Substrate Dose

[c] = HQ = Total Dose / TRV is used to verify equation calculations.

NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
bw - day = Body Weight - Day
HQ = Hazard Quotient
TRV = Toxicity Reference Value
PCB = Polychlorinated Biphenyls

Table I-9E
TRV-Based Soil Concentration
Refined Ecological Effects Evaluation
Short-tailed Shrew (*Blarina brevicauda*)
SSP Report - SWMUs 37, 38, and Area Q
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	NOAEL						LOAEL					
	Calculated NOAEL-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			NOAEL	HQ[c]	Calculated TRV-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			LOAEL	HQ[c]
		Food	Substrate	Total Dose				Food	Substrate	Total Dose		
Metals												
ARSENIC	5.01E-01	5.13E-02	2.50E-02	7.63E-02	7.66E-02	1.00	5.01E+00	5.13E-01	2.53E-01	7.66E-01	7.66E-01	1.00
CADMIUM	1.98E+00	1.02E+00	1.00E-01	1.12E+00	1.12E+00	1.00	1.98E+01	1.02E+01	9.97E-01	1.12E+01	1.12E+01	1.00
CHROMIUM	2.91E+04	1.61E+03	1.47E+03	3.07E+03	3.07E+03	1.00	2.91E+05	1.61E+04	1.47E+04	3.07E+04	3.07E+04	1.00
COPPER	1.57E+02	9.17E+00	7.91E+00	1.71E+01	1.71E+01	1.00	2.06E+02	1.21E+01	1.04E+01	2.25E+01	2.25E+01	1.00
LEAD	8.89E+01	4.50E+00	4.48E+00	8.98E+00	8.98E+00	1.00	8.89E+02	4.50E+01	4.48E+01	8.98E+01	8.98E+01	1.00
MERCURY	1.38E-01	1.49E-02	7.00E-03	2.19E-02	2.19E-02	1.00	5.64E-01	6.10E-02	2.85E-02	8.95E-02	8.94E-02	1.00
SELENIUM	8.88E-01	1.80E-01	4.50E-02	2.25E-01	2.25E-01	1.00	1.46E+00	2.97E-01	7.40E-02	3.71E-01	3.71E-01	1.00
ZINC	7.10E+02	1.44E+02	3.58E+01	1.80E+02	1.80E+02	1.00	1.42E+03	2.88E+02	7.17E+01	3.59E+02	3.59E+02	1.00
PCBs												
AROCLOR 1254	5.87E-03	4.10E-02	3.00E-04	4.13E-02	4.13E-02	1.00	5.87E-02	4.10E-01	3.00E-03	4.13E-01	4.13E-01	1.00

Notes:

[a] = The following equation was used to calculate NOAEL- and LOAEL-based soil concentrations:

$$C_{TRV} = \frac{(ADD_i) \times BW_i}{(IR_{food} \sum (BAF_{food_i} \times DF) + (IR_s)) \times AF}$$

C_{TRV}-Based Sediment Concentration (mg chemical / kg sediment, dry weight);
ADD= NOAEL or LOAEL (mg chemical/kg body weight-day);
BW = Body Weight of the receptor (kg);
IR_{food} = Ingestion Rate of food (kg food ingested per day, wet weight);
BAF_{foodi} = Bioconcentration factor, specific to prey type and chemical (ratio of mg of chemical/kg fauna, wet weight to mg chemical/ kg sediment, dry weight);
DF_i = Dietary fraction (proportion of food type in the diet);
IR_s = Incidental Ingestion Rate of sediment (kg sediment ingested per day, dry weight); and
AF = 100% Area Use Factor includes season use rates, area use rates, chemical assimilation rate.

NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
bw - day = Body Weight - Day
HQ = Hazard Quotient
TRV = Toxicity Reference Value
PCB = Polychlorinated Biphenyls

[b] = Receptor doses were determined in order to verify equation calculations for the TRV-Based soil concentrations.
Receptor doses were calculated using species information (Table C-15).
Food dose = (COPEC concentration in prey * % of food type ingested * seasonal and area use factor * receptor ingestion rate for food) / receptor body weight
Receptors prey are based on conservative diet assumptions in Table C-15.
Substrate Dose = (COPEC concentration in soil * receptor ingestion rate for substrate) / receptor body weight
Total Dose = Food Dose + Substrate Dose

[c] = HQ = Total Dose / TRV is used to verify equation calculations.

Table I-10A
TRV-Based Soil Concentration
Refined Ecological Effects Evaluation
American Robin (*Turdus migratorius*)
SSP Report - SWMU 46
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	NOAEL						LOAEL					
	Calculated NOAEL-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			NOAEL	HQ[c]	Calculated TRV-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			LOAEL	HQ[c]
		Food	Substrate	Total Dose				Food	Substrate	Total Dose		
Metals												
ARSENIC	1.09E+03	4.53E+00	6.14E-01	5.14E+00	5.14E+00	1.00	2.71E+03	1.13E+01	1.54E+00	1.28E+01	1.28E+01	1.00
CADMIUM	5.55E+01	1.42E+00	3.10E-02	1.45E+00	1.45E+00	1.00	7.65E+02	1.96E+01	4.33E-01	2.00E+01	2.00E+01	1.00
CHROMIUM	3.92E+02	7.78E-01	2.22E-01	1.00E+00	1.00E+00	1.00	1.96E+03	3.89E+00	1.11E+00	5.00E+00	5.00E+00	1.00
LEAD	3.91E+02	9.09E-01	2.21E-01	1.13E+00	1.13E+00	1.00	3.91E+03	9.09E+00	2.21E+00	1.13E+01	1.13E+01	1.00
MERCURY	4.90E+01	4.22E-01	2.80E-02	4.50E-01	4.50E-01	1.00	9.80E+01	8.45E-01	5.50E-02	9.00E-01	9.00E-01	1.00
SELENIUM	2.56E+01	3.86E-01	1.40E-02	4.00E-01	4.00E-01	1.00	5.12E+01	7.71E-01	2.90E-02	8.00E-01	8.00E-01	1.00
ZINC	1.14E+03	1.39E+01	6.43E-01	1.45E+01	1.45E+01	1.00	1.03E+04	1.25E+02	5.81E+00	1.31E+02	1.31E+02	1.00

Notes:

[a] = The following equation was used to calculate NOAEL- and LOAEL-based soil concentrations:

$$C_{TRV} = \frac{(ADD_i) \times BW_i}{(IR_{food} \sum (BAF_{food_i} \times DF) + (IR_s)) \times AF}$$

C_{TRV}-Based Sediment Concentration (mg chemical / kg sediment, dry weight);
ADD= NOAEL or LOAEL (mg chemical/kg body weight-day);
BW = Body Weight of the receptor (kg);
IR_{food} = Ingestion Rate of food (kg food ingested per day, wet weight);
BAF_{foodi} = Bioconcentration factor, specific to prey type and chemical (ratio of mg of chemical/kg fauna, wet weight to mg chemical/ kg sediment, dry weight);
DF_i = Dietary fraction (proportion of food type in the diet);
IR_s = Incidental Ingestion Rate of sediment (kg sediment ingested per day, dry weight); and
AF = 100% Area Use Factor includes season use rates, area use rates, chemical assimilation rate.

NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
mg/kg = Milligram Per Kilogram
bw - day = Body Weight - Day
HQ = Hazard Quotient
TRV = Toxicity Reference Value
PCB = Polychlorinated Biphenyls

[b] = Receptor doses were determined in order to verify equation calculations for the TRV-Based soil concentrations.
Receptor doses were calculated using species information (Table C-15).
Food dose = (COPEC concentration in prey * % of food type ingested * seasonal and area use factor * receptor ingestion rate for food) / receptor body weight
Receptors prey are based on conservative diet assumptions in Table C-15.
Substrate Dose = (COPEC concentration in soil * receptor ingestion rate for substrate) / receptor body weight
Total Dose = Food Dose + Substrate Dose

[c] = HQ = Total Dose / TRV is used to verify equation calculations.

Table I-10B
TRV-Based Soil Concentration
Refined Ecological Effects Evaluation
Red-tailed Hawk (*Buteo jamaicensis*)
SSP Report - SWMU 46
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	NOAEL						LOAEL					
	Calculated NOAEL-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			NOAEL	HQ[c]	Calculated TRV-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			LOAEL	HQ[c]
		Food	Substrate	Total Dose				Food	Substrate	Total Dose		
Metals												
ARSENIC	1.46E+07	5.14E+00	0.00E+00	5.14E+00	5.14E+00	1.00	3.64E+07	1.28E+01	0.00E+00	1.28E+01	1.28E+01	1.00
CADMIUM	1.47E+07	1.45E+00	0.00E+00	1.45E+00	1.45E+00	1.00	2.02E+08	2.00E+01	0.00E+00	2.00E+01	2.00E+01	1.00
CHROMIUM	1.01E+06	1.00E+00	0.00E+00	1.00E+00	1.00E+00	1.00	5.06E+06	5.00E+00	0.00E+00	5.00E+00	5.00E+00	1.00
LEAD	2.13E+07	1.13E+00	0.00E+00	1.13E+00	1.13E+00	1.00	2.13E+08	1.13E+01	0.00E+00	1.13E+01	1.13E+01	1.00
MERCURY	9.81E+03	4.50E-01	0.00E+00	4.50E-01	4.50E-01	1.00	1.96E+04	9.00E-01	0.00E+00	9.00E-01	9.00E-01	1.00
SELENIUM	1.51E+05	4.00E-01	0.00E+00	4.00E-01	4.00E-01	1.00	3.02E+05	8.00E-01	0.00E+00	8.00E-01	8.00E-01	1.00
ZINC	8.21E+05	1.45E+01	0.00E+00	1.45E+01	1.45E+01	1.00	7.42E+06	1.31E+02	0.00E+00	1.31E+02	1.31E+02	1.00

Notes:

[a] = The following equation was used to calculate NOAEL- and LOAEL-based soil concentrations:

$$C_{TRV} = \frac{(ADD_i) \times BW_i}{(IR_{food} \sum (BAF_{food_i} \times DF) + (IR_s)) \times AF}$$

C_{TRV}-Based Sediment Concentration (mg chemical / kg sediment, dry weight);
ADD= NOAEL or LOAEL (mg chemical/kg body weight-day);
BW = Body Weight of the receptor (kg);
IR_{food} = Ingestion Rate of food (kg food ingested per day, wet weight);
BAF_{food_i} = Bioconcentration factor, specific to prey type and chemical (ratio of mg of chemical/kg fauna, wet weight to mg chemical/ kg sediment, dry weight);
DF_i = Dietary fraction (proportion of food type in the diet);
IR_s = Incidental Ingestion Rate of sediment (kg sediment ingested per day, dry weight); and
AF = 100% Area Use Factor includes season use rates, area use rates, chemical assimilation rate.

NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
mg/kg = Milligram Per Kilogram
bw - day = Body Weight - Day
HQ = Hazard Quotient
TRV = Toxicity Reference Value

[b] = Receptor doses were determined in order to verify equation calculations for the TRV-Based soil concentrations.
Receptor doses were calculated using species information (Table C-15).
Food dose = (COPEC concentration in prey * % of food type ingested * seasonal and area use factor * receptor ingestion rate for food) / receptor body weight
Receptors prey are based on conservative diet assumptions in Table C-15.
Substrate Dose = (COPEC concentration in soil * receptor ingestion rate for substrate) / receptor body weight
Total Dose = Food Dose + Substrate Dose

[c] = HQ = Total Dose / TRV is used to verify equation calculations.

Table I-10C
TRV-Based Soil Concentration
Refined Ecological Effects Evaluation
Meadow Vole (*Microtus pennsylvanicus*)
SSP Report - SWMU 46
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	NOAEL						LOAEL					
	Calculated NOAEL-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			NOAEL	HQ[c]	Calculated TRV-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			LOAEL	HQ[c]
		Food	Substrate	Total Dose				Food	Substrate	Total Dose		
Metals												
ARSENIC	6.10E+01	6.95E-02	4.50E-02	1.15E-01	1.14E-01	1.00	6.10E+02	6.95E-01	4.50E-01	1.15E+00	1.14E+00	1.00
CADMIUM	1.02E+02	1.60E+00	7.50E-02	1.68E+00	1.68E+00	1.00	1.02E+03	1.60E+01	7.49E-01	1.68E+01	1.68E+01	1.00
CHROMIUM	5.87E+06	2.70E+02	4.33E+03	4.60E+03	4.60E+03	1.00	5.87E+07	2.70E+03	4.33E+04	4.60E+04	4.60E+04	1.00
LEAD	7.09E+03	8.21E+00	5.23E+00	1.34E+01	1.34E+01	1.00	7.09E+04	8.21E+01	5.23E+01	1.34E+02	1.34E+02	1.00
MERCURY	2.90E+00	3.06E-02	2.00E-03	3.26E-02	3.28E-02	1.00	1.18E+01	1.25E-01	9.00E-03	1.34E-01	1.34E-01	1.00
SELENIUM	1.85E+01	3.22E-01	1.40E-02	3.36E-01	3.36E-01	1.00	3.05E+01	5.32E-01	2.30E-02	5.55E-01	5.54E-01	1.00
ZINC	2.29E+04	2.52E+02	1.69E+01	2.69E+02	2.69E+02	1.00	4.58E+04	5.04E+02	3.38E+01	5.37E+02	5.37E+02	1.00

Notes:

[a] = The following equation was used to calculate NOAEL- and LOAEL-based soil concentrations:

$$C_{TRV} = \frac{(ADD_i) \times BW_i}{(IR_{food} \sum (BAF_{food_i} \times DF) + (IR_s)) \times AF}$$

C_{TRV}-Based Sediment Concentration (mg chemical / kg sediment, dry weight);
ADD= NOAEL or LOAEL (mg chemical/kg body weight-day);
BW = Body Weight of the receptor (kg);
IR_{food} = Ingestion Rate of food (kg food ingested per day, wet weight);
BAF_{food_i} = Bioconcentration factor, specific to prey type and chemical (ratio of mg of chemical/kg fauna, wet weight to mg chemical/ kg sediment, dry weight);
DF_i = Dietary fraction (proportion of food type in the diet);
IR_s = Incidental Ingestion Rate of sediment (kg sediment ingested per day, dry weight); and
AF = 100% Area Use Factor includes season use rates, area use rates, chemical assimilation rate.

NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
mg/kg = Milligram Per Kilogram
bw - day = Body Weight - Day
HQ = Hazard Quotient
TRV = Toxicity Reference Value

[b] = Receptor doses were determined in order to verify equation calculations for the TRV-Based soil concentrations.
Receptor doses were calculated using species information (Table C-15).
Food dose = (COPEC concentration in prey * % of food type ingested * seasonal and area use factor * receptor ingestion rate for food) / receptor body weight
Receptors prey are based on conservative diet assumptions in Table C-15.
Substrate Dose = (COPEC concentration in soil * receptor ingestion rate for substrate) / receptor body weight
Total Dose = Food Dose + Substrate Dose

[c] = HQ = Total Dose / TRV is used to verify equation calculations.

Table I-10D
TRV-Based Soil Concentration
Refined Ecological Effects Evaluation
Red Fox (*Vulpes vulpes*)
SSP Report - SWMU 46
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	NOAEL						LOAEL					
	Calculated NOAEL-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			NOAEL	HQ[c]	Calculated TRV-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			LOAEL	HQ[c]
		Food	Substrate	Total Dose				Food	Substrate	Total Dose		
Metals												
ARSENIC	1.48E+04	3.17E-02	4.30E-03	3.60E-02	3.60E-02	1.00	1.48E+05	3.17E-01	4.30E-02	3.60E-01	3.60E-01	1.00
CADMIUM	1.79E+05	4.76E-01	5.22E-02	5.28E-01	5.28E-01	1.00	1.79E+06	4.76E+00	5.22E-01	5.28E+00	5.28E+00	1.00
CHROMIUM	2.61E+08	1.37E+03	7.60E+01	1.45E+03	1.45E+03	1.00	2.61E+09	1.37E+04	7.60E+02	1.45E+04	1.45E+04	1.00
LEAD	5.61E+06	2.59E+00	1.64E+00	4.22E+00	4.22E+00	1.00	5.61E+07	2.59E+01	1.64E+01	4.22E+01	4.22E+01	1.00
MERCURY	4.31E+01	1.03E-02	0.00E+00	1.03E-02	1.03E-02	1.00	1.76E+02	4.20E-02	0.00E+00	4.20E-02	4.21E-02	1.00
SELENIUM	6.82E+03	1.04E-01	2.00E-03	1.06E-01	1.06E-01	1.00	1.12E+04	1.71E-01	3.00E-03	1.74E-01	1.74E-01	1.00
ZINC	9.10E+05	8.42E+01	2.65E-01	8.45E+01	8.45E+01	1.00	1.82E+06	1.68E+02	5.31E-01	1.69E+02	1.69E+02	1.00

Notes:

[a] = The following equation was used to calculate NOAEL- and LOAEL-based soil concentrations:

$$C_{TRV} = \frac{(ADD_i) \times BW_i}{(IR_{food} \sum (BAF_{food_i} \times DF) + (IR_s)) \times AF}$$

C_{TRV}-Based Sediment Concentration (mg chemical / kg sediment, dry weight);
ADD= NOAEL or LOAEL (mg chemical/kg body weight-day);
BW = Body Weight of the receptor (kg);
IR_{food} = Ingestion Rate of food (kg food ingested per day, wet weight);
BAF_{foodi} = Bioconcentration factor, specific to prey type and chemical (ratio of mg of chemical/kg fauna, wet weight to mg chemical/ kg sediment, dry weight);
DF_i = Dietary fraction (proportion of food type in the diet);
IR_s = Incidental Ingestion Rate of sediment (kg sediment ingested per day, dry weight); and
AF = 100% Area Use Factor includes season use rates, area use rates, chemical assimilation rate.

[b] = Receptor doses were determined in order to verify equation calculations for the TRV-Based soil concentrations.
Receptor doses were calculated using species information (Table C-15).
Food dose = (COPEC concentration in prey * % of food type ingested * seasonal and area use factor * receptor ingestion rate for food) / receptor body weight
Receptors prey are based on conservative diet assumptions in Table C-15.
Substrate Dose = (COPEC concentration in soil * receptor ingestion rate for substrate) / receptor body weight
Total Dose = Food Dose + Substrate Dose

[c] = HQ = Total Dose / TRV is used to verify equation calculations.

NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
bw - day = Body Weight - Day
HQ = Hazard Quotient
TRV = Toxicity Reference Value
PCB = Polychlorinated Biphenyls

Table I-10E
TRV-Based Soil Concentration
Refined Ecological Effects Evaluation
Short-tailed Shrew (*Blarina brevicauda*)
SSP Report - SWMU 46
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	NOAEL						LOAEL					
	Calculated NOAEL-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			NOAEL	HQ[c]	Calculated TRV-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			LOAEL	HQ[c]
		Food	Substrate	Total Dose				Food	Substrate	Total Dose		
Metals												
ARSENIC	1.85E+01	5.13E-02	2.50E-02	7.63E-02	7.66E-02	1.00	1.85E+02	5.13E-01	2.53E-01	7.66E-01	7.66E-01	1.00
CADMIUM	7.31E+01	1.02E+00	1.00E-01	1.12E+00	1.12E+00	1.00	7.31E+02	1.02E+01	9.97E-01	1.12E+01	1.12E+01	1.00
CHROMIUM	1.08E+06	1.61E+03	1.47E+03	3.07E+03	3.07E+03	1.00	1.08E+07	1.61E+04	1.47E+04	3.07E+04	3.07E+04	1.00
LEAD	3.29E+03	4.50E+00	4.48E+00	8.98E+00	8.98E+00	1.00	3.29E+04	4.50E+01	4.48E+01	8.98E+01	8.98E+01	1.00
MERCURY	5.11E+00	1.49E-02	7.00E-03	2.19E-02	2.19E-02	1.00	2.09E+01	6.10E-02	2.85E-02	8.95E-02	8.94E-02	1.00
SELENIUM	3.28E+01	1.80E-01	4.50E-02	2.25E-01	2.25E-01	1.00	5.42E+01	2.97E-01	7.40E-02	3.71E-01	3.71E-01	1.00
ZINC	2.63E+04	1.44E+02	3.58E+01	1.80E+02	1.80E+02	1.00	5.25E+04	2.88E+02	7.17E+01	3.59E+02	3.59E+02	1.00

Notes:

[a] = The following equation was used to calculate NOAEL- and LOAEL-based soil concentrations:

$$C_{TRV} = \frac{(ADD_i) \times BW_i}{(IR_{food} \sum (BAF_{food_i} \times DF) + (IR_s)) \times AF}$$

C_{TRV}-Based Sediment Concentration (mg chemical / kg sediment, dry weight);
ADD= NOAEL or LOAEL (mg chemical/kg body weight-day);
BW = Body Weight of the receptor (kg);
IR_{food} = Ingestion Rate of food (kg food ingested per day, wet weight);
BAF_{foodi} = Bioconcentration factor, specific to prey type and chemical (ratio of mg of chemical/kg fauna, wet weight to mg chemical/ kg sediment, dry weight);
DF_i = Dietary fraction (proportion of food type in the diet);
IR_s = Incidental Ingestion Rate of sediment (kg sediment ingested per day, dry weight); and
AF = 100% Area Use Factor includes season use rates, area use rates, chemical assimilation rate.

NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
bw - day = Body Weight - Day
HQ = Hazard Quotient
TRV = Toxicity Reference Value
PCB = Polychlorinated Biphenyls

[b] = Receptor doses were determined in order to verify equation calculations for the TRV-Based soil concentrations.
Receptor doses were calculated using species information (Table C-15).
Food dose = (COPEC concentration in prey * % of food type ingested * seasonal and area use factor * receptor ingestion rate for food) / receptor body weight
Receptors prey are based on conservative diet assumptions in Table C-15.
Substrate Dose = (COPEC concentration in soil * receptor ingestion rate for substrate) / receptor body weight
Total Dose = Food Dose + Substrate Dose

[c] = HQ = Total Dose / TRV is used to verify equation calculations.

Table I-11A
TRV-Based Soil Concentration
Refined Ecological Effects Evaluation
American Robin (*Turdus migratorius*)
SSP Report - SWMU 57
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	NOAEL						LOAEL					
	Calculated NOAEL-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			NOAEL	HQ[c]	Calculated TRV-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			LOAEL	HQ[c]
		Food	Substrate	Total Dose				Food	Substrate	Total Dose		
Metals												
ARSENIC	6.04E+01	4.53E+00	6.14E-01	5.14E+00	5.14E+00	1.00	1.51E+02	1.13E+01	1.54E+00	1.28E+01	1.28E+01	1.00
CADMIUM	3.08E+00	1.42E+00	3.10E-02	1.45E+00	1.45E+00	1.00	4.25E+01	1.96E+01	4.33E-01	2.00E+01	2.00E+01	1.00
CHROMIUM	2.18E+01	7.78E-01	2.22E-01	1.00E+00	1.00E+00	1.00	1.09E+02	3.89E+00	1.11E+00	5.00E+00	5.00E+00	1.00
LEAD	2.17E+01	9.09E-01	2.21E-01	1.13E+00	1.13E+00	1.00	2.17E+02	9.09E+00	2.21E+00	1.13E+01	1.13E+01	1.00
MERCURY	2.72E+00	4.22E-01	2.80E-02	4.50E-01	4.50E-01	1.00	5.45E+00	8.45E-01	5.50E-02	9.00E-01	9.00E-01	1.00
SELENIUM	1.42E+00	3.86E-01	1.40E-02	4.00E-01	4.00E-01	1.00	2.84E+00	7.71E-01	2.90E-02	8.00E-01	8.00E-01	1.00
ZINC	6.32E+01	1.39E+01	6.43E-01	1.45E+01	1.45E+01	1.00	5.71E+02	1.25E+02	5.81E+00	1.31E+02	1.31E+02	1.00
PCBs												
AROCLOR 1254	4.00E-02	1.80E-01	0.00E+00	1.80E-01	1.80E-01	1.00	4.00E-01	1.80E+00	4.00E-03	1.80E+00	1.80E+00	1.00

Notes:

[a] = The following equation was used to calculate NOAEL- and LOAEL-based soil concentrations:

$$C_{TRV} = \frac{(ADD_i) \times BW_i}{(IR_{food} \sum (BAF_{food_i} \times DF) + (IR_s)) \times AF}$$

C_{TRV}-Based Sediment Concentration (mg chemical / kg sediment, dry weight);
ADD= NOAEL or LOAEL (mg chemical/kg body weight-day);
BW = Body Weight of the receptor (kg);
IR_{food} = Ingestion Rate of food (kg food ingested per day, wet weight);
BAF_{foodi} = Bioconcentration factor, specific to prey type and chemical (ratio of mg of chemical/kg fauna, wet weight to mg chemical/ kg sediment, dry weight);
DF_i = Dietary fraction (proportion of food type in the diet);
IR_s = Incidental Ingestion Rate of sediment (kg sediment ingested per day, dry weight); and
AF = 100% Area Use Factor includes season use rates, area use rates, chemical assimilation rate.

NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
mg/kg = Milligram Per Kilogram
bw - day = Body Weight - Day
HQ = Hazard Quotient
TRV = Toxicity Reference Value
PCB = Polychlorinated Biphenyls

[b] = Receptor doses were determined in order to verify equation calculations for the TRV-Based soil concentrations.
Receptor doses were calculated using species information (Table C-15).
Food dose = (COPEC concentration in prey * % of food type ingested * seasonal and area use factor * receptor ingestion rate for food) / receptor body weight
Receptors prey are based on conservative diet assumptions in Table C-15.
Substrate Dose = (COPEC concentration in soil * receptor ingestion rate for substrate) / receptor body weight
Total Dose = Food Dose + Substrate Dose

[c] = HQ = Total Dose / TRV is used to verify equation calculations.

Table I-11B
TRV-Based Soil Concentration
Refined Ecological Effects Evaluation
Red-tailed Hawk (*Buteo jamaicensis*)
SSP Report - SWMU 57
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	NOAEL						LOAEL					
	Calculated NOAEL-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			NOAEL	HQ[c]	Calculated TRV-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			LOAEL	HQ[c]
		Food	Substrate	Total Dose				Food	Substrate	Total Dose		
Metals												
ARSENIC	8.09E+05	5.14E+00	0.00E+00	5.14E+00	5.14E+00	1.00	2.02E+06	1.28E+01	0.00E+00	1.28E+01	1.28E+01	1.00
CADMIUM	8.15E+05	1.45E+00	0.00E+00	1.45E+00	1.45E+00	1.00	1.12E+07	2.00E+01	0.00E+00	2.00E+01	2.00E+01	1.00
CHROMIUM	5.62E+04	1.00E+00	0.00E+00	1.00E+00	1.00E+00	1.00	2.81E+05	5.00E+00	0.00E+00	5.00E+00	5.00E+00	1.00
LEAD	1.19E+06	1.13E+00	0.00E+00	1.13E+00	1.13E+00	1.00	1.19E+07	1.13E+01	0.00E+00	1.13E+01	1.13E+01	1.00
MERCURY	5.45E+02	4.50E-01	0.00E+00	4.50E-01	4.50E-01	1.00	1.09E+03	9.00E-01	0.00E+00	9.00E-01	9.00E-01	1.00
SELENIUM	8.39E+03	4.00E-01	0.00E+00	4.00E-01	4.00E-01	1.00	1.68E+04	8.00E-01	0.00E+00	8.00E-01	8.00E-01	1.00
ZINC	4.56E+04	1.45E+01	0.00E+00	1.45E+01	1.45E+01	1.00	4.12E+05	1.31E+02	0.00E+00	1.31E+02	1.31E+02	1.00
PCBs												
AROCLOR 1254	3.18E+03	1.80E-01	0.00E+00	1.80E-01	1.80E-01	1.00	3.18E+04	1.80E+00	0.00E+00	1.80E+00	1.80E+00	1.00

Notes:

[a] = The following equation was used to calculate NOAEL- and LOAEL-based soil concentrations:

$$C_{TRV} = \frac{(ADD_i) \times BW_i}{(IR_{food} \sum (BAF_{food_i} \times DF) + (IR_s)) \times AF}$$

C_{TRV}-Based Sediment Concentration (mg chemical / kg sediment, dry weight);
ADD= NOAEL or LOAEL (mg chemical/kg body weight-day);
BW = Body Weight of the receptor (kg);
IR_{food} = Ingestion Rate of food (kg food ingested per day, wet weight);
BAF_{foodi} = Bioconcentration factor, specific to prey type and chemical (ratio of mg of chemical/kg fauna, wet weight to mg chemical/ kg sediment, dry weight);
DF_i = Dietary fraction (proportion of food type in the diet);
IR_s = Incidental Ingestion Rate of sediment (kg sediment ingested per day, dry weight); and
AF = 100% Area Use Factor includes season use rates, area use rates, chemical assimilation rate.

NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
mg/kg = Milligram Per Kilogram
bw - day = Body Weight - Day
HQ = Hazard Quotient
TRV = Toxicity Reference Value

[b] = Receptor doses were determined in order to verify equation calculations for the TRV-Based soil concentrations.
Receptor doses were calculated using species information (Table C-15).
Food dose = (COPEC concentration in prey * % of food type ingested * seasonal and area use factor * receptor ingestion rate for food) / receptor body weight
Receptors prey are based on conservative diet assumptions in Table C-15.
Substrate Dose = (COPEC concentration in soil * receptor ingestion rate for substrate) / receptor body weight
Total Dose = Food Dose + Substrate Dose

[c] = HQ = Total Dose / TRV is used to verify equation calculations.

Table I-11C
TRV-Based Soil Concentration
Refined Ecological Effects Evaluation
Meadow Vole (*Microtus pennsylvanicus*)
SSP Report - SWMU 57
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	NOAEL						LOAEL					
	Calculated NOAEL-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			NOAEL	HQ[c]	Calculated TRV-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			LOAEL	HQ[c]
		Food	Substrate	Total Dose				Food	Substrate	Total Dose		
Metals												
ARSENIC	1.65E+01	6.95E-02	4.50E-02	1.15E-01	1.14E-01	1.00	1.65E+02	6.95E-01	4.50E-01	1.15E+00	1.14E+00	1.00
CADMIUM	2.75E+01	1.60E+00	7.50E-02	1.68E+00	1.68E+00	1.00	2.75E+02	1.60E+01	7.49E-01	1.68E+01	1.68E+01	1.00
CHROMIUM	1.59E+06	2.70E+02	4.33E+03	4.60E+03	4.60E+03	1.00	1.59E+07	2.70E+03	4.33E+04	4.60E+04	4.60E+04	1.00
LEAD	1.92E+03	8.21E+00	5.23E+00	1.34E+01	1.34E+01	1.00	1.92E+04	8.21E+01	5.23E+01	1.34E+02	1.34E+02	1.00
MERCURY	7.83E-01	3.06E-02	2.00E-03	3.26E-02	3.28E-02	1.00	3.20E+00	1.25E-01	9.00E-03	1.34E-01	1.34E-01	1.00
SELENIUM	5.00E+00	3.22E-01	1.40E-02	3.36E-01	3.36E-01	1.00	8.25E+00	5.32E-01	2.30E-02	5.55E-01	5.54E-01	1.00
ZINC	6.19E+03	2.52E+02	1.69E+01	2.69E+02	2.69E+02	1.00	1.24E+04	5.04E+02	3.38E+01	5.37E+02	5.37E+02	1.00
PCBs												
AROCLOR 1254	2.14E+01	3.43E-03	5.80E-02	6.14E-02	6.18E-02	0.99	2.14E+02	3.43E-02	5.84E-01	6.18E-01	6.18E-01	1.00

Notes:

[a] = The following equation was used to calculate NOAEL- and LOAEL-based soil concentrations:

$$C_{TRV} = \frac{(ADD_i) \times BW_i}{(IR_{food} \sum (BAF_{food_i} \times DF) + (IR_s)) \times AF}$$

C_{TRV}-Based Sediment Concentration (mg chemical / kg sediment, dry weight);
ADD= NOAEL or LOAEL (mg chemical/kg body weight-day);
BW = Body Weight of the receptor (kg);
IR_{food} = Ingestion Rate of food (kg food ingested per day, wet weight);
BAF_{foodi} = Bioconcentration factor, specific to prey type and chemical (ratio of mg of chemical/kg fauna, wet weight to mg chemical/ kg sediment, dry weight);
DF_i = Dietary fraction (proportion of food type in the diet);
IR_s = Incidental Ingestion Rate of sediment (kg sediment ingested per day, dry weight); and
AF = 100% Area Use Factor includes season use rates, area use rates, chemical assimilation rate.

NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
mg/kg = Milligram Per Kilogram
bw - day = Body Weight - Day
HQ = Hazard Quotient
TRV = Toxicity Reference Value

[b] = Receptor doses were determined in order to verify equation calculations for the TRV-Based soil concentrations.
Receptor doses were calculated using species information (Table C-15).
Food dose = (COPEC concentration in prey * % of food type ingested * seasonal and area use factor * receptor ingestion rate for food) / receptor body weight
Receptors prey are based on conservative diet assumptions in Table C-15.
Substrate Dose = (COPEC concentration in soil * receptor ingestion rate for substrate) / receptor body weight
Total Dose = Food Dose + Substrate Dose

[c] = HQ = Total Dose / TRV is used to verify equation calculations.

Table I-11D
TRV-Based Soil Concentration
Refined Ecological Effects Evaluation
Red Fox (*Vulpes vulpes*)
SSP Report - SWMU 57
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	NOAEL						LOAEL					
	Calculated NOAEL-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			NOAEL	HQ[c]	Calculated TRV-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			LOAEL	HQ[c]
		Food	Substrate	Total Dose				Food	Substrate	Total Dose		
Metals												
ARSENIC	8.23E+02	3.17E-02	4.30E-03	3.60E-02	3.60E-02	1.00	8.23E+03	3.17E-01	4.30E-02	3.60E-01	3.60E-01	1.00
CADMIUM	9.95E+03	4.76E-01	5.22E-02	5.28E-01	5.28E-01	1.00	9.95E+04	4.76E+00	5.22E-01	5.28E+00	5.28E+00	1.00
CHROMIUM	1.45E+07	1.37E+03	7.60E+01	1.45E+03	1.45E+03	1.00	1.45E+08	1.37E+04	7.60E+02	1.45E+04	1.45E+04	1.00
LEAD	3.11E+05	2.59E+00	1.64E+00	4.22E+00	4.22E+00	1.00	3.11E+06	2.59E+01	1.64E+01	4.22E+01	4.22E+01	1.00
MERCURY	2.40E+00	1.03E-02	0.00E+00	1.03E-02	1.03E-02	1.00	9.78E+00	4.20E-02	0.00E+00	4.20E-02	4.21E-02	1.00
SELENIUM	3.79E+02	1.04E-01	2.00E-03	1.06E-01	1.06E-01	1.00	6.25E+02	1.71E-01	3.00E-03	1.74E-01	1.74E-01	1.00
ZINC	5.06E+04	8.42E+01	2.65E-01	8.45E+01	8.45E+01	1.00	1.01E+05	1.68E+02	5.31E-01	1.69E+02	1.69E+02	1.00
PCBs												
AROCLOR 1254	3.25E+01	1.93E-02	2.00E-04	1.95E-02	1.94E-02	1.00	3.25E+02	1.93E-01	2.00E-03	1.95E-01	1.94E-01	1.00

Notes:

[a] = The following equation was used to calculate NOAEL- and LOAEL-based soil concentrations:

$$C_{TRV} = \frac{(ADD_i) \times BW_i}{(IR_{food} \sum (BAF_{food_i} \times DF) + (IR_s)) \times AF}$$

C_{TRV}-Based Sediment Concentration (mg chemical / kg sediment, dry weight);
ADD= NOAEL or LOAEL (mg chemical/kg body weight-day);
BW = Body Weight of the receptor (kg);
IR_{food} = Ingestion Rate of food (kg food ingested per day, wet weight);
BAF_{foodi} = Bioconcentration factor, specific to prey type and chemical (ratio of mg of chemical/kg fauna, wet weight to mg chemical/ kg sediment, dry weight);
DF_i = Dietary fraction (proportion of food type in the diet);
IR_s = Incidental Ingestion Rate of sediment (kg sediment ingested per day, dry weight); and
AF = 100% Area Use Factor includes season use rates, area use rates, chemical assimilation rate.

[b] = Receptor doses were determined in order to verify equation calculations for the TRV-Based soil concentrations.

Receptor doses were calculated using species information (Table C-15).

Food dose = (COPEC concentration in prey * % of food type ingested * seasonal and area use factor * receptor ingestion rate for food) / receptor body weight

Receptors prey are based on conservative diet assumptions in Table C-15.

Substrate Dose = (COPEC concentration in soil * receptor ingestion rate for substrate) / receptor body weight

Total Dose = Food Dose + Substrate Dose

[c] = HQ = Total Dose / TRV is used to verify equation calculations.

NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
bw - day = Body Weight - Day
HQ = Hazard Quotient
TRV = Toxicity Reference Value
PCB = Polychlorinated Biphenyls

Table I-11E
TRV-Based Soil Concentration
Refined Ecological Effects Evaluation
Short-tailed Shrew (*Blarina brevicauda*)
SSP Report - SWMU 57
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	NOAEL						LOAEL					
	Calculated NOAEL-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			NOAEL	HQ[c]	Calculated TRV-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			LOAEL	HQ[c]
		Food	Substrate	Total Dose				Food	Substrate	Total Dose		
Metals												
ARSENIC	1.03E+00	5.13E-02	2.50E-02	7.63E-02	7.66E-02	1.00	1.03E+01	5.13E-01	2.53E-01	7.66E-01	7.66E-01	1.00
CADMIUM	4.06E+00	1.02E+00	1.00E-01	1.12E+00	1.12E+00	1.00	4.06E+01	1.02E+01	9.97E-01	1.12E+01	1.12E+01	1.00
CHROMIUM	5.98E+04	1.61E+03	1.47E+03	3.07E+03	3.07E+03	1.00	5.98E+05	1.61E+04	1.47E+04	3.07E+04	3.07E+04	1.00
LEAD	1.83E+02	4.50E+00	4.48E+00	8.98E+00	8.98E+00	1.00	1.83E+03	4.50E+01	4.48E+01	8.98E+01	8.98E+01	1.00
MERCURY	2.84E-01	1.49E-02	7.00E-03	2.19E-02	2.19E-02	1.00	1.16E+00	6.10E-02	2.85E-02	8.95E-02	8.94E-02	1.00
SELENIUM	1.82E+00	1.80E-01	4.50E-02	2.25E-01	2.25E-01	1.00	3.01E+00	2.97E-01	7.40E-02	3.71E-01	3.71E-01	1.00
ZINC	1.46E+03	1.44E+02	3.58E+01	1.80E+02	1.80E+02	1.00	2.92E+03	2.88E+02	7.17E+01	3.59E+02	3.59E+02	1.00
PCBs												
AROCLOR 1254	1.21E-02	4.10E-02	3.00E-04	4.13E-02	4.13E-02	1.00	1.21E-01	4.10E-01	3.00E-03	4.13E-01	4.13E-01	1.00

Notes:

[a] = The following equation was used to calculate NOAEL- and LOAEL-based soil concentrations:

$$C_{TRV} = \frac{(ADD_i) \times BW_i}{(IR_{food} \sum (BAF_{food_i} \times DF) + (IR_s)) \times AF}$$

C_{TRV}-Based Sediment Concentration (mg chemical / kg sediment, dry weight);
ADD= NOAEL or LOAEL (mg chemical/kg body weight-day);
BW = Body Weight of the receptor (kg);
IR_{food} = Ingestion Rate of food (kg food ingested per day, wet weight);
BAF_{foodi} = Bioconcentration factor, specific to prey type and chemical (ratio of mg of chemical/kg fauna, wet weight to mg chemical/ kg sediment, dry weight);
DF_i = Dietary fraction (proportion of food type in the diet);
IR_s = Incidental Ingestion Rate of sediment (kg sediment ingested per day, dry weight); and
AF = 100% Area Use Factor includes season use rates, area use rates, chemical assimilation rate.

NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
bw - day = Body Weight - Day
HQ = Hazard Quotient
TRV = Toxicity Reference Value
PCB = Polychlorinated Biphenyls

[b] = Receptor doses were determined in order to verify equation calculations for the TRV-Based soil concentrations.
Receptor doses were calculated using species information (Table C-15).
Food dose = (COPEC concentration in prey * % of food type ingested * seasonal and area use factor * receptor ingestion rate for food) / receptor body weight
Receptors prey are based on conservative diet assumptions in Table C-15.
Substrate Dose = (COPEC concentration in soil * receptor ingestion rate for substrate) / receptor body weight
Total Dose = Food Dose + Substrate Dose

[c] = HQ = Total Dose / TRV is used to verify equation calculations.

Table I-12A
TRV-Based Soil Concentration
Refined Ecological Effects Evaluation
American Robin (*Turdus migratorius*)
SSP Report - SWMU 68
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	NOAEL						LOAEL					
	Calculated NOAEL-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			NOAEL	HQ[c]	Calculated TRV-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			LOAEL	HQ[c]
		Food	Substrate	Total Dose				Food	Substrate	Total Dose		
Metals												
ARSENIC	1.09E+03	4.53E+00	6.14E-01	5.14E+00	5.14E+00	1.00	2.71E+03	1.13E+01	1.54E+00	1.28E+01	1.28E+01	1.00
CADMIUM	5.55E+01	1.42E+00	3.10E-02	1.45E+00	1.45E+00	1.00	7.65E+02	1.96E+01	4.33E-01	2.00E+01	2.00E+01	1.00
CHROMIUM	3.92E+02	7.78E-01	2.22E-01	1.00E+00	1.00E+00	1.00	1.96E+03	3.89E+00	1.11E+00	5.00E+00	5.00E+00	1.00
LEAD	3.91E+02	9.09E-01	2.21E-01	1.13E+00	1.13E+00	1.00	3.91E+03	9.09E+00	2.21E+00	1.13E+01	1.13E+01	1.00
MERCURY	4.90E+01	4.22E-01	2.80E-02	4.50E-01	4.50E-01	1.00	9.80E+01	8.45E-01	5.50E-02	9.00E-01	9.00E-01	1.00
SELENIUM	2.56E+01	3.86E-01	1.40E-02	4.00E-01	4.00E-01	1.00	5.12E+01	7.71E-01	2.90E-02	8.00E-01	8.00E-01	1.00
ZINC	1.14E+03	1.39E+01	6.43E-01	1.45E+01	1.45E+01	1.00	1.03E+04	1.25E+02	5.81E+00	1.31E+02	1.31E+02	1.00
PCBs												
AROCLOR 1254	7.21E-01	1.80E-01	0.00E+00	1.80E-01	1.80E-01	1.00	7.21E+00	1.80E+00	4.00E-03	1.80E+00	1.80E+00	1.00

Notes:

[a] = The following equation was used to calculate NOAEL- and LOAEL-based soil concentrations:

$$C_{TRV} = \frac{(ADD_i) \times BW_i}{(IR_{food} \sum (BAF_{food_i} \times DF) + (IR_s)) \times AF}$$

C_{TRV}-Based Sediment Concentration (mg chemical / kg sediment, dry weight);
ADD= NOAEL or LOAEL (mg chemical/kg body weight-day);
BW = Body Weight of the receptor (kg);
IR_{food} = Ingestion Rate of food (kg food ingested per day, wet weight);
BAF_{foodi} = Bioconcentration factor, specific to prey type and chemical (ratio of mg of chemical/kg fauna, wet weight to mg chemical/ kg sediment, dry weight);
DF_i = Dietary fraction (proportion of food type in the diet);
IR_s = Incidental Ingestion Rate of sediment (kg sediment ingested per day, dry weight); and
AF = 100% Area Use Factor includes season use rates, area use rates, chemical assimilation rate.

NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
mg/kg = Milligram Per Kilogram
bw - day = Body Weight - Day
HQ = Hazard Quotient
TRV = Toxicity Reference Value
PCB = Polychlorinated Biphenyls

[b] = Receptor doses were determined in order to verify equation calculations for the TRV-Based soil concentrations.
Receptor doses were calculated using species information (Table C-15).
Food dose = (COPEC concentration in prey * % of food type ingested * seasonal and area use factor * receptor ingestion rate for food) / receptor body weight
Receptors prey are based on conservative diet assumptions in Table C-15.
Substrate Dose = (COPEC concentration in soil * receptor ingestion rate for substrate) / receptor body weight
Total Dose = Food Dose + Substrate Dose

[c] = HQ = Total Dose / TRV is used to verify equation calculations.

Table I-12B
TRV-Based Soil Concentration
Refined Ecological Effects Evaluation
Red-tailed Hawk (*Buteo jamaicensis*)
SSP Report - SWMU 68
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	NOAEL						LOAEL					
	Calculated NOAEL-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			NOAEL	HQ[c]	Calculated TRV-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			LOAEL	HQ[c]
		Food	Substrate	Total Dose				Food	Substrate	Total Dose		
Metals												
ARSENIC	1.46E+07	5.14E+00	0.00E+00	5.14E+00	5.14E+00	1.00	3.64E+07	1.28E+01	0.00E+00	1.28E+01	1.28E+01	1.00
CADMIUM	1.47E+07	1.45E+00	0.00E+00	1.45E+00	1.45E+00	1.00	2.02E+08	2.00E+01	0.00E+00	2.00E+01	2.00E+01	1.00
CHROMIUM	1.01E+06	1.00E+00	0.00E+00	1.00E+00	1.00E+00	1.00	5.06E+06	5.00E+00	0.00E+00	5.00E+00	5.00E+00	1.00
LEAD	2.13E+07	1.13E+00	0.00E+00	1.13E+00	1.13E+00	1.00	2.13E+08	1.13E+01	0.00E+00	1.13E+01	1.13E+01	1.00
MERCURY	9.81E+03	4.50E-01	0.00E+00	4.50E-01	4.50E-01	1.00	1.96E+04	9.00E-01	0.00E+00	9.00E-01	9.00E-01	1.00
SELENIUM	1.51E+05	4.00E-01	0.00E+00	4.00E-01	4.00E-01	1.00	3.02E+05	8.00E-01	0.00E+00	8.00E-01	8.00E-01	1.00
ZINC	8.21E+05	1.45E+01	0.00E+00	1.45E+01	1.45E+01	1.00	7.42E+06	1.31E+02	0.00E+00	1.31E+02	1.31E+02	1.00
PCBs												
AROCLOR 1254	5.73E+04	1.80E-01	0.00E+00	1.80E-01	1.80E-01	1.00	5.73E+05	1.80E+00	0.00E+00	1.80E+00	1.80E+00	1.00

Notes:

[a] = The following equation was used to calculate NOAEL- and LOAEL-based soil concentrations:

$$C_{TRV} = \frac{(ADD_i) \times BW_i}{(IR_{food} \sum (BAF_{food_i} \times DF) + (IR_s)) \times AF}$$

C_{TRV}-Based Sediment Concentration (mg chemical / kg sediment, dry weight);
ADD= NOAEL or LOAEL (mg chemical/kg body weight-day);
BW = Body Weight of the receptor (kg);
IR_{food} = Ingestion Rate of food (kg food ingested per day, wet weight);
BAF_{foodi} = Bioconcentration factor, specific to prey type and chemical (ratio of mg of chemical/kg fauna, wet weight to mg chemical/ kg sediment, dry weight);
DF_i = Dietary fraction (proportion of food type in the diet);
IR_s = Incidental Ingestion Rate of sediment (kg sediment ingested per day, dry weight); and
AF = 100% Area Use Factor includes season use rates, area use rates, chemical assimilation rate.

NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
mg/kg = Milligram Per Kilogram
bw - day = Body Weight - Day
HQ = Hazard Quotient
TRV = Toxicity Reference Value

[b] = Receptor doses were determined in order to verify equation calculations for the TRV-Based soil concentrations.
Receptor doses were calculated using species information (Table C-15).
Food dose = (COPEC concentration in prey * % of food type ingested * seasonal and area use factor * receptor ingestion rate for food) / receptor body weight
Receptors prey are based on conservative diet assumptions in Table C-15.
Substrate Dose = (COPEC concentration in soil * receptor ingestion rate for substrate) / receptor body weight
Total Dose = Food Dose + Substrate Dose

[c] = HQ = Total Dose / TRV is used to verify equation calculations.

Table I-12C
TRV-Based Soil Concentration
Refined Ecological Effects Evaluation
Meadow Vole (*Microtus pennsylvanicus*)
SSP Report - SWMU 68
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	NOAEL						LOAEL					
	Calculated NOAEL-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			NOAEL	HQ[c]	Calculated TRV-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			LOAEL	HQ[c]
		Food	Substrate	Total Dose				Food	Substrate	Total Dose		
Metals												
ARSENIC	6.10E+01	6.95E-02	4.50E-02	1.15E-01	1.14E-01	1.00	6.10E+02	6.95E-01	4.50E-01	1.15E+00	1.14E+00	1.00
CADMIUM	1.02E+02	1.60E+00	7.50E-02	1.68E+00	1.68E+00	1.00	1.02E+03	1.60E+01	7.49E-01	1.68E+01	1.68E+01	1.00
CHROMIUM	5.87E+06	2.70E+02	4.33E+03	4.60E+03	4.60E+03	1.00	5.87E+07	2.70E+03	4.33E+04	4.60E+04	4.60E+04	1.00
LEAD	7.09E+03	8.21E+00	5.23E+00	1.34E+01	1.34E+01	1.00	7.09E+04	8.21E+01	5.23E+01	1.34E+02	1.34E+02	1.00
MERCURY	2.90E+00	3.06E-02	2.00E-03	3.26E-02	3.28E-02	1.00	1.18E+01	1.25E-01	9.00E-03	1.34E-01	1.34E-01	1.00
SELENIUM	1.85E+01	3.22E-01	1.40E-02	3.36E-01	3.36E-01	1.00	3.05E+01	5.32E-01	2.30E-02	5.55E-01	5.54E-01	1.00
ZINC	2.29E+04	2.52E+02	1.69E+01	2.69E+02	2.69E+02	1.00	4.58E+04	5.04E+02	3.38E+01	5.37E+02	5.37E+02	1.00
PCBs												
AROCLOR 1254	7.92E+01	3.43E-03	5.80E-02	6.14E-02	6.18E-02	0.99	7.92E+02	3.43E-02	5.84E-01	6.18E-01	6.18E-01	1.00

Notes:

[a] = The following equation was used to calculate NOAEL- and LOAEL-based soil concentrations:

$$C_{TRV} = \frac{(ADD_i) \times BW_i}{(IR_{food} \sum (BAF_{food_i} \times DF) + (IR_s)) \times AF}$$

C_{TRV}-Based Sediment Concentration (mg chemical / kg sediment, dry weight);
ADD= NOAEL or LOAEL (mg chemical/kg body weight-day);
BW = Body Weight of the receptor (kg);
IR_{food} = Ingestion Rate of food (kg food ingested per day, wet weight);
BAF_{foodi} = Bioconcentration factor, specific to prey type and chemical (ratio of mg of chemical/kg fauna, wet weight to mg chemical/ kg sediment, dry weight);
DF_i = Dietary fraction (proportion of food type in the diet);
IR_s = Incidental Ingestion Rate of sediment (kg sediment ingested per day, dry weight); and
AF = 100% Area Use Factor includes season use rates, area use rates, chemical assimilation rate.

NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
mg/kg = Milligram Per Kilogram
bw - day = Body Weight - Day
HQ = Hazard Quotient
TRV = Toxicity Reference Value

[b] = Receptor doses were determined in order to verify equation calculations for the TRV-Based soil concentrations.
Receptor doses were calculated using species information (Table C-15).
Food dose = (COPEC concentration in prey * % of food type ingested * seasonal and area use factor * receptor ingestion rate for food) / receptor body weight
Receptors prey are based on conservative diet assumptions in Table C-15.
Substrate Dose = (COPEC concentration in soil * receptor ingestion rate for substrate) / receptor body weight
Total Dose = Food Dose + Substrate Dose

[c] = HQ = Total Dose / TRV is used to verify equation calculations.

Table I-12D
TRV-Based Soil Concentration
Refined Ecological Effects Evaluation
Red Fox (*Vulpes vulpes*)
SSP Report - SWMU 68
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	NOAEL						LOAEL					
	Calculated NOAEL-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			NOAEL	HQ[c]	Calculated TRV-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			LOAEL	HQ[c]
		Food	Substrate	Total Dose				Food	Substrate	Total Dose		
Metals												
ARSENIC	1.48E+04	3.17E-02	4.30E-03	3.60E-02	3.60E-02	1.00	1.48E+05	3.17E-01	4.30E-02	3.60E-01	3.60E-01	1.00
CADMIUM	1.79E+05	4.76E-01	5.22E-02	5.28E-01	5.28E-01	1.00	1.79E+06	4.76E+00	5.22E-01	5.28E+00	5.28E+00	1.00
CHROMIUM	2.61E+08	1.37E+03	7.60E+01	1.45E+03	1.45E+03	1.00	2.61E+09	1.37E+04	7.60E+02	1.45E+04	1.45E+04	1.00
LEAD	5.61E+06	2.59E+00	1.64E+00	4.22E+00	4.22E+00	1.00	5.61E+07	2.59E+01	1.64E+01	4.22E+01	4.22E+01	1.00
MERCURY	4.31E+01	1.03E-02	0.00E+00	1.03E-02	1.03E-02	1.00	1.76E+02	4.20E-02	0.00E+00	4.20E-02	4.21E-02	1.00
SELENIUM	6.82E+03	1.04E-01	2.00E-03	1.06E-01	1.06E-01	1.00	1.12E+04	1.71E-01	3.00E-03	1.74E-01	1.74E-01	1.00
ZINC	9.10E+05	8.42E+01	2.65E-01	8.45E+01	8.45E+01	1.00	1.82E+06	1.68E+02	5.31E-01	1.69E+02	1.69E+02	1.00
PCBs												
AROCLOR 1254	5.85E+02	1.93E-02	2.00E-04	1.95E-02	1.94E-02	1.00	5.85E+03	1.93E-01	2.00E-03	1.95E-01	1.94E-01	1.00

Notes:

[a] = The following equation was used to calculate NOAEL- and LOAEL-based soil concentrations:

$$C_{TRV} = \frac{(ADD_i) \times BW_i}{(IR_{food} \sum (BAF_{food_i} \times DF) + (IR_s)) \times AF}$$

C_{TRV}-Based Sediment Concentration (mg chemical / kg sediment, dry weight);
ADD= NOAEL or LOAEL (mg chemical/kg body weight-day);
BW = Body Weight of the receptor (kg);
IR_{food} = Ingestion Rate of food (kg food ingested per day, wet weight);
BAF_{foodi} = Bioconcentration factor, specific to prey type and chemical (ratio of mg of chemical/kg fauna, wet weight to mg chemical/ kg sediment, dry weight);
DF_i = Dietary fraction (proportion of food type in the diet);
IR_s = Incidental Ingestion Rate of sediment (kg sediment ingested per day, dry weight); and
AF = 100% Area Use Factor includes season use rates, area use rates, chemical assimilation rate.

[b] = Receptor doses were determined in order to verify equation calculations for the TRV-Based soil concentrations.

Receptor doses were calculated using species information (Table C-15).

Food dose = (COPEC concentration in prey * % of food type ingested * seasonal and area use factor * receptor ingestion rate for food) / receptor body weight

Receptors prey are based on conservative diet assumptions in Table C-15.

Substrate Dose = (COPEC concentration in soil * receptor ingestion rate for substrate) / receptor body weight

Total Dose = Food Dose + Substrate Dose

[c] = HQ = Total Dose / TRV is used to verify equation calculations.

NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
bw - day = Body Weight - Day
HQ = Hazard Quotient
TRV = Toxicity Reference Value
PCB = Polychlorinated Biphenyls

Table I-12E
TRV-Based Soil Concentration
Refined Ecological Effects Evaluation
Short-tailed Shrew (*Blarina brevicauda*)
SSP Report - SWMU 68
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	NOAEL						LOAEL					
	Calculated NOAEL-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			NOAEL	HQ[c]	Calculated TRV-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			LOAEL	HQ[c]
		Food	Substrate	Total Dose				Food	Substrate	Total Dose		
Metals												
ARSENIC	1.85E+01	5.13E-02	2.50E-02	7.63E-02	7.66E-02	1.00	1.85E+02	5.13E-01	2.53E-01	7.66E-01	7.66E-01	1.00
CADMIUM	7.31E+01	1.02E+00	1.00E-01	1.12E+00	1.12E+00	1.00	7.31E+02	1.02E+01	9.97E-01	1.12E+01	1.12E+01	1.00
CHROMIUM	1.08E+06	1.61E+03	1.47E+03	3.07E+03	3.07E+03	1.00	1.08E+07	1.61E+04	1.47E+04	3.07E+04	3.07E+04	1.00
LEAD	3.29E+03	4.50E+00	4.48E+00	8.98E+00	8.98E+00	1.00	3.29E+04	4.50E+01	4.48E+01	8.98E+01	8.98E+01	1.00
MERCURY	5.11E+00	1.49E-02	7.00E-03	2.19E-02	2.19E-02	1.00	2.09E+01	6.10E-02	2.85E-02	8.95E-02	8.94E-02	1.00
SELENIUM	3.28E+01	1.80E-01	4.50E-02	2.25E-01	2.25E-01	1.00	5.42E+01	2.97E-01	7.40E-02	3.71E-01	3.71E-01	1.00
ZINC	2.63E+04	1.44E+02	3.58E+01	1.80E+02	1.80E+02	1.00	5.25E+04	2.88E+02	7.17E+01	3.59E+02	3.59E+02	1.00
PCBs												
AROCLOR 1254	2.17E-01	4.10E-02	3.00E-04	4.13E-02	4.13E-02	1.00	2.17E+00	4.10E-01	3.00E-03	4.13E-01	4.13E-01	1.00

Notes:

[a] = The following equation was used to calculate NOAEL- and LOAEL-based soil concentrations:

$$C_{TRV} = \frac{(ADD_i) \times BW_i}{(IR_{food} \sum (BAF_{food_i} \times DF) + (IR_s)) \times AF}$$

C_{TRV}-Based Sediment Concentration (mg chemical / kg sediment, dry weight);
ADD= NOAEL or LOAEL (mg chemical/kg body weight-day);
BW = Body Weight of the receptor (kg);
IR_{food} = Ingestion Rate of food (kg food ingested per day, wet weight);
BAF_{foodi} = Bioconcentration factor, specific to prey type and chemical (ratio of mg of chemical/kg fauna, wet weight to mg chemical/ kg sediment, dry weight);
DF_i = Dietary fraction (proportion of food type in the diet);
IR_s = Incidental Ingestion Rate of sediment (kg sediment ingested per day, dry weight); and
AF = 100% Area Use Factor includes season use rates, area use rates, chemical assimilation rate.

NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
bw - day = Body Weight - Day
HQ = Hazard Quotient
TRV = Toxicity Reference Value
PCB = Polychlorinated Biphenyls

[b] = Receptor doses were determined in order to verify equation calculations for the TRV-Based soil concentrations.
Receptor doses were calculated using species information (Table C-15).
Food dose = (COPEC concentration in prey * % of food type ingested * seasonal and area use factor * receptor ingestion rate for food) / receptor body weight
Receptors prey are based on conservative diet assumptions in Table C-15.
Substrate Dose = (COPEC concentration in soil * receptor ingestion rate for substrate) / receptor body weight
Total Dose = Food Dose + Substrate Dose

[c] = HQ = Total Dose / TRV is used to verify equation calculations.

Table I-13A
TRV-Based Soil Concentration
Refined Ecological Effects Evaluation
American Robin (*Turdus migratorius*)
SSP Report - SWMU 69
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	NOAEL						LOAEL					
	Calculated NOAEL-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			NOAEL	HQ[c]	Calculated TRV-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			LOAEL	HQ[c]
		Food	Substrate	Total Dose				Food	Substrate	Total Dose		
Metals												
ARSENIC	2.17E+03	4.53E+00	6.14E-01	5.14E+00	5.14E+00	1.00	5.43E+03	1.13E+01	1.54E+00	1.28E+01	1.28E+01	1.00
CADMIUM	1.11E+02	1.42E+00	3.10E-02	1.45E+00	1.45E+00	1.00	1.53E+03	1.96E+01	4.33E-01	2.00E+01	2.00E+01	1.00
CHROMIUM	7.83E+02	7.78E-01	2.22E-01	1.00E+00	1.00E+00	1.00	3.92E+03	3.89E+00	1.11E+00	5.00E+00	5.00E+00	1.00
LEAD	7.81E+02	9.09E-01	2.21E-01	1.13E+00	1.13E+00	1.00	7.81E+03	9.09E+00	2.21E+00	1.13E+01	1.13E+01	1.00
MERCURY	9.80E+01	4.22E-01	2.80E-02	4.50E-01	4.50E-01	1.00	1.96E+02	8.45E-01	5.50E-02	9.00E-01	9.00E-01	1.00
SELENIUM	5.12E+01	3.86E-01	1.40E-02	4.00E-01	4.00E-01	1.00	1.02E+02	7.71E-01	2.90E-02	8.00E-01	8.00E-01	1.00
ZINC	2.28E+03	1.39E+01	6.43E-01	1.45E+01	1.45E+01	1.00	2.06E+04	1.25E+02	5.81E+00	1.31E+02	1.31E+02	1.00
PCBs												
AROCLOR 1254	1.44E+00	1.80E-01	0.00E+00	1.80E-01	1.80E-01	1.00	1.44E+01	1.80E+00	4.00E-03	1.80E+00	1.80E+00	1.00

Notes:

[a] = The following equation was used to calculate NOAEL- and LOAEL-based soil concentrations:

$$C_{TRV} = \frac{(ADD_i) \times BW_i}{(IR_{food} \sum (BAF_{food_i} \times DF) + (IR_s)) \times AF}$$

C_{TRV}-Based Sediment Concentration (mg chemical / kg sediment, dry weight);
ADD= NOAEL or LOAEL (mg chemical/kg body weight-day);
BW = Body Weight of the receptor (kg);
IR_{food} = Ingestion Rate of food (kg food ingested per day, wet weight);
BAF_{foodi} = Bioconcentration factor, specific to prey type and chemical (ratio of mg of chemical/kg fauna, wet weight to mg chemical/ kg sediment, dry weight);
DF_i = Dietary fraction (proportion of food type in the diet);
IR_s = Incidental Ingestion Rate of sediment (kg sediment ingested per day, dry weight); and
AF = 100% Area Use Factor includes season use rates, area use rates, chemical assimilation rate.

NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
mg/kg = Milligram Per Kilogram
bw - day = Body Weight - Day
HQ = Hazard Quotient
TRV = Toxicity Reference Value
PCB = Polychlorinated Biphenyls

[b] = Receptor doses were determined in order to verify equation calculations for the TRV-Based soil concentrations.
Receptor doses were calculated using species information (Table C-15).
Food dose = (COPEC concentration in prey * % of food type ingested * seasonal and area use factor * receptor ingestion rate for food) / receptor body weight
Receptors prey are based on conservative diet assumptions in Table C-15.
Substrate Dose = (COPEC concentration in soil * receptor ingestion rate for substrate) / receptor body weight
Total Dose = Food Dose + Substrate Dose

[c] = HQ = Total Dose / TRV is used to verify equation calculations.

Table I-13B
TRV-Based Soil Concentration
Refined Ecological Effects Evaluation
Red-tailed Hawk (*Buteo jamaicensis*)
SSP Report - SWMU 69
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	NOAEL						LOAEL					
	Calculated NOAEL-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			NOAEL	HQ[c]	Calculated TRV-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			LOAEL	HQ[c]
		Food	Substrate	Total Dose				Food	Substrate	Total Dose		
Metals												
ARSENIC	2.91E+07	5.14E+00	0.00E+00	5.14E+00	5.14E+00	1.00	7.27E+07	1.28E+01	0.00E+00	1.28E+01	1.28E+01	1.00
CADMIUM	2.93E+07	1.45E+00	0.00E+00	1.45E+00	1.45E+00	1.00	4.05E+08	2.00E+01	0.00E+00	2.00E+01	2.00E+01	1.00
CHROMIUM	2.02E+06	1.00E+00	0.00E+00	1.00E+00	1.00E+00	1.00	1.01E+07	5.00E+00	0.00E+00	5.00E+00	5.00E+00	1.00
LEAD	4.27E+07	1.13E+00	0.00E+00	1.13E+00	1.13E+00	1.00	4.27E+08	1.13E+01	0.00E+00	1.13E+01	1.13E+01	1.00
MERCURY	1.96E+04	4.50E-01	0.00E+00	4.50E-01	4.50E-01	1.00	3.92E+04	9.00E-01	0.00E+00	9.00E-01	9.00E-01	1.00
SELENIUM	3.02E+05	4.00E-01	0.00E+00	4.00E-01	4.00E-01	1.00	6.04E+05	8.00E-01	0.00E+00	8.00E-01	8.00E-01	1.00
ZINC	1.64E+06	1.45E+01	0.00E+00	1.45E+01	1.45E+01	1.00	1.48E+07	1.31E+02	0.00E+00	1.31E+02	1.31E+02	1.00
PCBs												
AROCLOR 1254	1.15E+05	1.80E-01	0.00E+00	1.80E-01	1.80E-01	1.00	1.15E+06	1.80E+00	0.00E+00	1.80E+00	1.80E+00	1.00

Notes:

[a] = The following equation was used to calculate NOAEL- and LOAEL-based soil concentrations:

$$C_{TRV} = \frac{(ADD_i) \times BW_i}{(IR_{food} \sum (BAF_{food_i} \times DF) + (IR_s)) \times AF}$$

C_{TRV}-Based Sediment Concentration (mg chemical / kg sediment, dry weight);
ADD= NOAEL or LOAEL (mg chemical/kg body weight-day);
BW = Body Weight of the receptor (kg);
IR_{food} = Ingestion Rate of food (kg food ingested per day, wet weight);
BAF_{foodi} = Bioconcentration factor, specific to prey type and chemical (ratio of mg of chemical/kg fauna, wet weight to mg chemical/ kg sediment, dry weight);
DF_i = Dietary fraction (proportion of food type in the diet);
IR_s = Incidental Ingestion Rate of sediment (kg sediment ingested per day, dry weight); and
AF = 100% Area Use Factor includes season use rates, area use rates, chemical assimilation rate.

NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
mg/kg = Milligram Per Kilogram
bw - day = Body Weight - Day
HQ = Hazard Quotient
TRV = Toxicity Reference Value

[b] = Receptor doses were determined in order to verify equation calculations for the TRV-Based soil concentrations.
Receptor doses were calculated using species information (Table C-15).
Food dose = (COPEC concentration in prey * % of food type ingested * seasonal and area use factor * receptor ingestion rate for food) / receptor body weight
Receptors prey are based on conservative diet assumptions in Table C-15.
Substrate Dose = (COPEC concentration in soil * receptor ingestion rate for substrate) / receptor body weight
Total Dose = Food Dose + Substrate Dose

[c] = HQ = Total Dose / TRV is used to verify equation calculations.

Table I-13C
TRV-Based Soil Concentration
Refined Ecological Effects Evaluation
Meadow Vole (*Microtus pennsylvanicus*)
SSP Report - SWMU 69
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	NOAEL						LOAEL					
	Calculated NOAEL-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			NOAEL	HQ[c]	Calculated TRV-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			LOAEL	HQ[c]
		Food	Substrate	Total Dose				Food	Substrate	Total Dose		
Metals												
ARSENIC	1.22E+02	6.95E-02	4.50E-02	1.15E-01	1.14E-01	1.00	1.22E+03	6.95E-01	4.50E-01	1.15E+00	1.14E+00	1.00
CADMIUM	2.03E+02	1.60E+00	7.50E-02	1.68E+00	1.68E+00	1.00	2.03E+03	1.60E+01	7.49E-01	1.68E+01	1.68E+01	1.00
CHROMIUM	1.17E+07	2.70E+02	4.33E+03	4.60E+03	4.60E+03	1.00	1.17E+08	2.70E+03	4.33E+04	4.60E+04	4.60E+04	1.00
LEAD	1.42E+04	8.21E+00	5.23E+00	1.34E+01	1.34E+01	1.00	1.42E+05	8.21E+01	5.23E+01	1.34E+02	1.34E+02	1.00
MERCURY	5.80E+00	3.06E-02	2.00E-03	3.26E-02	3.28E-02	1.00	2.37E+01	1.25E-01	9.00E-03	1.34E-01	1.34E-01	1.00
SELENIUM	3.70E+01	3.22E-01	1.40E-02	3.36E-01	3.36E-01	1.00	6.11E+01	5.32E-01	2.30E-02	5.55E-01	5.54E-01	1.00
ZINC	4.58E+04	2.52E+02	1.69E+01	2.69E+02	2.69E+02	1.00	9.16E+04	5.04E+02	3.38E+01	5.37E+02	5.37E+02	1.00
PCBs												
AROCLOR 1254	1.58E+02	3.43E-03	5.80E-02	6.14E-02	6.18E-02	0.99	1.58E+03	3.43E-02	5.84E-01	6.18E-01	6.18E-01	1.00

Notes:

[a] = The following equation was used to calculate NOAEL- and LOAEL-based soil concentrations:

$$C_{TRV} = \frac{(ADD_i) \times BW_i}{(IR_{food} \sum (BAF_{food_i} \times DF) + (IR_s)) \times AF}$$

C_{TRV}-Based Sediment Concentration (mg chemical / kg sediment, dry weight);
ADD= NOAEL or LOAEL (mg chemical/kg body weight-day);
BW = Body Weight of the receptor (kg);
IR_{food} = Ingestion Rate of food (kg food ingested per day, wet weight);
BAF_{foodi} = Bioconcentration factor, specific to prey type and chemical (ratio of mg of chemical/kg fauna, wet weight to mg chemical/ kg sediment, dry weight);
DF_i = Dietary fraction (proportion of food type in the diet);
IR_s = Incidental Ingestion Rate of sediment (kg sediment ingested per day, dry weight); and
AF = 100% Area Use Factor includes season use rates, area use rates, chemical assimilation rate.

NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
mg/kg = Milligram Per Kilogram
bw - day = Body Weight - Day
HQ = Hazard Quotient
TRV = Toxicity Reference Value

[b] = Receptor doses were determined in order to verify equation calculations for the TRV-Based soil concentrations.
Receptor doses were calculated using species information (Table C-15).
Food dose = (COPEC concentration in prey * % of food type ingested * seasonal and area use factor * receptor ingestion rate for food) / receptor body weight
Receptors prey are based on conservative diet assumptions in Table C-15.
Substrate Dose = (COPEC concentration in soil * receptor ingestion rate for substrate) / receptor body weight
Total Dose = Food Dose + Substrate Dose

[c] = HQ = Total Dose / TRV is used to verify equation calculations.

Table I-13D
TRV-Based Soil Concentration
Refined Ecological Effects Evaluation
Red Fox (*Vulpes vulpes*)
SSP Report - SWMU 69
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	NOAEL						LOAEL					
	Calculated NOAEL-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			NOAEL	HQ[c]	Calculated TRV-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			LOAEL	HQ[c]
		Food	Substrate	Total Dose				Food	Substrate	Total Dose		
Metals												
ARSENIC	2.96E+04	3.17E-02	4.30E-03	3.60E-02	3.60E-02	1.00	2.96E+05	3.17E-01	4.30E-02	3.60E-01	3.60E-01	1.00
CADMIUM	3.58E+05	4.76E-01	5.22E-02	5.28E-01	5.28E-01	1.00	3.58E+06	4.76E+00	5.22E-01	5.28E+00	5.28E+00	1.00
CHROMIUM	5.21E+08	1.37E+03	7.60E+01	1.45E+03	1.45E+03	1.00	5.21E+09	1.37E+04	7.60E+02	1.45E+04	1.45E+04	1.00
LEAD	1.12E+07	2.59E+00	1.64E+00	4.22E+00	4.22E+00	1.00	1.12E+08	2.59E+01	1.64E+01	4.22E+01	4.22E+01	1.00
MERCURY	8.62E+01	1.03E-02	0.00E+00	1.03E-02	1.03E-02	1.00	3.52E+02	4.20E-02	0.00E+00	4.20E-02	4.21E-02	1.00
SELENIUM	1.36E+04	1.04E-01	2.00E-03	1.06E-01	1.06E-01	1.00	2.25E+04	1.71E-01	3.00E-03	1.74E-01	1.74E-01	1.00
ZINC	1.82E+06	8.42E+01	2.65E-01	8.45E+01	8.45E+01	1.00	3.64E+06	1.68E+02	5.31E-01	1.69E+02	1.69E+02	1.00
PCBs												
AROCLOR 1254	1.17E+03	1.93E-02	2.00E-04	1.95E-02	1.94E-02	1.00	1.17E+04	1.93E-01	2.00E-03	1.95E-01	1.94E-01	1.00

Notes:

[a] = The following equation was used to calculate NOAEL- and LOAEL-based soil concentrations:

$$C_{TRV} = \frac{(ADD_i) \times BW_i}{(IR_{food} \sum (BAF_{food_i} \times DF) + (IR_s)) \times AF}$$

C_{TRV}-Based Sediment Concentration (mg chemical / kg sediment, dry weight);
ADD= NOAEL or LOAEL (mg chemical/kg body weight-day);
BW = Body Weight of the receptor (kg);
IR_{food} = Ingestion Rate of food (kg food ingested per day, wet weight);
BAF_{foodi} = Bioconcentration factor, specific to prey type and chemical (ratio of mg of chemical/kg fauna, wet weight to mg chemical/ kg sediment, dry weight);
DF_i = Dietary fraction (proportion of food type in the diet);
IR_s = Incidental Ingestion Rate of sediment (kg sediment ingested per day, dry weight); and
AF = 100% Area Use Factor includes season use rates, area use rates, chemical assimilation rate.

[b] = Receptor doses were determined in order to verify equation calculations for the TRV-Based soil concentrations.

Receptor doses were calculated using species information (Table C-15).

Food dose = (COPEC concentration in prey * % of food type ingested * seasonal and area use factor * receptor ingestion rate for food) / receptor body weight

Receptors prey are based on conservative diet assumptions in Table C-15.

Substrate Dose = (COPEC concentration in soil * receptor ingestion rate for substrate) / receptor body weight

Total Dose = Food Dose + Substrate Dose

[c] = HQ = Total Dose / TRV is used to verify equation calculations.

NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
bw - day = Body Weight - Day
HQ = Hazard Quotient
TRV = Toxicity Reference Value
PCB = Polychlorinated Biphenyls

Table I-13E
TRV-Based Soil Concentration
Refined Ecological Effects Evaluation
Short-tailed Shrew (*Blarina brevicauda*)
SSP Report - SWMU 69
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	NOAEL						LOAEL					
	Calculated NOAEL-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			NOAEL	HQ[c]	Calculated TRV-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			LOAEL	HQ[c]
		Food	Substrate	Total Dose				Food	Substrate	Total Dose		
Metals												
ARSENIC	3.71E+01	5.13E-02	2.50E-02	7.63E-02	7.66E-02	1.00	3.71E+02	5.13E-01	2.53E-01	7.66E-01	7.66E-01	1.00
CADMIUM	1.46E+02	1.02E+00	1.00E-01	1.12E+00	1.12E+00	1.00	1.46E+03	1.02E+01	9.97E-01	1.12E+01	1.12E+01	1.00
CHROMIUM	2.15E+06	1.61E+03	1.47E+03	3.07E+03	3.07E+03	1.00	2.15E+07	1.61E+04	1.47E+04	3.07E+04	3.07E+04	1.00
LEAD	6.58E+03	4.50E+00	4.48E+00	8.98E+00	8.98E+00	1.00	6.58E+04	4.50E+01	4.48E+01	8.98E+01	8.98E+01	1.00
MERCURY	1.02E+01	1.49E-02	7.00E-03	2.19E-02	2.19E-02	1.00	4.18E+01	6.10E-02	2.85E-02	8.95E-02	8.94E-02	1.00
SELENIUM	6.57E+01	1.80E-01	4.50E-02	2.25E-01	2.25E-01	1.00	1.08E+02	2.97E-01	7.40E-02	3.71E-01	3.71E-01	1.00
ZINC	5.25E+04	1.44E+02	3.58E+01	1.80E+02	1.80E+02	1.00	1.05E+05	2.88E+02	7.17E+01	3.59E+02	3.59E+02	1.00
PCBs												
AROCLOR 1254	4.35E-01	4.10E-02	3.00E-04	4.13E-02	4.13E-02	1.00	4.35E+00	4.10E-01	3.00E-03	4.13E-01	4.13E-01	1.00

Notes:

[a] = The following equation was used to calculate NOAEL- and LOAEL-based soil concentrations:

$$C_{TRV} = \frac{(ADD_i) \times BW_i}{(IR_{food} \sum (BAF_{food_i} \times DF) + (IR_s)) \times AF}$$

C_{TRV}-Based Sediment Concentration (mg chemical / kg sediment, dry weight);
ADD= NOAEL or LOAEL (mg chemical/kg body weight-day);
BW = Body Weight of the receptor (kg);
IR_{food} = Ingestion Rate of food (kg food ingested per day, wet weight);
BAF_{foodi} = Bioconcentration factor, specific to prey type and chemical (ratio of mg of chemical/kg fauna, wet weight to mg chemical/ kg sediment, dry weight);
DF_i = Dietary fraction (proportion of food type in the diet);
IR_s = Incidental Ingestion Rate of sediment (kg sediment ingested per day, dry weight); and
AF = 100% Area Use Factor includes season use rates, area use rates, chemical assimilation rate.

NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
bw - day = Body Weight - Day
HQ = Hazard Quotient
TRV = Toxicity Reference Value
PCB = Polychlorinated Biphenyls

[b] = Receptor doses were determined in order to verify equation calculations for the TRV-Based soil concentrations.
Receptor doses were calculated using species information (Table C-15).
Food dose = (COPEC concentration in prey * % of food type ingested * seasonal and area use factor * receptor ingestion rate for food) / receptor body weight
Receptors prey are based on conservative diet assumptions in Table C-15.
Substrate Dose = (COPEC concentration in soil * receptor ingestion rate for substrate) / receptor body weight
Total Dose = Food Dose + Substrate Dose

[c] = HQ = Total Dose / TRV is used to verify equation calculations.

TableI-14A
TRV-Based Soil Concentration
Refined Ecological Effects Evaluation
American Robin (*Turdus migratorius*)
SSP Report - Area A
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	NOAEL						LOAEL					
	Calculated NOAEL-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			NOAEL	HQ[c]	Calculated TRV-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			LOAEL	HQ[c]
		Food	Substrate	Total Dose				Food	Substrate	Total Dose		
Metals												
ARSENIC	6.04E+02	4.53E+00	6.14E-01	5.14E+00	5.14E+00	1.00	1.51E+03	1.13E+01	1.54E+00	1.28E+01	1.28E+01	1.00
CADMIUM	3.08E+01	1.42E+00	3.10E-02	1.45E+00	1.45E+00	1.00	4.25E+02	1.96E+01	4.33E-01	2.00E+01	2.00E+01	1.00
CHROMIUM	2.18E+02	7.78E-01	2.22E-01	1.00E+00	1.00E+00	1.00	1.09E+03	3.89E+00	1.11E+00	5.00E+00	5.00E+00	1.00
COPPER	6.00E+03	4.09E+01	6.10E+00	4.70E+01	4.70E+01	1.00	7.87E+03	5.37E+01	8.01E+00	6.17E+01	6.17E+01	1.00
LEAD	2.17E+02	9.09E-01	2.21E-01	1.13E+00	1.13E+00	1.00	2.17E+03	9.09E+00	2.21E+00	1.13E+01	1.13E+01	1.00
MERCURY	2.72E+01	4.22E-01	2.80E-02	4.50E-01	4.50E-01	1.00	5.45E+01	8.45E-01	5.50E-02	9.00E-01	9.00E-01	1.00
SELENIUM	1.42E+01	3.86E-01	1.40E-02	4.00E-01	4.00E-01	1.00	2.84E+01	7.71E-01	2.90E-02	8.00E-01	8.00E-01	1.00
ZINC	6.32E+02	1.39E+01	6.43E-01	1.45E+01	1.45E+01	1.00	5.71E+03	1.25E+02	5.81E+00	1.31E+02	1.31E+02	1.00
PCBs												
AROCLOR 1254	4.00E-01	1.80E-01	0.00E+00	1.80E-01	1.80E-01	1.00	4.00E+00	1.80E+00	4.00E-03	1.80E+00	1.80E+00	1.00

Notes:

[a] = The following equation was used to calculate NOAEL- and LOAEL-based soil concentrations:

$$C_{TRV} = \frac{(ADD_i) \times BW_i}{(IR_{food} \sum (BAF_{food_i} \times DF) + (IR_s)) \times AF}$$

C_{TRV}-Based Sediment Concentration (mg chemical / kg sediment, dry weight);
ADD= NOAEL or LOAEL (mg chemical/kg body weight-day);
BW = Body Weight of the receptor (kg);
IR_{food} = Ingestion Rate of food (kg food ingested per day, wet weight);
BAF_{foodi} = Bioconcentration factor, specific to prey type and chemical (ratio of mg of chemical/kg fauna, wet weight to mg chemical/ kg sediment, dry weight);
DF_i = Dietary fraction (proportion of food type in the diet);
IR_s = Incidental Ingestion Rate of sediment (kg sediment ingested per day, dry weight); and
AF = 100% Area Use Factor includes season use rates, area use rates, chemical assimilation rate.

NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
mg/kg = Milligram Per Kilogram
bw - day = Body Weight - Day
HQ = Hazard Quotient
TRV = Toxicity Reference Value
PCB = Polychlorinated Biphenyls

[b] = Receptor doses were determined in order to verify equation calculations for the TRV-Based soil concentrations.
Receptor doses were calculated using species information (Table C-15).
Food dose = (COPEC concentration in prey * % of food type ingested * seasonal and area use factor * receptor ingestion rate for food) / receptor body weight
Receptors prey are based on conservative diet assumptions in Table C-15.
Substrate Dose = (COPEC concentration in soil * receptor ingestion rate for substrate) / receptor body weight
Total Dose = Food Dose + Substrate Dose

[c] = HQ = Total Dose / TRV is used to verify equation calculations.

Table I-14B
TRV-Based Soil Concentration
Refined Ecological Effects Evaluation
Red-tailed Hawk (*Buteo jamaicensis*)
SSP Report - Area A
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	NOAEL						LOAEL					
	Calculated NOAEL-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			NOAEL	HQ[c]	Calculated TRV-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			LOAEL	HQ[c]
		Food	Substrate	Total Dose				Food	Substrate	Total Dose		
Metals												
ARSENIC	8.09E+06	5.14E+00	0.00E+00	5.14E+00	5.14E+00	1.00	2.02E+07	1.28E+01	0.00E+00	1.28E+01	1.28E+01	1.00
CADMIUM	8.15E+06	1.45E+00	0.00E+00	1.45E+00	1.45E+00	1.00	1.12E+08	2.00E+01	0.00E+00	2.00E+01	2.00E+01	1.00
CHROMIUM	5.62E+05	1.00E+00	0.00E+00	1.00E+00	1.00E+00	1.00	2.81E+06	5.00E+00	0.00E+00	5.00E+00	5.00E+00	1.00
COPPER	1.48E+07	4.70E+01	0.00E+00	4.70E+01	4.70E+01	1.00	1.94E+07	6.17E+01	0.00E+00	6.17E+01	6.17E+01	1.00
LEAD	1.19E+07	1.13E+00	0.00E+00	1.13E+00	1.13E+00	1.00	1.19E+08	1.13E+01	0.00E+00	1.13E+01	1.13E+01	1.00
MERCURY	5.45E+03	4.50E-01	0.00E+00	4.50E-01	4.50E-01	1.00	1.09E+04	9.00E-01	0.00E+00	9.00E-01	9.00E-01	1.00
SELENIUM	8.39E+04	4.00E-01	0.00E+00	4.00E-01	4.00E-01	1.00	1.68E+05	8.00E-01	0.00E+00	8.00E-01	8.00E-01	1.00
ZINC	4.56E+05	1.45E+01	0.00E+00	1.45E+01	1.45E+01	1.00	4.12E+06	1.31E+02	0.00E+00	1.31E+02	1.31E+02	1.00
PCBs												
AROCLOR 1254	3.18E+04	1.80E-01	0.00E+00	1.80E-01	1.80E-01	1.00	3.18E+05	1.80E+00	0.00E+00	1.80E+00	1.80E+00	1.00

Notes:

[a] = The following equation was used to calculate NOAEL- and LOAEL-based soil concentrations:

$$C_{TRV} = \frac{(ADD_i) \times BW_i}{(IR_{food} \sum (BAF_{food_i} \times DF) + (IR_s)) \times AF}$$

C_{TRV}-Based Sediment Concentration (mg chemical / kg sediment, dry weight);
ADD= NOAEL or LOAEL (mg chemical/kg body weight-day);
BW = Body Weight of the receptor (kg);
IR_{food} = Ingestion Rate of food (kg food ingested per day, wet weight);
BAF_{foodi} = Bioconcentration factor, specific to prey type and chemical (ratio of mg of chemical/kg fauna, wet weight to mg chemical/ kg sediment, dry weight);
DF_i = Dietary fraction (proportion of food type in the diet);
IR_s = Incidental Ingestion Rate of sediment (kg sediment ingested per day, dry weight); and
AF = 100% Area Use Factor includes season use rates, area use rates, chemical assimilation rate.

NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
mg/kg = Milligram Per Kilogram
bw - day = Body Weight - Day
HQ = Hazard Quotient
TRV = Toxicity Reference Value

[b] = Receptor doses were determined in order to verify equation calculations for the TRV-Based soil concentrations.
Receptor doses were calculated using species information (Table C-15).
Food dose = (COPEC concentration in prey * % of food type ingested * seasonal and area use factor * receptor ingestion rate for food) / receptor body weight
Receptors prey are based on conservative diet assumptions in Table C-15.
Substrate Dose = (COPEC concentration in soil * receptor ingestion rate for substrate) / receptor body weight
Total Dose = Food Dose + Substrate Dose

[c] = HQ = Total Dose / TRV is used to verify equation calculations.

Table I-14C
TRV-Based Soil Concentration
Refined Ecological Effects Evaluation
Meadow Vole (*Microtus pennsylvanicus*)
SSP Report - Area A
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	NOAEL						LOAEL					
	Calculated NOAEL-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			NOAEL	HQ[c]	Calculated TRV-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			LOAEL	HQ[c]
		Food	Substrate	Total Dose				Food	Substrate	Total Dose		
Metals												
ARSENIC	3.39E+01	6.95E-02	4.50E-02	1.15E-01	1.14E-01	1.00	3.39E+02	6.95E-01	4.50E-01	1.15E+00	1.14E+00	1.00
CADMIUM	5.65E+01	1.60E+00	7.50E-02	1.68E+00	1.68E+00	1.00	5.65E+02	1.60E+01	7.49E-01	1.68E+01	1.68E+01	1.00
CHROMIUM	3.26E+06	2.70E+02	4.33E+03	4.60E+03	4.60E+03	1.00	3.26E+07	2.70E+03	4.33E+04	4.60E+04	4.60E+04	1.00
COPPER	3.14E+03	2.14E+01	4.17E+00	2.55E+01	2.55E+01	1.00	4.14E+03	2.81E+01	5.49E+00	3.36E+01	3.36E+01	1.00
LEAD	3.94E+03	8.21E+00	5.23E+00	1.34E+01	1.34E+01	1.00	3.94E+04	8.21E+01	5.23E+01	1.34E+02	1.34E+02	1.00
MERCURY	1.61E+00	3.06E-02	2.00E-03	3.26E-02	3.28E-02	1.00	6.57E+00	1.25E-01	9.00E-03	1.34E-01	1.34E-01	1.00
SELENIUM	1.03E+01	3.22E-01	1.40E-02	3.36E-01	3.36E-01	1.00	1.70E+01	5.32E-01	2.30E-02	5.55E-01	5.54E-01	1.00
ZINC	1.27E+04	2.52E+02	1.69E+01	2.69E+02	2.69E+02	1.00	2.54E+04	5.04E+02	3.38E+01	5.37E+02	5.37E+02	1.00
PCBs												
AROCLOR 1254	4.40E+01	3.43E-03	5.80E-02	6.14E-02	6.18E-02	0.99	4.40E+02	3.43E-02	5.84E-01	6.18E-01	6.18E-01	1.00

Notes:

[a] = The following equation was used to calculate NOAEL- and LOAEL-based soil concentrations:

$$C_{TRV} = \frac{(ADD_i) \times BW_i}{(IR_{food} \sum (BAF_{food_i} \times DF) + (IR_s)) \times AF}$$

C_{TRV}-Based Sediment Concentration (mg chemical / kg sediment, dry weight);
ADD= NOAEL or LOAEL (mg chemical/kg body weight-day);
BW = Body Weight of the receptor (kg);
IR_{food} = Ingestion Rate of food (kg food ingested per day, wet weight);
BAF_{foodi} = Bioconcentration factor, specific to prey type and chemical (ratio of mg of chemical/kg fauna, wet weight to mg chemical/ kg sediment, dry weight);
DF_i = Dietary fraction (proportion of food type in the diet);
IR_s = Incidental Ingestion Rate of sediment (kg sediment ingested per day, dry weight); and
AF = 100% Area Use Factor includes season use rates, area use rates, chemical assimilation rate.

NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
mg/kg = Milligram Per Kilogram
bw - day = Body Weight - Day
HQ = Hazard Quotient
TRV = Toxicity Reference Value

[b] = Receptor doses were determined in order to verify equation calculations for the TRV-Based soil concentrations.
Receptor doses were calculated using species information (Table C-15).
Food dose = (COPEC concentration in prey * % of food type ingested * seasonal and area use factor * receptor ingestion rate for food) / receptor body weight
Receptors prey are based on conservative diet assumptions in Table C-15.
Substrate Dose = (COPEC concentration in soil * receptor ingestion rate for substrate) / receptor body weight
Total Dose = Food Dose + Substrate Dose

[c] = HQ = Total Dose / TRV is used to verify equation calculations.

Table I-14D
TRV-Based Soil Concentration
Refined Ecological Effects Evaluation
Red Fox (*Vulpes vulpes*)
SSP Report - Area A
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	NOAEL						LOAEL					
	Calculated NOAEL-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			NOAEL	HQ[c]	Calculated TRV-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			LOAEL	HQ[c]
		Food	Substrate	Total Dose				Food	Substrate	Total Dose		
Metals												
ARSENIC	8.23E+03	3.17E-02	4.30E-03	3.60E-02	3.60E-02	1.00	8.23E+04	3.17E-01	4.30E-02	3.60E-01	3.60E-01	1.00
CADMIUM	9.95E+04	4.76E-01	5.22E-02	5.28E-01	5.28E-01	1.00	9.95E+05	4.76E+00	5.22E-01	5.28E+00	5.28E+00	1.00
CHROMIUM	1.45E+08	1.37E+03	7.60E+01	1.45E+03	1.45E+03	1.00	1.45E+09	1.37E+04	7.60E+02	1.45E+04	1.45E+04	1.00
COPPER	4.56E+05	7.79E+00	2.39E-01	8.03E+00	8.03E+00	1.00	6.00E+05	1.03E+01	3.15E-01	1.06E+01	1.06E+01	1.00
LEAD	3.11E+06	2.59E+00	1.64E+00	4.22E+00	4.22E+00	1.00	3.11E+07	2.59E+01	1.64E+01	4.22E+01	4.22E+01	1.00
MERCURY	2.40E+01	1.03E-02	0.00E+00	1.03E-02	1.03E-02	1.00	9.78E+01	4.20E-02	0.00E+00	4.20E-02	4.21E-02	1.00
SELENIUM	3.79E+03	1.04E-01	2.00E-03	1.06E-01	1.06E-01	1.00	6.25E+03	1.71E-01	3.00E-03	1.74E-01	1.74E-01	1.00
ZINC	5.06E+05	8.42E+01	2.65E-01	8.45E+01	8.45E+01	1.00	1.01E+06	1.68E+02	5.31E-01	1.69E+02	1.69E+02	1.00
PCBs												
AROCLOR 1254	3.25E+02	1.93E-02	2.00E-04	1.95E-02	1.94E-02	1.00	3.25E+03	1.93E-01	2.00E-03	1.95E-01	1.94E-01	1.00

Notes:

[a] = The following equation was used to calculate NOAEL- and LOAEL-based soil concentrations:

$$C_{TRV} = \frac{(ADD_i) \times BW_i}{(IR_{food} \sum (BAF_{food_i} \times DF) + (IR_s)) \times AF}$$

C_{TRV}-Based Sediment Concentration (mg chemical / kg sediment, dry weight);
ADD= NOAEL or LOAEL (mg chemical/kg body weight-day);
BW = Body Weight of the receptor (kg);
IR_{food} = Ingestion Rate of food (kg food ingested per day, wet weight);
BAF_{foodi} = Bioconcentration factor, specific to prey type and chemical (ratio of mg of chemical/kg fauna, wet weight to mg chemical/ kg sediment, dry weight);
DF_i = Dietary fraction (proportion of food type in the diet);
IR_s = Incidental Ingestion Rate of sediment (kg sediment ingested per day, dry weight); and
AF = 100% Area Use Factor includes season use rates, area use rates, chemical assimilation rate.

[b] = Receptor doses were determined in order to verify equation calculations for the TRV-Based soil concentrations.
Receptor doses were calculated using species information (Table C-15).
Food dose = (COPEC concentration in prey * % of food type ingested * seasonal and area use factor * receptor ingestion rate for food) / receptor body weight
Receptors prey are based on conservative diet assumptions in Table C-15.
Substrate Dose = (COPEC concentration in soil * receptor ingestion rate for substrate) / receptor body weight
Total Dose = Food Dose + Substrate Dose

[c] = HQ = Total Dose / TRV is used to verify equation calculations.

NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
bw - day = Body Weight - Day
HQ = Hazard Quotient
TRV = Toxicity Reference Value
PCB = Polychlorinated Biphenyls

Table I-14E
TRV-Based Soil Concentration
Refined Ecological Effects Evaluation
Short-tailed Shrew (*Blarina brevicauda*)
SSP Report - Area A
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	NOAEL						LOAEL					
	Calculated NOAEL-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			NOAEL	HQ[c]	Calculated TRV-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			LOAEL	HQ[c]
		Food	Substrate	Total Dose				Food	Substrate	Total Dose		
Metals												
ARSENIC	1.03E+01	5.13E-02	2.50E-02	7.63E-02	7.66E-02	1.00	1.03E+02	5.13E-01	2.53E-01	7.66E-01	7.66E-01	1.00
CADMIUM	4.06E+01	1.02E+00	1.00E-01	1.12E+00	1.12E+00	1.00	4.06E+02	1.02E+01	9.97E-01	1.12E+01	1.12E+01	1.00
CHROMIUM	5.98E+05	1.61E+03	1.47E+03	3.07E+03	3.07E+03	1.00	5.98E+06	1.61E+04	1.47E+04	3.07E+04	3.07E+04	1.00
COPPER	3.22E+03	9.17E+00	7.91E+00	1.71E+01	1.71E+01	1.00	4.24E+03	1.21E+01	1.04E+01	2.25E+01	2.25E+01	1.00
LEAD	1.83E+03	4.50E+00	4.48E+00	8.98E+00	8.98E+00	1.00	1.83E+04	4.50E+01	4.48E+01	8.98E+01	8.98E+01	1.00
MERCURY	2.84E+00	1.49E-02	7.00E-03	2.19E-02	2.19E-02	1.00	1.16E+01	6.10E-02	2.85E-02	8.95E-02	8.94E-02	1.00
SELENIUM	1.82E+01	1.80E-01	4.50E-02	2.25E-01	2.25E-01	1.00	3.01E+01	2.97E-01	7.40E-02	3.71E-01	3.71E-01	1.00
ZINC	1.46E+04	1.44E+02	3.58E+01	1.80E+02	1.80E+02	1.00	2.92E+04	2.88E+02	7.17E+01	3.59E+02	3.59E+02	1.00
PCBs												
AROCLOR 1254	1.21E-01	4.10E-02	3.00E-04	4.13E-02	4.13E-02	1.00	1.21E+00	4.10E-01	3.00E-03	4.13E-01	4.13E-01	1.00

Notes:

[a] = The following equation was used to calculate NOAEL- and LOAEL-based soil concentrations:

$$C_{TRV} = \frac{(ADD_i) \times BW_i}{(IR_{food} \sum (BAF_{food_i} \times DF) + (IR_s)) \times AF}$$

C_{TRV}-Based Sediment Concentration (mg chemical / kg sediment, dry weight);
ADD= NOAEL or LOAEL (mg chemical/kg body weight-day);
BW = Body Weight of the receptor (kg);
IR_{food} = Ingestion Rate of food (kg food ingested per day, wet weight);
BAF_{foodi} = Bioconcentration factor, specific to prey type and chemical (ratio of mg of chemical/kg fauna, wet weight to mg chemical/ kg sediment, dry weight);
DF_i = Dietary fraction (proportion of food type in the diet);
IR_s = Incidental Ingestion Rate of sediment (kg sediment ingested per day, dry weight); and
AF = 100% Area Use Factor includes season use rates, area use rates, chemical assimilation rate.

NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
bw - day = Body Weight - Day
HQ = Hazard Quotient
TRV = Toxicity Reference Value
PCB = Polychlorinated Biphenyls

[b] = Receptor doses were determined in order to verify equation calculations for the TRV-Based soil concentrations.
Receptor doses were calculated using species information (Table C-15).
Food dose = (COPEC concentration in prey * % of food type ingested * seasonal and area use factor * receptor ingestion rate for food) / receptor body weight
Receptors prey are based on conservative diet assumptions in Table C-15.
Substrate Dose = (COPEC concentration in soil * receptor ingestion rate for substrate) / receptor body weight
Total Dose = Food Dose + Substrate Dose

[c] = HQ = Total Dose / TRV is used to verify equation calculations.

Table I-15A
TRV-Based Soil Concentration
Refined Ecological Effects Evaluation
American Robin (*Turdus migratorius*)
SSP Report - Area F
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	NOAEL						LOAEL					
	Calculated NOAEL-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			NOAEL	HQ[c]	Calculated TRV-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			LOAEL	HQ[c]
		Food	Substrate	Total Dose				Food	Substrate	Total Dose		
Metals												
ARSENIC	6.04E+02	4.53E+00	6.14E-01	5.14E+00	5.14E+00	1.00	1.51E+03	1.13E+01	1.54E+00	1.28E+01	1.28E+01	1.00
CADMIUM	3.08E+01	1.42E+00	3.10E-02	1.45E+00	1.45E+00	1.00	4.25E+02	1.96E+01	4.33E-01	2.00E+01	2.00E+01	1.00
CHROMIUM	2.18E+02	7.78E-01	2.22E-01	1.00E+00	1.00E+00	1.00	1.09E+03	3.89E+00	1.11E+00	5.00E+00	5.00E+00	1.00
LEAD	2.17E+02	9.09E-01	2.21E-01	1.13E+00	1.13E+00	1.00	2.17E+03	9.09E+00	2.21E+00	1.13E+01	1.13E+01	1.00
MERCURY	2.72E+01	4.22E-01	2.80E-02	4.50E-01	4.50E-01	1.00	5.45E+01	8.45E-01	5.50E-02	9.00E-01	9.00E-01	1.00
SELENIUM	1.42E+01	3.86E-01	1.40E-02	4.00E-01	4.00E-01	1.00	2.84E+01	7.71E-01	2.90E-02	8.00E-01	8.00E-01	1.00
ZINC	6.32E+02	1.39E+01	6.43E-01	1.45E+01	1.45E+01	1.00	5.71E+03	1.25E+02	5.81E+00	1.31E+02	1.31E+02	1.00
PCBs												
AROCLOR 1254	4.00E-01	1.80E-01	0.00E+00	1.80E-01	1.80E-01	1.00	4.00E+00	1.80E+00	4.00E-03	1.80E+00	1.80E+00	1.00

Notes:

[a] = The following equation was used to calculate NOAEL- and LOAEL-based soil concentrations:

$$C_{TRV} = \frac{(ADD_i) \times BW_i}{(IR_{food} \sum (BAF_{food_i} \times DF) + (IR_s)) \times AF}$$

C_{TRV}-Based Sediment Concentration (mg chemical / kg sediment, dry weight);
ADD= NOAEL or LOAEL (mg chemical/kg body weight-day);
BW = Body Weight of the receptor (kg);
IR_{food} = Ingestion Rate of food (kg food ingested per day, wet weight);
BAF_{foodi} = Bioconcentration factor, specific to prey type and chemical (ratio of mg of chemical/kg fauna, wet weight to mg chemical/ kg sediment, dry weight);
DF_i = Dietary fraction (proportion of food type in the diet);
IR_s = Incidental Ingestion Rate of sediment (kg sediment ingested per day, dry weight); and
AF = 100% Area Use Factor includes season use rates, area use rates, chemical assimilation rate.

NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
mg/kg = Milligram Per Kilogram
bw - day = Body Weight - Day
HQ = Hazard Quotient
TRV = Toxicity Reference Value
PCB = Polychlorinated Biphenyls

[b] = Receptor doses were determined in order to verify equation calculations for the TRV-Based soil concentrations.
Receptor doses were calculated using species information (Table C-15).
Food dose = (COPEC concentration in prey * % of food type ingested * seasonal and area use factor * receptor ingestion rate for food) / receptor body weight
Receptors prey are based on conservative diet assumptions in Table C-15.
Substrate Dose = (COPEC concentration in soil * receptor ingestion rate for substrate) / receptor body weight
Total Dose = Food Dose + Substrate Dose

[c] = HQ = Total Dose / TRV is used to verify equation calculations.

Table I-15B
TRV-Based Soil Concentration
Refined Ecological Effects Evaluation
Red-tailed Hawk (*Buteo jamaicensis*)
SSP Report - Area F
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	NOAEL						LOAEL					
	Calculated NOAEL-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			NOAEL	HQ[c]	Calculated TRV-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			LOAEL	HQ[c]
		Food	Substrate	Total Dose				Food	Substrate	Total Dose		
Metals												
ARSENIC	8.09E+06	5.14E+00	0.00E+00	5.14E+00	5.14E+00	1.00	2.02E+07	1.28E+01	0.00E+00	1.28E+01	1.28E+01	1.00
CADMIUM	8.15E+06	1.45E+00	0.00E+00	1.45E+00	1.45E+00	1.00	1.12E+08	2.00E+01	0.00E+00	2.00E+01	2.00E+01	1.00
CHROMIUM	5.62E+05	1.00E+00	0.00E+00	1.00E+00	1.00E+00	1.00	2.81E+06	5.00E+00	0.00E+00	5.00E+00	5.00E+00	1.00
LEAD	1.19E+07	1.13E+00	0.00E+00	1.13E+00	1.13E+00	1.00	1.19E+08	1.13E+01	0.00E+00	1.13E+01	1.13E+01	1.00
MERCURY	5.45E+03	4.50E-01	0.00E+00	4.50E-01	4.50E-01	1.00	1.09E+04	9.00E-01	0.00E+00	9.00E-01	9.00E-01	1.00
SELENIUM	8.39E+04	4.00E-01	0.00E+00	4.00E-01	4.00E-01	1.00	1.68E+05	8.00E-01	0.00E+00	8.00E-01	8.00E-01	1.00
ZINC	4.56E+05	1.45E+01	0.00E+00	1.45E+01	1.45E+01	1.00	4.12E+06	1.31E+02	0.00E+00	1.31E+02	1.31E+02	1.00
PCBs												
AROCLOR 1254	3.18E+04	1.80E-01	0.00E+00	1.80E-01	1.80E-01	1.00	3.18E+05	1.80E+00	0.00E+00	1.80E+00	1.80E+00	1.00

Notes:

[a] = The following equation was used to calculate NOAEL- and LOAEL-based soil concentrations:

$$C_{TRV} = \frac{(ADD_i) \times BW_i}{(IR_{food} \sum (BAF_{food_i} \times DF) + (IR_s)) \times AF}$$

C_{TRV}-Based Sediment Concentration (mg chemical / kg sediment, dry weight);
ADD= NOAEL or LOAEL (mg chemical/kg body weight-day);
BW = Body Weight of the receptor (kg);
IR_{food} = Ingestion Rate of food (kg food ingested per day, wet weight);
BAF_{foodi} = Bioconcentration factor, specific to prey type and chemical (ratio of mg of chemical/kg fauna, wet weight to mg chemical/ kg sediment, dry weight);
DF_i = Dietary fraction (proportion of food type in the diet);
IR_s = Incidental Ingestion Rate of sediment (kg sediment ingested per day, dry weight); and
AF = 100% Area Use Factor includes season use rates, area use rates, chemical assimilation rate.

NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
mg/kg = Milligram Per Kilogram
bw - day = Body Weight - Day
HQ = Hazard Quotient
TRV = Toxicity Reference Value

[b] = Receptor doses were determined in order to verify equation calculations for the TRV-Based soil concentrations.
Receptor doses were calculated using species information (Table C-15).
Food dose = (COPEC concentration in prey * % of food type ingested * seasonal and area use factor * receptor ingestion rate for food) / receptor body weight
Receptors prey are based on conservative diet assumptions in Table C-15.
Substrate Dose = (COPEC concentration in soil * receptor ingestion rate for substrate) / receptor body weight
Total Dose = Food Dose + Substrate Dose

[c] = HQ = Total Dose / TRV is used to verify equation calculations.

Table I-15C
TRV-Based Soil Concentration
Refined Ecological Effects Evaluation
Meadow Vole (*Microtus pennsylvanicus*)
SSP Report - Area F
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	NOAEL						LOAEL					
	Calculated NOAEL-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			NOAEL	HQ[c]	Calculated TRV-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			LOAEL	HQ[c]
		Food	Substrate	Total Dose				Food	Substrate	Total Dose		
Metals												
ARSENIC	3.39E+01	6.95E-02	4.50E-02	1.15E-01	1.14E-01	1.00	3.39E+02	6.95E-01	4.50E-01	1.15E+00	1.14E+00	1.00
CADMIUM	5.65E+01	1.60E+00	7.50E-02	1.68E+00	1.68E+00	1.00	5.65E+02	1.60E+01	7.49E-01	1.68E+01	1.68E+01	1.00
CHROMIUM	3.26E+06	2.70E+02	4.33E+03	4.60E+03	4.60E+03	1.00	3.26E+07	2.70E+03	4.33E+04	4.60E+04	4.60E+04	1.00
LEAD	3.94E+03	8.21E+00	5.23E+00	1.34E+01	1.34E+01	1.00	3.94E+04	8.21E+01	5.23E+01	1.34E+02	1.34E+02	1.00
MERCURY	1.61E+00	3.06E-02	2.00E-03	3.26E-02	3.28E-02	1.00	6.57E+00	1.25E-01	9.00E-03	1.34E-01	1.34E-01	1.00
SELENIUM	1.03E+01	3.22E-01	1.40E-02	3.36E-01	3.36E-01	1.00	1.70E+01	5.32E-01	2.30E-02	5.55E-01	5.54E-01	1.00
ZINC	1.27E+04	2.52E+02	1.69E+01	2.69E+02	2.69E+02	1.00	2.54E+04	5.04E+02	3.38E+01	5.37E+02	5.37E+02	1.00
PCBs												
AROCLOR 1254	4.40E+01	3.43E-03	5.80E-02	6.14E-02	6.18E-02	0.99	4.40E+02	3.43E-02	5.84E-01	6.18E-01	6.18E-01	1.00

Notes:

[a] = The following equation was used to calculate NOAEL- and LOAEL-based soil concentrations:

$$C_{TRV} = \frac{(ADD_i) \times BW_i}{(IR_{food} \sum (BAF_{food_i} \times DF) + (IR_s)) \times AF}$$

C_{TRV}-Based Sediment Concentration (mg chemical / kg sediment, dry weight);
ADD= NOAEL or LOAEL (mg chemical/kg body weight-day);
BW = Body Weight of the receptor (kg);
IR_{food} = Ingestion Rate of food (kg food ingested per day, wet weight);
BAF_{foodi} = Bioconcentration factor, specific to prey type and chemical (ratio of mg of chemical/kg fauna, wet weight to mg chemical/ kg sediment, dry weight);
DF_i = Dietary fraction (proportion of food type in the diet);
IR_s = Incidental Ingestion Rate of sediment (kg sediment ingested per day, dry weight); and
AF = 100% Area Use Factor includes season use rates, area use rates, chemical assimilation rate.

NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
mg/kg = Milligram Per Kilogram
bw - day = Body Weight - Day
HQ = Hazard Quotient
TRV = Toxicity Reference Value

[b] = Receptor doses were determined in order to verify equation calculations for the TRV-Based soil concentrations.
Receptor doses were calculated using species information (Table C-15).
Food dose = (COPEC concentration in prey * % of food type ingested * seasonal and area use factor * receptor ingestion rate for food) / receptor body weight
Receptors prey are based on conservative diet assumptions in Table C-15.
Substrate Dose = (COPEC concentration in soil * receptor ingestion rate for substrate) / receptor body weight
Total Dose = Food Dose + Substrate Dose

[c] = HQ = Total Dose / TRV is used to verify equation calculations.

Table I-15D
TRV-Based Soil Concentration
Refined Ecological Effects Evaluation
Red Fox (*Vulpes vulpes*)
SSP Report - Area F
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	NOAEL						LOAEL					
	Calculated NOAEL-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			NOAEL	HQ[c]	Calculated TRV-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			LOAEL	HQ[c]
		Food	Substrate	Total Dose				Food	Substrate	Total Dose		
Metals												
ARSENIC	8.23E+03	3.17E-02	4.30E-03	3.60E-02	3.60E-02	1.00	8.23E+04	3.17E-01	4.30E-02	3.60E-01	3.60E-01	1.00
CADMIUM	9.95E+04	4.76E-01	5.22E-02	5.28E-01	5.28E-01	1.00	9.95E+05	4.76E+00	5.22E-01	5.28E+00	5.28E+00	1.00
CHROMIUM	1.45E+08	1.37E+03	7.60E+01	1.45E+03	1.45E+03	1.00	1.45E+09	1.37E+04	7.60E+02	1.45E+04	1.45E+04	1.00
LEAD	3.11E+06	2.59E+00	1.64E+00	4.22E+00	4.22E+00	1.00	3.11E+07	2.59E+01	1.64E+01	4.22E+01	4.22E+01	1.00
MERCURY	2.40E+01	1.03E-02	0.00E+00	1.03E-02	1.03E-02	1.00	9.78E+01	4.20E-02	0.00E+00	4.20E-02	4.21E-02	1.00
SELENIUM	3.79E+03	1.04E-01	2.00E-03	1.06E-01	1.06E-01	1.00	6.25E+03	1.71E-01	3.00E-03	1.74E-01	1.74E-01	1.00
ZINC	5.06E+05	8.42E+01	2.65E-01	8.45E+01	8.45E+01	1.00	1.01E+06	1.68E+02	5.31E-01	1.69E+02	1.69E+02	1.00
PCBs												
AROCLOR 1254	3.25E+02	1.93E-02	2.00E-04	1.95E-02	1.94E-02	1.00	3.25E+03	1.93E-01	2.00E-03	1.95E-01	1.94E-01	1.00

Notes:

[a] = The following equation was used to calculate NOAEL- and LOAEL-based soil concentrations:

$$C_{TRV} = \frac{(ADD_i) \times BW_i}{(IR_{food} \sum (BAF_{food_i} \times DF) + (IR_s)) \times AF}$$

C_{TRV}-Based Sediment Concentration (mg chemical / kg sediment, dry weight);
ADD= NOAEL or LOAEL (mg chemical/kg body weight-day);
BW = Body Weight of the receptor (kg);
IR_{food} = Ingestion Rate of food (kg food ingested per day, wet weight);
BAF_{foodi} = Bioconcentration factor, specific to prey type and chemical (ratio of mg of chemical/kg fauna, wet weight to mg chemical/ kg sediment, dry weight);
DF_i = Dietary fraction (proportion of food type in the diet);
IR_s = Incidental Ingestion Rate of sediment (kg sediment ingested per day, dry weight); and
AF = 100% Area Use Factor includes season use rates, area use rates, chemical assimilation rate.

[b] = Receptor doses were determined in order to verify equation calculations for the TRV-Based soil concentrations.

Receptor doses were calculated using species information (Table C-15).

Food dose = (COPEC concentration in prey * % of food type ingested * seasonal and area use factor * receptor ingestion rate for food) / receptor body weight

Receptors prey are based on conservative diet assumptions in Table C-15.

Substrate Dose = (COPEC concentration in soil * receptor ingestion rate for substrate) / receptor body weight

Total Dose = Food Dose + Substrate Dose

[c] = HQ = Total Dose / TRV is used to verify equation calculations.

NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
bw - day = Body Weight - Day
HQ = Hazard Quotient
TRV = Toxicity Reference Value
PCB = Polychlorinated Biphenyls

Table I-15E
TRV-Based Soil Concentration
Refined Ecological Effects Evaluation
Short-tailed Shrew (*Blarina brevicauda*)
SSP Report - Area F
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	NOAEL						LOAEL					
	Calculated NOAEL-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			NOAEL	HQ[c]	Calculated TRV-Based Soil Concentration[a] (mg/kg)	Receptor Dose[b]			LOAEL	HQ[c]
		Food	Substrate	Total Dose				Food	Substrate	Total Dose		
Metals												
ARSENIC	1.03E+01	5.13E-02	2.50E-02	7.63E-02	7.66E-02	1.00	1.03E+02	5.13E-01	2.53E-01	7.66E-01	7.66E-01	1.00
CADMIUM	4.06E+01	1.02E+00	1.00E-01	1.12E+00	1.12E+00	1.00	4.06E+02	1.02E+01	9.97E-01	1.12E+01	1.12E+01	1.00
CHROMIUM	5.98E+05	1.61E+03	1.47E+03	3.07E+03	3.07E+03	1.00	5.98E+06	1.61E+04	1.47E+04	3.07E+04	3.07E+04	1.00
LEAD	1.83E+03	4.50E+00	4.48E+00	8.98E+00	8.98E+00	1.00	1.83E+04	4.50E+01	4.48E+01	8.98E+01	8.98E+01	1.00
MERCURY	2.84E+00	1.49E-02	7.00E-03	2.19E-02	2.19E-02	1.00	1.16E+01	6.10E-02	2.85E-02	8.95E-02	8.94E-02	1.00
SELENIUM	1.82E+01	1.80E-01	4.50E-02	2.25E-01	2.25E-01	1.00	3.01E+01	2.97E-01	7.40E-02	3.71E-01	3.71E-01	1.00
ZINC	1.46E+04	1.44E+02	3.58E+01	1.80E+02	1.80E+02	1.00	2.92E+04	2.88E+02	7.17E+01	3.59E+02	3.59E+02	1.00
PCBs												
AROCLOR 1254	1.21E-01	4.10E-02	3.00E-04	4.13E-02	4.13E-02	1.00	1.21E+00	4.10E-01	3.00E-03	4.13E-01	4.13E-01	1.00

Notes:

[a] = The following equation was used to calculate NOAEL- and LOAEL-based soil concentrations:

$$C_{TRV} = \frac{(ADD_i) \times BW_i}{(IR_{food} \sum (BAF_{food_i} \times DF) + (IR_s)) \times AF}$$

C_{TRV}-Based Sediment Concentration (mg chemical / kg sediment, dry weight);
ADD= NOAEL or LOAEL (mg chemical/kg body weight-day);
BW = Body Weight of the receptor (kg);
IR_{food} = Ingestion Rate of food (kg food ingested per day, wet weight);
BAF_{foodi} = Bioconcentration factor, specific to prey type and chemical (ratio of mg of chemical/kg fauna, wet weight to mg chemical/ kg sediment, dry weight);
DF_i = Dietary fraction (proportion of food type in the diet);
IR_s = Incidental Ingestion Rate of sediment (kg sediment ingested per day, dry weight); and
AF = 100% Area Use Factor includes season use rates, area use rates, chemical assimilation rate.

NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
bw - day = Body Weight - Day
HQ = Hazard Quotient
TRV = Toxicity Reference Value
PCB = Polychlorinated Biphenyls

[b] = Receptor doses were determined in order to verify equation calculations for the TRV-Based soil concentrations.
Receptor doses were calculated using species information (Table C-15).
Food dose = (COPEC concentration in prey * % of food type ingested * seasonal and area use factor * receptor ingestion rate for food) / receptor body weight
Receptors prey are based on conservative diet assumptions in Table C-15.
Substrate Dose = (COPEC concentration in soil * receptor ingestion rate for substrate) / receptor body weight
Total Dose = Food Dose + Substrate Dose

[c] = HQ = Total Dose / TRV is used to verify equation calculations.

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Table I-16
Wildlife Receptor Profiles
Screening Level Ecological Risk Assessment
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

											Preliminary Assessment				Refinement Assessment											
Representative Species			Composition of Diet (%)					Reference	Substrate Ingestion Rate			Body Weight		Food Ingestion Rate		Body Weight		Food Ingestion Rate		Home Range (ha)	Proportion of Year Species Active	Estimated Area Use Factor							
Food-web Classification	Common Name	Scientific Name	Plants	Inverte-brates	Small mammals	Aquatic Invertebrates	Fish		% of Dry Intake	kg dry wt./day	Reference	kg wet wt.	Reference	kg wet wt./day	Reference[a]	kg wet wt.	Reference	kg wet wt./day	Reference			SWMU 13 (1.0 ha)	SWMUs 37, 38, and Area Q (0.37 ha)	SWMU 46 (0.01 ha)	SWMU 57 (0.18 ha)	SWMU 68 (0.01 ha)	SWMU 69 (0.005 ha)	AOC A (0.018 ha)	AOC F (0.018 ha)
Birds																												
soil-probing invertivore	American robin	*Turdus migratorius*	50%	50%				Suter and Sample 1994	5%	0.0019	Suter and Sample 1994	0.077	USEPA 1993	0.177	Suter and Sample 1994	0.08	USEPA 1993	0.093	Suter and Sample 1994	0.42	1	1.00	0.88	0.02	0.43	0.02	0.01	0.04	0.04
avian, small piscivore	Belted kingfisher	*Ceryle alcyon*					100%	USEPA 1993a	0%	0	USEPA 1993a	0.136	Sample and Suter 1994	0.068	Sample and Suter 1994	0.148	Sample and Suter 1994	1.7	Sample and Suter 1994	14.2	1	0.07	--	--	--	--	--	--	--
avian, aquatic inverivore	Mallard Duck	*Anas platyrhynchus*				100%		USEPA 1993a[1]	2%	0.0012	USEPA 1993a	1	Dunning 1993	0.291	USEPA 1993	1.1	USEPA 1993	0.31	Sample and Suter 1995	111	1	0.00901	--	--	--	--	--	--	--
avian, large carnivore	Red-tailed hawk	*Buteo jamaicensis*			100%			USEPA 1993a; Suter and Sample 1994	0%	0	Suter and Sample 1994	1.028	Suter and Sample 1995	0.136	Suter and Sample 1994	1.235	USEPA 1993	0.109	USEPA 1993/Suter and Sample 1994	250	1	0.004	0.001	0.00004	0.001	0.00004	0.00002	0.00007	0.000
Mammals																												
mammal, small herbivore	Meadow vole	*Microtus pennsylvanicus*	100%					Suter and Sample 1994	2.4%	0.00012	Suter and Sample 1994	0.024	USEPA 1993	0.005	Suter and Sample 1994	0.044	Sample et al. 1996	0.005	Suter and Sample 1994	0.037	1	1.00	1.00	0.27	1.00	0.27	0.14	0.49	0.49
mammal, medium carnivore	Red fox	*Vulpes vulpes*	17%	4%	79%			Suter and Sample 1994	2.8%	0.0126	Suter and Sample 1994	3.94	Suter and Sample 1995	0.596	Suter and Sample 1995	4.5	EPA 1993	0.45	Suter and Sample 1994	96	1	0.0104	0.0039	0.0001	0.0019	0.0001	0.0001	0.0002	0.0002
mammal, semi-aquatic omnivore	Raccoon	*Procyon lotor*	50%			50%		USEPA 1993a	9.4%	0.032	USEPA 1993a	3.18	USEPA 1993	0.89	USEPA 1993	5.81	USEPA 1993	1.7	USEPA 1993	108	1	0.0093	--	--	--	--	--	--	--
mammal, small invertivore	Short-tailed shrew	*Blarina brevicauda*		100%				USEPA 1993a; Suter and Sample 1994	13%	0.00117	Suter and Sample 1994	0.015	USEPA 1993/Suter and Sample 1994	0.01	Suter and Sample 1995	0.022	USEPA 1993	0.009	Suter and Sample 1994	0.39	1	1.00	0.95	0.03	0.46	0.03	0.01	0.05	0.05

Notes:
% = Percent
kg = Kilogram
wt. = Weight
ha = Hectare
USEPA = U.S. Environmental Protection Agency
COPEC = Constituent of Potential Ecological Concern
SWMU = Solid Waste Management Unit

Table I-17
Derivation of Chronic NOAEL and LOAEL Toxic Reference Values
Screening Level Ecological Risk Assessment
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	AVIAN TEST SPECIES				MAMMALIAN TEST SPECIES				AVIAN RECEPTORS								MAMMALIAN RECEPTORS							
									American Robin		Red-tailed Hawk		Belted Kingfisher		Mallard Duck		Meadow Vole		Red Fox		Short-tailed Shrew		Raccoon	
	Chronic LOAEL[a]	Chronic NOAEL[b]	Test Animal	Source	Chronic LOAEL[a]	Chronic NOAEL[b]	Test Animal	Source	Chronic LOAEL	Chronic NOAEL	Chronic LOAEL	Chronic NOAEL	Chronic LOAEL	Chronic NOAEL	Chronic LOAEL	Chronic NOAEL	Chronic LOAEL	Chronic NOAEL	Chronic LOAEL	Chronic NOAEL	Chronic LOAEL	Chronic NOAEL	Chronic LOAEL	Chronic NOAEL
	(mg/kg-bw/d)				(mg/kg-bw/d)				(mg/kg-bw/d)		(mg/kg-bw/d)		(mg/kg-bw/d)		(mg/kg-bw/d)		(mg/kg-bw/d)		(mg/kg-bw/d)		(mg/kg-bw/d)		(mg/kg-bw/d)	
SVOCs																								
Acenaphthene	5.05E+00	1.01E+00	red-winged blackbird	USACE 1998	87.5	17.5	mouse	USACE 1998	5.05E+00	1.01E+00	5.05E+00	1.01E+00	5.05E+00	1.01E+00	5.05E+00	1.01E+00	7.95E+01	1.59E+01	2.50E+01	5.00E+00	5.32E+01	1.06E+01	2.35E+01	4.69E+00
Acenaphthylene	--	--	--	USACE 1998	500	100	rat	USACE 1998	--	--	--	--	--	--	--	--	8.40E+02	1.68E+02	2.64E+02	5.28E+01	5.62E+02	1.12E+02	2.48E+02	4.95E+01
Anthracene	--	--	--	USACE 1998	3300	330	rodents	USACE 1998	--	--	--	--	--	--	--	--	4.59E+03	4.59E+02	1.44E+03	1.44E+02	3.07E+03	3.07E+02	1.35E+03	1.35E+02
Benzo(a)anthracene	--	--	--	USACE 1998	2	0.2	rodents	USACE 1998	--	--	--	--	--	--	--	--	2.78E+00	2.78E-01	8.75E-01	8.75E-02	1.86E+00	1.86E-01	8.21E-01	8.21E-02
Benzo(a)pyrene	2.50E+00	5.00E-01	duck	ORNL 1996	10	1	mouse	ORNL 1996	2.50E+00	5.00E-01	2.50E+00	5.00E-01	2.50E+00	5.00E-01	2.50E+00	5.00E-01	9.09E+00	9.09E-01	2.86E+00	2.86E-01	6.08E+00	6.08E-01	2.68E+00	2.68E-01
Benzo(b)fluoranthene	--	--	--	ORNL 1996	10	1	mouse	ORNL 1996	--	--	--	--	--	--	--	--	9.09E+00	9.09E-01	2.86E+00	2.86E-01	6.08E+00	6.08E-01	2.68E+00	2.68E-01
Benzo(g,h,i)perylene	--	--	--	USACE 1998	2.5	0.5	mouse	USACE 1998	--	--	--	--	--	--	--	--	2.27E+00	4.54E-01	7.14E-01	1.43E-01	1.52E+00	3.04E-01	6.70E-01	1.34E-01
Benzo(k)fluoranthene	--	--	--	USACE 1998	72	7.2	rodents	USACE 1998	--	--	--	--	--	--	--	--	1.00E+02	1.00E+01	3.15E+01	3.15E+00	6.70E+01	6.70E+00	2.96E+01	2.96E+00
Chrysene	--	--	--	USACE 1998	99	9.9	rodents	USACE 1998	--	--	--	--	--	--	--	--	1.38E+02	1.38E+01	4.33E+01	4.33E+00	9.21E+01	9.21E+00	4.06E+01	4.06E+00
Dibenzo(a,h)anthracene	--	--	--	USACE 1998	13.33	1.333	rodents	USACE 1998	--	--	--	--	--	--	--	--	1.85E+01	1.85E+00	5.83E+00	5.83E-01	1.24E+01	1.24E+00	5.47E+00	5.47E-01
Fluoranthene	--	--	--	USACE 1998	100	20	rodents	USACE 1998	--	--	--	--	--	--	--	--	1.39E+02	2.78E+01	4.38E+01	8.75E+00	9.31E+01	1.86E+01	4.11E+01	8.21E+00
Fluorene	5.05E+00	1.01E+00	red-winged blackbird	USACE 1998	2.5	0.5	mouse	USACE 1998	5.05E+00	1.01E+00	5.05E+00	1.01E+00	5.05E+00	1.01E+00	5.05E+00	1.01E+00	2.27E+00	4.54E-01	7.14E-01	1.43E-01	1.52E+00	3.04E-01	6.70E-01	1.34E-01
Indeno(1,2,3-cd)pyrene	--	--	--	USACE 1998	72	7.2	rodents	USACE 1998	--	--	--	--	--	--	--	--	1.00E+02	1.00E+01	3.15E+01	3.15E+00	6.70E+01	6.70E+00	2.96E+01	2.96E+00
Phenanthrene	5.65E+00	1.13E+00	red-winged blackbird	USACE 1998	35	7	mouse	USACE 1998	5.65E+00	1.13E+00	5.65E+00	1.13E+00	5.65E+00	1.13E+00	5.65E+00	1.13E+00	3.18E+01	6.36E+00	1.00E+01	2.00E+00	2.13E+01	4.25E+00	9.38E+00	1.88E+00
Phenol	--	--	--	USACE 1998	120	60	rat	USACE 1998	--	--	--	--	--	--	--	--	2.02E+02	1.01E+02	6.34E+01	3.17E+01	1.35E+02	6.74E+01	5.95E+01	2.97E+01
Pyrene	--	--	--	USACE 1998	40	8	mouse	USACE 1998	--	--	--	--	--	--	--	--	3.63E+01	7.27E+00	1.14E+01	2.29E+00	2.43E+01	4.86E+00	1.07E+01	2.14E+00
Metals																								
Arsenic	1.28E+01	5.14E+00	mallard duck	ORNL 1996	1.26	0.126	mouse	ORNL 1996	1.28E+01	5.14E+00	1.28E+01	5.14E+00	1.28E+01	5.14E+00	1.28E+01	5.14E+00	1.14E+00	1.14E-01	3.60E-01	3.60E-02	7.66E-01	7.66E-02	3.38E-01	3.38E-02
Cadmium	2.00E+01	1.45E+00	mallard duck	ORNL 1996	10	1	rat	ORNL 1996	2.00E+01	1.45E+00	2.00E+01	1.45E+00	2.00E+01	1.45E+00	2.00E+01	1.45E+00	1.68E+01	1.68E+00	5.28E+00	5.28E-01	1.12E+01	1.12E+00	4.95E+00	4.95E-01
Chromium	5.00E+00	1.00E+00	black duck	ORNL 1996	27370	2737	rat	ORNL 1996	5.00E+00	1.00E+00	5.00E+00	1.00E+00	5.00E+00	1.00E+00	5.00E+00	1.00E+00	4.60E+04	4.60E+03	1.45E+04	1.45E+03	3.07E+04	3.07E+03	1.36E+04	1.36E+03
Copper	6.17E+01	4.70E+01	1 day old chicks	ORNL 1996	15.4	11.7	mink	ORNL 1996	6.17E+01	4.70E+01	6.17E+01	4.70E+01	6.17E+01	4.70E+01	6.17E+01	4.70E+01	3.36E+01	2.55E+01	1.06E+01	8.03E+00	2.25E+01	1.71E+01	9.92E+00	7.54E+00
Lead	1.13E+01	1.13E+00	Japanese quail	ORNL 1996	80	8	rat	ORNL 1996	1.13E+01	1.13E+00	1.13E+01	1.13E+00	1.13E+01	1.13E+00	1.13E+01	1.13E+00	1.34E+02	1.34E+01	4.22E+01	4.22E+00	8.98E+01	8.98E+00	3.96E+01	3.96E+00
Mercury	9.00E-01	4.50E-01	Japanese Quail	ORNL 1996	0.06125	0.015	mink	ORNL 1996	9.00E-01	4.50E-01	9.00E-01	4.50E-01	9.00E-01	4.50E-01	9.00E-01	4.50E-01	1.34E-01	3.28E-02	4.21E-02	1.03E-02	8.94E-02	2.19E-02	3.95E-02	9.66E-03
Nickel	1.07E+02	7.74E+01	mallard duckling	ORNL 1996	80	40	rat	ORNL 1996	1.07E+02	7.74E+01	1.07E+02	7.74E+01	1.07E+02	7.74E+01	1.07E+02	7.74E+01	1.34E+02	6.72E+01	4.22E+01	2.11E+01	8.98E+01	4.49E+01	3.96E+01	1.98E+01
Selenium	8.00E-01	4.00E-01	mallard duck	ORNL 1996	0.33	0.2	rat	ORNL 1996	8.00E-01	4.00E-01	8.00E-01	4.00E-01	8.00E-01	4.00E-01	8.00E-01	4.00E-01	5.54E-01	3.36E-01	1.74E-01	1.06E-01	3.71E-01	2.25E-01	1.63E-01	9.91E-02
Silver	1.24E+02	1.66E+01	turkey	Matuk et al. 1981	222	22.2	rat	Matuk et al. 1981	1.24E+02	1.66E+01	1.24E+02	1.66E+01	1.24E+02	1.66E+01	1.24E+02	1.66E+01	3.73E+02	3.73E+01	1.17E+02	1.17E+01	2.49E+02	2.49E+01	1.10E+02	1.10E+01
Zinc	1.31E+02	1.45E+01	white leghorn hen	ORNL 1996	320	160	rat	ORNL 1996	1.31E+02	1.45E+01	1.31E+02	1.45E+01	1.31E+02	1.45E+01	1.31E+02	1.45E+01	5.37E+02	2.69E+02	1.69E+02	8.45E+01	3.59E+02	1.80E+02	1.59E+02	7.93E+01
PCBs																								
Aroclor 1254	1.80E+00	1.80E-01	ring-necked pheasant	ORNL 1996	0.68	0.068	oldfield mouse	ORNL 1996	1.80E+00	1.80E-01	1.80E+00	1.80E-01	1.80E+00	1.80E-01	1.80E+00	1.80E-01	6.18E-01	6.18E-02	1.94E-01	1.94E-02	4.13E-01	4.13E-02	1.82E-01	1.82E-02
Pesticides																								
Dieldrin	7.70E-01	7.70E-02	barn owl	ORNL 1996	0.2	0.02	rat	ORNL 1996	7.70E-01	7.70E-02	7.70E-01	7.70E-02	7.70E-01	7.70E-02	7.70E-01	7.70E-02	3.36E-01	3.36E-02	1.06E-01	1.06E-02	2.25E-01	2.25E-02	9.91E-02	9.91E-03
Dioxins/Furans																								
2,3,7,8-TCDD	1.40E-04	1.40E-05	ring-necked	ORNL 1996	0.00025	0.000025	mouse	ORNL 1996	1.40E-04	1.40E-05	1.40E-04	1.40E-05	1.40E-04	1.40E-05	1.40E-04	1.40E-05	2.27E-04	2.27E-05	7.14E-05	7.14E-06	1.52E-04	1.52E-05	6.70E-05	6.70E-06

Notes:
[a] = LOAEL is low observable adverse effects level.
[b] = NOAEL is no observable adverse effects level.
NOAEL and LOAEL values were derived from acute values by applying an uncertainty factor of 150.
LD_{50} = Lethal Dose for 50% of test organisms
NOAEL and LOAEL values derived for benzo(a)pyrene were used as a surrogate for dibenzo(a,h)anthracene.
[c] = Wildlife NOAEL or LOAEL = (test-species NOAEL or LOAEL dose × body-weight extrapolation factor (Table C1).
-- Appropriate data are not available from published literature to derive NOAEL and LOAEL values.
ORNL (1996) as found in Sample, et. al. 1996.

TRV = Toxic Reference Value
NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
mg/kg = Milligram Per Kilogram
bw/d = Body Weight Per Day
SVOC = Semivolatile Organic Compound
PCB = Polychlorinated Biphenyls
USACE = U.S. Army Corps of Engineers
ORNL = Oak Ridge National Laboratory

Table I-18
Body Weight Extrapolation Factors
Mammalian Wildlife Receptors
Screening Level Ecological Risk Assessment
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Test Species													
Species	**Body Weight[a] (BW_t) (kg)**	**Species**	**Body Weight[b] (BW_w) (kg)**	**Body-Weight Extrapolation Factor**	**Species**	**Body Weight[b] (BW_w) (kg)**	**Body-Weight Extrapolation Factor**	**Species**	**Body Weight[b] (BW_w) (kg)**	**Body-Weight Extrapolation Factor**	**Species**	**Body Weight[b] (BW_w) (kg)**	**Body-Weight Extrapolation Factor**
Mink	1	Meadow Vole	0.044	2.18	Red Fox	4.5	0.69	Short-tailed Shrew	0.22	1.46	Raccoon	5.81	0.64
Mouse	0.03	--	--	0.91	--	--	0.29	--	--	0.61	--	--	0.27
Rat	0.35	--	--	1.68	--	--	0.53	--	--	1.12	--	--	0.50
Juvenile Pig (6 kg)	6	--	--	3.42	--	--	1.07	--	--	2.29	--	--	1.01
Rhesus monkey	5	--	--	3.26	--	--	1.03	--	--	2.18	--	--	0.96
Rodents	0.165	--	--	1.39	--	--	0.44	--	--	0.93	--	--	0.41
Oldfield Mouse	0.03	--	--	0.91	--	--	0.29	--	--	0.61	--	--	0.27

Notes:

kg = Kilogram

BW_t = Body Weight

BW_w = Body Weight

[a] = Body weights for test species are standardized values and are based on the weights provided for the refinement assessment.

[b] = Body-weight extrapolation factor = $(BW_t/BW_w)^{0.25}$ (Sample et al. 1996)

Table I-19
Bioaccumulation Factors
Screening Level Ecological Risk Assessment
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	Log K_{ow}	K_{ow} Reference	Terrestrial Food Items					
			Plants[a]	Reference	Soil Invertebrates[b]	Reference	Small Birds/ Mammals[c]	Reference
SVOCs[d]								
Acenaphthene	3.92	USEPA 1996b	4.2E-02	Travis and Arms (1988)	8.7E-02	Beyer and Stafford (1993)	2.5E-03	Travis and Arms (1988)
Acenaphthylene	4.07	USACE 1998	3.4E-02	Travis and Arms (1988)	6.4E-02	Beyer and Stafford (1993)	3.5E-03	Travis and Arms (1988)
Anthracene	4.55	USEPA 1996b	1.8E-02	Travis and Arms (1988)	9.3E-02	Beyer and Stafford (1993)	1.1E-02	Travis and Arms (1988)
Benzo(a)anthracene	5.7	USEPA 1996b	3.9E-03	Travis and Arms (1988)	7.8E-02	Beyer and Stafford (1993)	1.5E-01	Travis and Arms (1988)
Benzo(a)pyrene	6.11	USEPA 1996b	2.3E-03	Travis and Arms (1988)	9.9E-02	Beyer and Stafford (1993)	3.9E-01	Travis and Arms (1988)
Benzo(b)fluoranthene	6.2	USEPA 1996b	2.0E-03	Travis and Arms (1988)	6.1E-02	Beyer and Stafford (1993)	4.8E-01	Travis and Arms (1988)
Benzo(g,h,i)perylene	7.1	USACE 1998	6.1E-04	Travis and Arms (1988)	4.4E-02	Beyer and Stafford (1993)	3.8E+00	Travis and Arms (1988)
Benzo(k)fluoranthene	6.2	USEPA 1996b	2.0E-03	Travis and Arms (1988)	6.1E-02	Beyer and Stafford (1993)	4.8E-01	Travis and Arms (1988)
Chrysene	5.7	USEPA 1996b	3.9E-03	Travis and Arms (1988)	1.3E-01	Beyer and Stafford (1993)	1.5E-01	Travis and Arms (1988)
Dibenzo(a,h)anthracene	6.69	USEPA 1996b	1.1E-03	Travis and Arms (1988)	1.4E-01	Beyer and Stafford (1993)	1.5E+00	Travis and Arms (1988)
Fluoranthene	5.12	USEPA 1996b	8.5E-03	Travis and Arms (1988)	1.1E-01	Beyer and Stafford (1993)	4.0E-02	Travis and Arms (1988)
Indeno(1,2,3-cd)pyrene	6.65	USEPA 1996b	1.1E-03	Travis and Arms (1988)	1.2E-01	Beyer and Stafford (1993)	1.3E+00	Travis and Arms (1988)
Naphthalene	3.36	USEPA 1996b	8.9E-02	Travis and Arms (1988)	6.1E-02	Beyer and Stafford (1993)	6.9E-04	Travis and Arms (1988)
Phenanthrene	4.57	USACE 1998	1.8E-02	Travis and Arms (1988)	8.1E-02	Beyer and Stafford (1993)	1.1E-02	Travis and Arms (1988)
Pyrene	5.11	USEPA 1996b	8.6E-03	Travis and Arms (1988)	1.1E-01	Beyer and Stafford (1993)	3.9E-02	Travis and Arms (1988)
Inorganics								
Arsenic	NA	--	3.7E-02	Bechtel (1998)	2.64E-01	Beyer and Stafford (1993)	1.0E-01	Baes et al. (1984)
Cadmium	NA	--	5.1E-01	Bechtel (1998)	1.3E+00	Beyer and Stafford (1993)	2.8E-02	Baes et al. (1984)
Chromium	NA	--	1.5E-03	Baes et al. (1984)	1.4E-01	Beyer and Stafford (1993)	2.8E-01	Baes et al. (1984)
Copper	NA	--	1.2E-01	Bechtel (1998)	1.51E-01	Beyer and Stafford (1993)	5.0E-01	Baes et al. (1984)
Lead	NA	--	3.8E-02	Bechtel (1998)	1.3E-01	Beyer and Stafford (1993)	1.5E-02	Baes et al. (1984)
Mercury	NA	--	3.4E-01	Bechtel (1998)	2.8E-01	Beyer and Stafford (1993)	1.3E+01	Baes et al. (1984)
Nickel	NA	--	3.4E-02	Bechtel (1998)	1.2E-01	Beyer and Stafford (1993)	3.0E-01	Baes et al. (1984)
Selenium	NA	--	5.7E-01	Bechtel (1998)	5.2E-01	Zinc used as surrogate	7.5E-01	Baes et al. (1984)
Silver	NA	--	8.0E-02	Baes et al. (1984)	5.2E-01	Zinc used as surrogate	1.5E-01	Baes et al. (1984)
Zinc	NA	--	3.6E-01	Bechtel (1998)	5.2E-01	Beyer and Stafford (1993)	5.0E+00	Baes et al. (1984)
PCBs								
Aroclor 1254	6.47	USACE 1998	1.4E-03	Travis and Arms (1988)	1.8E+01	USEPA (1995)	8.9E-01	Travis and Arms (1988)
Pesticides								
Dieldrin	5.37	USEPA 1996b	6.1E-03	Travis and Arms (1988)	1.5E+00	Average organochlorine BCF used as surrogate	7.1E-02	Travis and Arms (1988)
Dioxins/Furans								
2,3,7,8-TCDD	6.15	USACE 1998	2.2E-03	Travis and Arms (1988)	9.1E+00	USEPA (1995)	7.2E+00	USEPA (1995)

Notes:

SVOC = Semivolatile Organic Compound

PCB = Polychlorinated Biphenyls

USEPA = U.S. Environmental Protection Agency

USACE = U.S. Army Corps of Engineers

PAH = Polynuclear Aromatic Hydrocarbon

NA = Not applicable

-- = No reference

BAF = Bioaccumulation Factor

mg = Milligram

kg = Kilogram

[a] = (mg of chemical / kg of plant material wet weight) / (mg of chemical / kg of soil dry weight)
Dry weight BAF values provided for plants and invertebrates were adjusted to wet weight BAF values by using a factor of 0.2 (assumes 80 percent water).

[b] = (mg of chemical / kg of soil invertebrate wet weight) / (mg of chemical / kg of soil dry weight)

[c] = (mg of chemcial / kg of bird wet weight) / (mg of chemical / kg of soil dry weight)

[d] = BAF for total PAHs (0.3 X 0.29 =0.087) from Beyer and Stafford (1993), adjusted to wet weight, was used as a surrogate for SVOCs (except PAHs).

Table I-20
Biota Sediment Accumulation Factors
Screening Level Ecological Risk Assessment
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

ANALYTE [1]	CAS-NUMBER	Log K_{ow} [2]	BSAFs [3]				
			Normalized BSAF for organic constituents foc (Kg oc / Kg sediment)	$BSAF_{bi}$ Value	Source	$BSAF_{fish}$ Value	Source
			0.0248				
METALS							
ARSENIC	7440-38-2	--	--	1.65E-02	Bechtel (1998a)	1.54E-01	Song and Breslin (1999)
CADMIUM	7440-43-9	--	--	8.0E-02	Bechtel (1998a)	3.70E-02	Song and Breslin (1999)
CHROMIUM	7440-48-4	--	--	1.4E-02	Bechtel (1998a)	9.0E-03	Song and Breslin (1999)
COPPER	7440-50-8	--	--	2.1E-01	Bechtel (1998b)	5.0E-02	Song and Breslin (1999)
LEAD	7439-92-1	--	--	8.6E-03	Bechtel (1998b)	2.4E-01	Bechtel (1998a)
MERCURY	7439-97-6	--	--	1.4E-01	Bechtel (1998a)	1.08E+00	Bechtel (1998a)
NICKEL	7440-02-0	--	--	1.1E-01	Bechtel (1998a)	1.60E-02	Song and Breslin (1999)
SELENIUM	7782-49-2	--	--	3.0E-01	Bechtel (1998b); zinc used as surrogate	2.1E+00	Bechtel (1998a); zinc used as surrogate
SILVER	7440-22-4	--	--	1.1E-01	Bechtel (1998a); nickel used as surrogate	7.9E-01	Bechtel (1998a); nickel used as surrogate
ZINC	7440-66-6	--	--	3.0E-01	Bechtel (1998b)	2.2E-01	Song and Breslin (1999)
PAHs							
ACENAPHTHENE	83-32-9	3.92	0.29	1.52E-02	USEPA (1997)	1.84E-01	USEPA (1997)
ACENAPHTHYLENE	208-96-8	4.1	0.29	1.52E-02	USEPA (1997)	1.84E-01	USEPA (1997)
ANTHRACENE	120-12-7	4.35	0.29	1.52E-02	USEPA (1997)	1.84E-01	USEPA (1997)
BENZO(A)ANTHRACENE	56-55-3	5.52	0.29	1.52E-02	USEPA (1997)	1.84E-01	USEPA (1997)
BENZO(A)PYRENE	50-32-8	6.11	0.29	1.52E-02	USEPA (1997)	1.84E-01	USEPA (1997)
BENZO(B)FLUORANTHENE	205-99-2	6.11	0.29	1.52E-02	USEPA (1997)	1.84E-01	USEPA (1997)
BENZO(G,H,I)PERYLENE	191-24-2	6.7	0.29	1.52E-02	USEPA (1997)	1.84E-01	USEPA (1997)
BENZO(K)FLUORANTHENE	207-08-9	6.11	0.29	1.52E-02	USEPA (1997)	1.84E-01	USEPA (1997)
CHRYSENE	218-01-9	5.52	0.29	1.52E-02	USEPA (1997)	1.84E-01	USEPA (1997)
DIBENZO(A,H)ANTHRACENE	53-70-3	6.7	0.29	1.52E-02	USEPA (1997)	1.84E-01	USEPA (1997)
FLUORANTHENE	206-44-0	4.93	0.29	1.52E-02	USEPA (1997)	1.84E-01	USEPA (1997)
FLUORENE	86-73-7	4.02	0.29	1.52E-02	USEPA (1997)	1.84E-01	USEPA (1997)
HEXACHLOROBENZENE	118-74-1	5.86	0.09	4.72E-03	USEPA (1997)	5.72E-02	USEPA (1997)
HEXACHLOROBUTADIENE	87-68-3	4.72	1	5.24E-02	USEPA (1997); value of 1 used as surrogate	6.35E-01	USEPA (1997); value of 1 used as surrogate
HEXACHLOROCYCLOPENTADIENE	77-47-4	4.63	1	5.24E-02	USEPA (1997); value of 1 used as surrogate	6.35E-01	USEPA (1997); value of 1 used as surrogate
HEXACHLOROETHANE	67-72-1	4.03	1	5.24E-02	USEPA (1997); value of 1 used as surrogate	6.35E-01	USEPA (1997); value of 1 used as surrogate
INDENO(1,2,3-CD)PYRENE	193-39-5	6.7	0.29	1.52E-02	USEPA (1997)	1.84E-01	USEPA (1997)
PENTACHLOROPHENOL	87-86-5	4.74	1	5.24E-02	USEPA (1997); value of 1 used as surrogate	6.35E-01	USEPA (1997); value of 1 used as surrogate
PHENANTHRENE	85-01-8	4.35	0.29	1.52E-02	USEPA (1997)	1.84E-01	USEPA (1997)
PYRENE	129-00-0	4.93	0.29	1.52E-02	USEPA (1997)	1.84E-01	USEPA (1997)

Notes:

1) Important Bioaccumulative Compounds as listed in USEPA 2000.

2) Log KOWs taken from KOWWIN version 1.67 USEPA 2000 at http://www.epa.gov/oppt/exposure/docs/episuitedl.htm

3) Sediment BSAFs:
a) Sediment Invertebrates --
Metals - Metal BSAFs for invertebrates were taken from Bechtel (1998a).
Organic chemicals - BSAFbi = (normalized BSAFbi × flipid) ÷ foc, where flipid = 0.01 kg lipid / kg organism, dw (Connell et al., 1988; Markwell et al., 1989; Oliver, 1984, 1987)
Dry weight to wet weight conversion factor based on assummed percent moisture of invertebrates (87%).
b) Fish -- (mg of chemical / kg of fish) / (mg of chemical / kg of sediment dry weight)
Metals - Metal BSAFs for fish were taken from Song and Breslin (1999).
Organics - BSAFfish = (normalized BSAFfish × flipid) ÷ foc, where flipid = 0.063 kg lipid/kg organism, dry weight (USEPA 1997) and foc =2.48%
Dry weight to wet weight conversion factor based on assummed percent moisture of fish (75%).

Table I-21
Bioaccumulation Factors and Toxicity Equivalency Factors for Dioxin/Furan Congeners
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Dioxin/Furan Congener	Bioaccumulation Equivalency Factors (BEF)	Toxicity Equivalency Factors (TEF)	
		Avian	Mammal
PCDD Congener:			
2,3,7,8-TCDD	1	1	0
1,2,3,7,8-PeCDD	0.92	1	1
1,2,3,7,8,9-HxCDD	0.31	0.1	0.1
1,2,3,6,7,8-HxCDD	0.12	0.01	0.1
1,2,3,4,7,8-HxCDD	0.14	0.05	0.1
1,2,3,4,6,7,8-HpCDD	0.051	0.001	0.01
1,2,3,4,6,7,8,9-OCDD	0.012	0.0001	0.0001
PCDF Congener			
2,3,7,8-TCDF	0.8	1	0.1
2,3,4,7,8-PeCDF	1.6	1	0.5
2,3,4,6,7,8-HxCDF	0.67	0.1	0.1
1,2,3,7,8-PeCDF	0.22	0.1	0.05
1,2,3,7,8,9-HxCDF	0.63	0.1	0.1
1,2,3,6,7,8-HxCDF	0.19	0.1	0.1
1,2,3,4,7,8-HxCDF	0.076	0.01	0.01
1,2,3,4,7,8,9-HpCDF	0.39	0.01	0.01
1,2,3,4,6,7,8-HpCDF	0.011	0.01	0.01
1,2,3,4,6,7,8,9-OCDF	0.016	0.0001	0.0001

Notes:
BEF = Bioaccumulation Equivalency Factor
TEF = Toxicity Equivalency Factor
Source: USEPA (1999)

Table I-22
Dioxin Exposure Assessment for Selected Terrestrial Receptors - SWMU 13
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Parameter	Maximum Soil Concentration[a] (pg/g)	Receptor Dose[b] (pg/kg bw-day)			Total Dose x TEF[1] (pg/kg bw-day)
		Food	Substrate	Total Dose	
American Robin					
PCDD Congener:					
2,3,7,8-TCDD	5.85E-02	6.12E-01	1.00E-03	6.13E-01	6.13E-01
1,2,3,7,8-PeCDD	6.56E-01	6.31E+00	1.60E-02	6.33E+00	6.33E+00
1,2,3,7,8,9-HxCDD	2.33E+00	7.56E+00	5.70E-02	7.61E+00	7.61E-01
1,2,3,6,7,8-HxCDD	2.24E+00	2.81E+00	5.50E-02	2.87E+00	2.87E-02
1,2,3,4,7,8-HxCDD	7.35E-01	1.08E+00	1.80E-02	1.09E+00	5.47E-02
1,2,3,4,6,7,8-HpCDD	5.00E+01	2.67E+01	1.23E+00	2.79E+01	2.79E-02
1,2,3,4,6,7,8,9-OCDD	1.52E+03	1.91E+02	3.75E+01	2.28E+02	2.28E-02
PCDF Congener					
2,3,7,8-TCDF	7.84E-01	6.56E+00	1.90E-02	6.58E+00	6.58E+00
2,3,4,7,8-PeCDF	5.74E-01	9.61E+00	1.40E-02	9.62E+00	9.62E+00
2,3,4,6,7,8-HxCDF	4.94E-01	3.46E+00	1.20E-02	3.47E+00	3.47E-01
1,2,3,7,8-PeCDF	4.50E-01	1.04E+00	1.10E-02	1.05E+00	1.05E-01
1,2,3,7,8,9-HxCDF	2.77E-01	1.83E+00	7.00E-03	1.83E+00	1.83E-01
1,2,3,6,7,8-HxCDF	5.34E-01	1.06E+00	1.30E-02	1.07E+00	1.07E-01
1,2,3,4,7,8-HxCDF	6.81E-01	5.41E-01	1.70E-02	5.58E-01	5.58E-03
1,2,3,4,7,8,9-HpCDF	4.60E-01	1.88E+00	1.10E-02	1.89E+00	1.89E-02
1,2,3,4,6,7,8-HpCDF	5.11E+00	5.88E-01	1.26E-01	7.14E-01	7.14E-03
1,2,3,4,6,7,8,9-OCDF	1.12E+01	1.87E+00	2.76E-01	2.15E+00	2.15E-04
				$TEQ_{2,3,7,8\text{-}TCDD}$:	2.48E+01
				NOAEL:	1.40E+01
				HQ_{NOAEL}:	1.8E+00
				LOAEL:	1.40E+02
				HQ_{LOAEL}:	<1
Red-tailed Hawk					
PCDD Congener:					
2,3,7,8-TCDD	5.85E-02	3.52E-02	0.00E+00	3.52E-02	3.52E-02
1,2,3,7,8-PeCDD	6.56E-01	3.63E-01	0.00E+00	3.63E-01	3.63E-01
1,2,3,7,8,9-HxCDD	2.33E+00	4.35E-01	0.00E+00	4.35E-01	4.35E-02
1,2,3,6,7,8-HxCDD	2.24E+00	1.62E-01	0.00E+00	1.62E-01	1.62E-03
1,2,3,4,7,8-HxCDD	7.35E-01	6.20E-02	0.00E+00	6.20E-02	3.10E-03
1,2,3,4,6,7,8-HpCDD	5.00E+01	1.54E+00	0.00E+00	1.54E+00	1.54E-03
1,2,3,4,6,7,8,9-OCDD	1.52E+03	1.10E+01	0.00E+00	1.10E+01	1.10E-03
PCDF Congener					
2,3,7,8-TCDF	7.84E-01	3.78E-01	0.00E+00	3.78E-01	3.78E-01
2,3,4,7,8-PeCDF	5.74E-01	5.53E-01	0.00E+00	5.53E-01	5.53E-01
2,3,4,6,7,8-HxCDF	4.94E-01	1.99E-01	0.00E+00	1.99E-01	1.99E-02
1,2,3,7,8-PeCDF	4.50E-01	5.96E-02	0.00E+00	5.96E-02	5.96E-03
1,2,3,7,8,9-HxCDF	2.77E-01	1.05E-01	0.00E+00	1.05E-01	1.05E-02
1,2,3,6,7,8-HxCDF	5.34E-01	6.11E-02	0.00E+00	6.11E-02	6.11E-03
1,2,3,4,7,8-HxCDF	6.81E-01	3.12E-02	0.00E+00	3.12E-02	3.12E-04
1,2,3,4,7,8,9-HpCDF	4.60E-01	1.08E-01	0.00E+00	1.08E-01	1.08E-03
1,2,3,4,6,7,8-HpCDF	5.11E+00	3.38E-02	0.00E+00	3.38E-02	3.38E-04
1,2,3,4,6,7,8,9-OCDF	1.12E+01	1.08E-01	0.00E+00	1.08E-01	1.08E-05
				$TEQ_{2,3,7,8\text{-}TCDD}$:	1.42E+00
				NOAEL:	1.40E+01
				HQ_{NOAEL}:	<1
				LOAEL:	1.40E+02
				HQ_{LOAEL}:	<1

Table I-22 (Continued)
Dioxin Exposure Assessment for Selected Terrestrial Receptors - SWMU 13
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Parameter	Maximum Soil Concentration (pg/g)	Receptor Dose[b] (pg/kg bw-day)			Total Dose x TEF[1] (pg/kg bw-day)
		Food	Substrate	Total Dose	
Meadow Vole					
PCDD Congener:					
2,3,7,8-TCDD	5.85E-02	2.63E-05	0.00E+00	2.63E-05	0.00E+00
1,2,3,7,8-PeCDD	6.56E-01	2.72E-04	3.00E-03	3.27E-03	3.27E-03
1,2,3,7,8,9-HxCDD	2.33E+00	3.25E-04	1.20E-02	1.23E-02	1.23E-03
1,2,3,6,7,8-HxCDD	2.24E+00	1.21E-04	1.10E-02	1.11E-02	1.11E-03
1,2,3,4,7,8-HxCDD	7.35E-01	4.63E-05	4.00E-03	4.05E-03	4.05E-04
1,2,3,4,6,7,8-HpCDD	5.00E+01	1.15E-03	2.50E-01	2.51E-01	2.51E-03
1,2,3,4,6,7,8,9-OCDD	1.52E+03	8.21E-03	7.60E+00	7.61E+00	7.61E-04
PCDF Congener					
2,3,7,8-TCDF	7.84E-01	2.82E-04	4.00E-03	4.28E-03	4.28E-04
2,3,4,7,8-PeCDF	5.74E-01	4.13E-04	3.00E-03	3.41E-03	1.71E-03
2,3,4,6,7,8-HxCDF	4.94E-01	1.49E-04	2.00E-03	2.15E-03	2.15E-04
1,2,3,7,8-PeCDF	4.50E-01	4.45E-05	2.00E-03	2.04E-03	1.02E-04
1,2,3,7,8,9-HxCDF	2.77E-01	7.85E-05	1.00E-03	1.08E-03	1.08E-04
1,2,3,6,7,8-HxCDF	5.34E-01	4.56E-05	3.00E-03	3.05E-03	3.05E-04
1,2,3,4,7,8-HxCDF	6.81E-01	2.33E-05	3.00E-03	3.02E-03	3.02E-05
1,2,3,4,7,8,9-HpCDF	4.60E-01	8.07E-05	2.00E-03	2.08E-03	2.08E-05
1,2,3,4,6,7,8-HpCDF	5.11E+00	2.53E-05	2.60E-02	2.60E-02	2.60E-04
1,2,3,4,6,7,8,9-OCDF	1.12E+01	8.06E-05	5.60E-02	5.61E-02	5.61E-06
				$TEQ_{2,3,7,8\text{-}TCDD}$:	1.25E-02
				NOAEL:	2.27E+01
				HQ_{NOAEL}:	<1
				LOAEL:	2.27E+02
				HQ_{LOAEL}:	<1
Red Fox					
PCDD Congener:					
2,3,7,8-TCDD	5.85E-02	5.36E-02	0.00E+00	5.36E-02	0.00E+00
1,2,3,7,8-PeCDD	6.56E-01	5.53E-01	2.00E-03	5.55E-01	5.55E-01
1,2,3,7,8,9-HxCDD	2.33E+00	6.61E-01	7.00E-03	6.68E-01	6.68E-02
1,2,3,6,7,8-HxCDD	2.24E+00	2.46E-01	7.00E-03	2.53E-01	2.53E-02
1,2,3,4,7,8-HxCDD	7.35E-01	9.42E-02	2.00E-03	9.62E-02	9.62E-03
1,2,3,4,6,7,8-HpCDD	5.00E+01	2.33E+00	1.60E-01	2.49E+00	2.49E-02
1,2,3,4,6,7,8,9-OCDD	1.52E+03	1.67E+01	4.86E+00	2.16E+01	2.16E-03
PCDF Congener					
2,3,7,8-TCDF	7.84E-01	5.74E-01	3.00E-03	5.77E-01	5.77E-02
2,3,4,7,8-PeCDF	5.74E-01	8.41E-01	2.00E-03	8.43E-01	4.21E-01
2,3,4,6,7,8-HxCDF	4.94E-01	3.03E-01	2.00E-03	3.05E-01	3.05E-02
1,2,3,7,8-PeCDF	4.50E-01	9.06E-02	1.00E-03	9.16E-02	4.58E-03
1,2,3,7,8,9-HxCDF	2.77E-01	1.60E-01	1.00E-03	1.61E-01	1.61E-02
1,2,3,6,7,8-HxCDF	5.34E-01	9.29E-02	2.00E-03	9.49E-02	9.49E-03
1,2,3,4,7,8-HxCDF	6.81E-01	4.74E-02	2.00E-03	4.94E-02	4.94E-04
1,2,3,4,7,8,9-HpCDF	4.60E-01	1.64E-01	1.00E-03	1.65E-01	1.65E-03
1,2,3,4,6,7,8-HpCDF	5.11E+00	5.15E-02	1.60E-02	6.75E-02	6.75E-04
1,2,3,4,6,7,8,9-OCDF	1.12E+01	1.64E-01	3.60E-02	2.00E-01	2.00E-05
				$TEQ_{2,3,7,8\text{-}TCDD}$:	1.23E+00
				NOAEL:	7.14E+00
				HQ_{NOAEL}:	<1
				LOAEL:	7.14E+01
				HQ_{LOAEL}:	<1

Table I-22 (Continued)
Dioxin Exposure Assessment for Selected Terrestrial Receptors - SWMU 13
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Parameter	Maximum Soil Concentration (pg/g)	Receptor Dose[b] (pg/kg bw-day)			Total Dose x TEF[1] (pg/kg bw-day)
		Food	Substrate	Total Dose	
Short-tailed Shrew					
PCDD Congener:					
2,3,7,8-TCDD	2.00E-01	1.21E+00	1.60E-02	1.23E+00	0.00E+00
1,2,3,7,8-PeCDD	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,3,7,8,9-HxCDD	2.60E+00	4.89E+00	1.38E-01	5.03E+00	5.03E-01
1,2,3,6,7,8-HxCDD	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,3,4,7,8-HxCDD	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,3,4,6,7,8-HpCDD	2.03E+01	6.28E+00	1.08E+00	7.36E+00	7.36E-02
1,2,3,4,6,7,8,9-OCDD	2.01E+03	1.46E+02	1.07E+02	2.53E+02	2.53E-02
PCDF Congener					
2,3,7,8-TCDF	3.00E-01	1.46E+00	1.60E-02	1.47E+00	1.47E-01
2,3,4,7,8-PeCDF	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2,3,4,6,7,8-HxCDF	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,3,7,8-PeCDF	3.00E-01	4.00E-01	1.60E-02	4.16E-01	2.08E-02
1,2,3,7,8,9-HxCDF	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,3,6,7,8-HxCDF	3.00E-01	3.46E-01	1.60E-02	3.62E-01	3.62E-02
1,2,3,4,7,8-HxCDF	3.00E-01	1.38E-01	1.60E-02	1.54E-01	1.54E-03
1,2,3,4,7,8,9-HpCDF	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,3,4,6,7,8-HpCDF	1.90E+00	1.27E-01	1.01E-01	2.28E-01	2.28E-03
1,2,3,4,6,7,8,9-OCDF	5.20E+00	5.05E-01	2.77E-01	7.82E-01	7.82E-05
				$TEQ_{2,3,7,8\text{-}TCDD}$:	8.10E-01
				NOAEL:	1.52E+01
				HQ_{NOAEL}:	<1
				LOAEL:	1.52E+02
				HQ_{LOAEL}:	<1

Notes:

pg/g = Picogram Per Gram

pg/kg = Picogram Per Kilogram

bw - day = Body Weight - Day

TEF = Toxicity Equivalency Factor

TEQ = Toxicity Equivalents

NOAEL = No observable adverse effects level

LOAEL = Lowest observable adverse effects level

HQ = Hazard Quotient

COPEC = Contaminant of Potential Ecologic Concern

BAF = Bioaccumulation Factor

BEF = Bioaccumulation Equivalency Factor

= HQ greater than 1.0

[1] = TEFs from (Van den Berg et al. 1998)

[a] = COPEC concentrations in prey biota (plants/invertebrates/mammals) = (maximum soil values) * (BAF) * (BEF)

[b] = Receptor doses were determined from species information (Table C-15) and dose rate equations in Sample et al. (1996).

Food dose = (COPEC concentration in prey * % of food type ingested * area use factor * receptor food ingestion rate) / receptor body weight

Substrate Dose = (COPEC concentration in sediment * receptor soil ingestion rate) / receptor body weight

Total Dose = Food Dose + Substrate Dose

Refinement wildlife body weights and ingestion rates used.

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APPENDIX J

THREATENED AND ENDANGERED SPECIES CORRESPONDENCE

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URS

April 13, 2004

Ms. René Hypes, Project Review Coordinator
Division of Natural Heritage
Virginia Department of Conservation and Recreation
217 Governor Street
Richmond, VA 23219

Subject: Natural Heritage Project Review

Dear Ms. Hypes:

I am writing to request information concerning threatened and endangered species potentially inhabiting the area in the vicinity of an industrial site located near the town of Radford, VA. URS is performing an ecological risk assessment of the site. This information is needed to update information we received from a prior request (Invoice Number: H-3243, 4/10/03).

The site is located in the Valley and Ridge Province in western Montgomery County and eastern Pulaski County, VA. Land use surrounding the site is largely undeveloped due to steep terrain, although less rugged areas are primarily used for agriculture.

A portion of a topographic map (Radford North,VA quad) is attached which specifies the location of the site. Please perform a search of the area within a one-mile radius of this location and notify us of any threatened or endangered species and/or critical or protected habitats known to occur in this vicinity.

If you should have any questions concerning this request, please contact me at 215-542-3800. I thank you for your assistance in this matter.

Sincerely,

Doreen LaPorta

Doreen LaPorta
Biologist

Enclosures(2)

URS Corporation
1400 Union Meeting Road, Suite 202
Blue Bell, PA 19422-1972
Tel: 215.542.3800
Fax: 215.542.3888

W. Tayloe Murphy, Jr.
Secretary of Natural Resources

Joseph H. Maroon
Director

COMMONWEALTH of VIRGINIA

DEPARTMENT OF CONSERVATION AND RECREATION

217 Governor Street
Richmond, Virginia 23219-2010
Telephone (804) 786-7951 FAX (804) 371-2674 TDD (804) 786-2121

Doreen LaPorta
URS
1400 Union Meeting Road, Suite 202
Blue Bell, PA 19422-1972

May 17, 2004

Re: Industrial Site, Valley and Ridge in western Montgomery County

Dear Ms. LaPorta:

The Department of Conservation and Recreation's Division of Natural Heritage (DCR) has searched its Biotics Data System for occurrences of natural heritage resources from the area outlined on the submitted map. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

According to the topographic map, this project either overlies or is adjacent to a karst landscape characterized by sinkholes, caves, disappearing streams, and large springs. The project has been sent to the Virginia Karst Program and to the Virginia Speleological Survey for review for documented sensitive karst features and caves. A significant cave has been documented in the project vicinity. Please coordinate with the Virginia Karst Program at 540-831-4056 (worndorff@dcr.state.va.us) to avoid, minimize, or mitigate impacts.

Our files also do not indicate the presence of any State Natural Area Preserves under DCR's jurisdiction in the project vicinity.

Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the Virginia Department of Conservation and Recreation (DCR), DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species. The current activity will not affect any documented state-listed plants or insects.

New and updated information is continually added to Biotics. Please contact DCR for an update on this natural heritage information if a significant amount of time passes before it is utilized.

A fee of $ 95.00 has been assessed for the service of providing this information. Please find enclosed an invoice for that amount. Please return one copy of the invoice along with your remittance made payable to the Treasurer of Virginia, Department of Conservation and Recreation, 203 Governor Street, Suite 414, Richmond, VA 23219, ATTN: Cashier. Payment is due within thirty days of the invoice date.

Should you have any questions or concerns, feel free to contact me at 804-371-2708. Thank you for the opportunity to comment on this project.

Sincerely,

S. René Hypes
Project Review Coordinator

CC: Wil Orndorff, DCR

URS

April 13, 2004

Ms. Roberta Hylton
Project Leader, Southwest Virginia Field Office
U.S. Fish and Wildlife Service
330 Cummings Street
Abingdon, VA 24210

Subject: Threatened and Endangered Species Review

Dear Ms. Hylton:

I am writing to request information concerning threatened and endangered species potentially inhabiting the area in the vicinity of an industrial site located near the town of Radford, VA. URS is performing an ecological risk assessment of the site. This information is needed to update information we received from a prior request (Project #2918, 4/21/03).

The site is located in the Valley and Ridge Province in western Montgomery County and eastern Pulaski County, VA. Land use surrounding the site is largely undeveloped due to steep terrain, although less rugged areas are primarily used for agriculture.

A portion of a topographic map (Radford North,VA quad) is attached which specifies the location of the site. Please perform a search of the area within a one-mile radius of this location and notify us of any threatened or endangered species and/or critical or protected habitats known to occur in this vicinity.

If you should have any questions concerning this request, please contact me at 215-542-3800. I thank you for your assistance in this matter.

Sincerely,

Doreen LaPorta

Doreen LaPorta
Biologist

Enclosure

URS Corporation
1400 Union Meeting Road, Suite 202
Blue Bell, PA 19422-1972
Tel: 215.542.3800
Fax: 215.542.3888

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
6669 Short Lane
Gloucester, VA 23061

May 10, 2004

Ms. Doreen LaPorta
URS Corporation
1400 Union Meeting Road, Suite 202
Blue Bell, Pennsylvania 19422

Re: Project #3348

Greetings:

The U.S. Fish and Wildlife Service (Service) has received your request to review the attached project for potential impacts to federally listed or proposed endangered and threatened species and designated critical habitat in Virginia pursuant to the Endangered Species Act (ESA) of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*). Attached is a list of species with Federal status and species of concern that have been documented or may occur in the county where your project is located. This list was prepared by this office and is based on information obtained from previous surveys for rare and endangered species.

In order to ensure coordination with the State agencies, we consistently recommend that individuals contact the Virginia Department of Conservation and Recreation, Division of Natural Heritage **and** the Virginia Department of Game and Inland Fisheries, since each agency maintains a different database and has differing expertise and/or regulatory responsibility. You can contact these agencies at the following addresses:

Virginia Department of Game and Inland Fisheries
Environmental Services Section
P.O. Box 11104
Richmond, VA 23230
(804) 367-1000

Virginia Department of Conservation and Recreation
Division of Natural Heritage
217 Governor Street, 2nd Floor
Richmond, VA 23219
(804) 786-7951

If either of these agencies determines that your project may impact a federally listed, proposed, or candidate species OR federally designated critical habitat, please contact this office and provide a copy of the response letter from each agency and the above referenced project number; otherwise, further contact with this office is not necessary.

If you have any questions or need further assistance, please contact Ms. Jolie Harrison at (804) 693-6694, extension 208.

Sincerely,

Karen L. Mayne

Karen L. Mayne
Supervisor
Virginia Field Office

Enclosures

PULASKI COUNTY, VIRGINIA
Federally Listed, Proposed, and Candidate Species

SCIENTIFIC NAME	COMMON NAME	STATUS
INVERTEBRATES		
Polygyriscus virginianus	Virginia fringed mountain snail	LE
MAMMALS		
Corynorhinus townsendii virginianus[1]	Virginia big-eared bat	LE
Myotis sodalis[1]	Indiana bat	LE
VASCULAR PLANTS		
Echinacea laevigata	Smooth coneflower	LE

Species of Concern

FISH		
Ethcostoma osburni	Candy darter	G3
INVERTEBRATES		
Caecidotea henroti	Henrot's cave isopod	G2
Glyphyalinia raderi	Maryland glyph	G2
Lasmigona subviridis	Green floater	G3
Pseudanophthalmus sp. 7	A cave beetle	G1
Pyrgus wyandot	Appalachian grizzled skipper	G2
Rhagidia varia	A cave mite	G3
Speyeria diana	Diana fritillary	G3
Speyeria idalia	Regal fritillary	G3
Stygobromus abditus	James cave amphipod	G1
VASCULAR PLANTS		
Buckleya distichophylla	Piratebush	G2
Cardamine flagellifera	A bittercress	G3
Carex schweinitzii[1]	Schweinitz's sedge	G3
Clematis coactilis	Virginia white-haired leatherflower	G3
Delphinium exaltatum	Tall larkspur	G3
Paxistima canbyi	Canby's mountain-lover	G2
Phlox beckleyi	Sword-leaved phlox	G2
Poa paludigena[1]	Bog bluegrass	G3

[1]This species has been documented in an adjacent county and may occur in this county.

June 25, 2002
Prepared by U.S. Fish and Wildlife Service, Virginia Field Office

MONTGOMERY COUNTY, VIRGINIA
Federally Listed, Proposed, and Candidate Species

SCIENTIFIC NAME	COMMON NAME	STATUS
FISH		
Percina rex	Roanoke logperch	LE
MAMMALS		
Corynorhinus townsendii virginianus[1]	Virginia big-eared bat	LE
Myotis sodalis[1]	Indiana bat	LE
VASCULAR PLANTS		
Echinacea laevigata	Smooth coneflower	LE

Species of Concern

FISH		
Noturus gilberti	Orangefin madtom	G2
Phenacobius teretulus	Kanawha minnow	G3
Scartomyzon ariommus	Bigeye jumprock	G2
INVERTEBRATES		
Allocapnia simmonsi	Simmons' slender winter stonefly	G2
Atrytone arogos arogos	Arogos skipper	G3G4T1T2
Caecidotea vandeli	Vandel's cave isopod	G2
Catocala dulciola	Sweet underwing	G3
Catocala herodias gerhardi	Herodias underwing	G3T3
Lasmigona holstonia	Tennessee heelsplitter	G2G3
Lasmigona subviridis	Green floater	G3
Pseudanophthalmus pusio	A cave beetle	G3
Pyrgus wyandot	Appalachian grizzled skipper	G2
Speyeria diana	Diana fritillary	G3
Speyeria idalia	Regal fritillary	G3
Stygobromus fergusoni	Montgomery County cave amphipod	G1
VASCULAR PLANTS		
Bucklcya distichophylla	Piratebush	G2
Carex schweinitzii	Schweinitz's sedge	G3
Clematis addisonii	Addison's leatherflower	G2
Clematis coactilis	Virginia white-haired leatherflower	G3

June 25, 2002
Prepared by U.S. Fish and Wildlife Service, Virginia Field Office

SCIENTIFIC NAME	COMMON NAME	STATUS
Delphinium exaltatum	Tall larkspur	G3
Monotropsis odorata	Sweet pine sap	G3
Paxistima canbyi	Canby's mountain-lover	G2
Phlox buckleyi	Sword-leaved phlox	G2
Poa paludigena[1]	Bog bluegrass	G3

[1]This species has been documented in an adjacent county and may occur in this county.

June 25, 2002
Prepared by U.S. Fish and Wildlife Service, Virginia Field Office

PULASKI COUNTY, VIRGINIA
Federally Listed, Proposed, and Candidate Species

SCIENTIFIC NAME	COMMON NAME	STATUS
INVERTEBRATES		
Polygyriscus virginianus	Virginia fringed mountain snail	LE
MAMMALS		
Corynorhinus townsendii virginianus[1]	Virginia big-eared bat	LE
Myotis sodalis[1]	Indiana bat	LE
VASCULAR PLANTS		
Echinacea laevigata	Smooth coneflower	LE

Species of Concern

FISH			
Etheostoma osburni	Candy darter	G3	
INVERTEBRATES			
Caecidotea henroti	Henrot's cave isopod	G2	
Glyphyalinia raderi	Maryland glyph	G2	
Lasmigona subviridis	Green floater	G3	
Pseudanophthalmus sp. 7	A cave beetle	G1	
Pyrgus wyandot	Appalachian grizzled skipper	G2	
Rhagidia varia	A cave mite		G3
Speyeria diana	Diana fritillary		G3
Speyeria idalia	Regal fritillary		G3
Stygobromus abditus	James cave amphipod		G1
VASCULAR PLANTS			
Buckleya distichophylla	Piratebush	G2	
Cardamine flagellifera	A bittercress		G3
Carex schweinitzii[1]	Schweinitz's sedge	G3	
Clematis coactilis	Virginia white-haired leatherflower	G3	
Delphinium exaltatum	Tall larkspur		G3
Paxistima canbyi	Canby's mountain-lover	G2	
Phlox beckleyi	Sword-leaved phlox		G2
Poa paludigena[1]	Bog bluegrass	G3	

[1]This species has been documented in an adjacent county and may occur in this county.

June 25, 2002
Prepared by U.S. Fish and Wildlife Service, Virginia Field Office

APPENDIX K

DATA VALIDATION REPORTS
AND LABORATORY ANALYTICAL DATA (FORM I)

APPENDIX K.1

SSP SAMPLING EVENT – DECEMBER 2003
DATA VALIDATION REPORTS
AND LABORATORY ANALYTICAL DATA (FORM I)

APPENDIX K.2

ADDITIONAL INVESTIGATION SAMPLING – APRIL 2006
DATA VALIDATION REPORTS
AND LABORATORY ANALYTICAL DATA (FORM I)

APPENDIX K.3

ADDITIONAL INVESTIGATION SAMPLING – NOVEMBER 2006
DATA VALIDATION REPORTS
AND LABORATORY ANALYTICAL DATA (FORM I)

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APPENDIX K.3

ADDITIONAL INVESTIGATION SAMPLING – NOVEMBER 2006
DATA VALIDATION REPORTS
AND LABORATORY ANALYTICAL DATA (FORM I)

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Table K.3-1
Additional Investigation Sampling Results (46MW1) - November 2006
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date	CAS	C/N	Adjusted Tap Water RBC	MCL	46MW1 11/28/2006				46MW1-DUP (DUP-1) 11/28/2006			
					Result	LQ, VQ, r	MDL	RL	Result	LQ, VQ, r	MDL	RL
TCL VOCs (µg/L)												
1,1-Dichloroethene	75-35-4	N	35.32	70	<0.13	U	0.13	1	<0.13	U	0.13	1
cis-1,2-Dichloroethene	156-59-2	N	6.08	70	<0.16	U	0.16	1	<0.16	U	0.16	1
Tetrachloroethene	127-18-4	C	0.104	5	<0.13	U	0.13	1	<0.13	U	0.13	1
trans-1,2-Dichloroethene	156-60-5	N	12.17	100	<0.15	U	0.15	1	<0.15	U	0.15	1
Trichloroethene	79-01-6	C	0.0264	5	<0.14	U	0.14	1	<0.14	U	0.14	1
Vinyl Chloride	75-01-4	C	0.015	2	<0.15	U	0.15	1	<0.15	U	0.15	1

Notes:

CAS = Chemical Abstracts Service
µg/L = Microgram Per Liter
TCL = Target Compound List
VOC = Volatile Organic Compound
RBC = USEPA Region III Risk-Based Concentration
(RBC) values from the October 31, 2006,
RBC Table and October 10, 2006, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
C/N = Carcinogenic/Noncarcinogenic per EPA RBC Table (October 2006)
T-RBC = Tap Water RBC value
MCL = Maximum Contaminant Level
MDL = Method Detection Limit
RL = Reporting Limit
LQ = Laboratory Qualifier
VQ = Validation Qualifier
r = Reason Code
ND = Not Detected

= Exceeded Adjusted T-RBC

= Exceeds MCL

Table K.3-2
Additional Investigation Sampling Results (FMW1) - November 2006
SSP Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date	CAS	C/N	Adjusted Tap Water RBC	MCL	FMW1 11/29/2006				FMW1-DUP (DUP-2) 11/29/2006			
					Result	LQ, VQ, r	MDL	RL	Result	LQ, VQ, r	MDL	RL
TAL Metals (µg/L)												
Chromium	7440-47-3	N	10.95	100	3.7		0.66	2	3.2		0.66	2
TCL Pesticides (µg/L)												
4,4'-DDD	72-54-8	C	2.79E-01	--	<0.0036	U	0.0036	0.1	<0.0036	U	0.0036	0.1
4,4'-DDE	72-55-9	C	1.97E-01	--	<0.0036	U	0.0036	0.1	<0.0036	U	0.0036	0.1
4,4'-DDT	50-29-3	C	1.97E-01	--	<0.0036	U	0.0036	0.1	<0.0036	U	0.0036	0.1
Aldrin	309-00-2	C	3.94E-03	--	<0.0027	U	0.0027	0.05	<0.0027	U	0.0027	0.05
alpha-BHC	319-84-6	C	1.06E-02	--	<0.0034	U	0.0034	0.05	<0.0034	U	0.0034	0.05
alpha-Chlordane	5103-71-9	C	1.91E-01	--	<0.0033	U	0.0033	0.05	<0.0033	U	0.0033	0.05
beta-BHC	319-85-7	C	3.72E-02	--	<0.003	U	0.003	0.05	<0.003	U	0.003	0.05
delta-BHC	319-86-8	C	1.06E-02	--	<0.0031	U	0.0031	0.1	<0.0031	U	0.0031	0.1
Dieldrin	60-57-1	C	4.19E-03	--	<0.0032	U	0.0032	0.05	<0.0032	U	0.0032	0.05
Endosulfan I	959-98-8	N	2.19E+01	--	<0.0028	U	0.0028	0.1	<0.0028	U	0.0028	0.1
Endosulfan II	33213-65-9	N	2.19E+01	--	<0.0031	U	0.0031	0.1	<0.0031	U	0.0031	0.1
Endosulfan Sulfate	1031-07-8	N	2.19E+01	--	<0.0041	U	0.0041	0.1	<0.0041	U	0.0041	0.1
Endrin	72-20-8	N	1.10E+00	2	<0.0029	U	0.0029	0.1	<0.0029	U	0.0029	0.1
Endrin aldehyde	7421-93-4	N	1.10E+00	--	<0.0037	U	0.0037	0.1	<0.0037	U	0.0037	0.1
Endrin ketone	53494-70-5	N	1.10E+00	--	<0.0045	U	0.0045	0.05	<0.0045	U	0.0045	0.05
gamma-BHC (Lindane)	58-89-9	C	5.15E-02	0.2	<0.0026	U	0.0026	0.05	<0.0026	U	0.0026	0.05
gamma-Chlordane	5103-74-2	C	1.91E-01	--	<0.0034	U	0.0034	0.05	<0.0034	U	0.0034	0.05
Heptachlor	76-44-8	C	1.49E-02	0.4	<0.003	U	0.003	0.05	<0.003	U	0.003	0.05
Heptachlor epoxide	1024-57-3	C	7.36E-03	0.2	<0.0031	U	0.0031	0.05	<0.0031	U	0.0031	0.05
Methoxychlor	72-43-5	N	1.83E+01	40	<0.0036	U	0.0036	0.5	<0.0036	U	0.0036	0.5
Toxaphene	8001-35-2	C	6.09E-02	3	<0.1	U	0.1	5	<0.1	U	0.1	5

Notes:

CAS = Chemical Abstracts Service
µg/L = Microgram Per Liter
TAL = Target Analyte List
TCL = Target Compound List
[1] = Chromium VI RBC value was used
RBC = USEPA Region III Risk-Based Concentration (RBC) values from the October 31, 2006, RBC Table and October 10, 2006, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
C/N = Carcinogenic/Noncarcinogenic per EPA RBC Table (October 2006)
T-RBC = Tap Water RBC value
MCL = Maximum Contaminant Level

MDL = Method Detection Limit
RL = Reporting Limit
LQ = Laboratory Qualifier
VQ = Validation Qualifier
r = Reason Code
ND = Not Detected

= Exceeded Adjusted T-RBC

= Exceeds MCL

APPENDIX K.1

SSP SAMPLING EVENT – DECEMBER 2003
DATA VALIDATION REPORTS
AND LABORATORY ANALYTICAL DATA (FORM I)

TriMatrix Laboratories, Inc.

VOCs, SVOCs, PAHs, Explosives, Pesticides,
PCBs, Herbicides, Metals, and Cyanide

DATA VALIDATION REPORT - Level III Review

SDG No.: 36440-1 **Fraction:** VOCs, SVOCs, PAHs, Explosives, Pesticides, PCBs, Herbicides, Metals, & Cyanide

Lab: TriMatrix **Project Name:** Radford SSP

Reviewer: AS **Date:** December 30, 2003 (Revision 2)

This report presents the findings of a review of the referenced data. The report consists of this summary, copies of data reports with data qualifying flags applied (as required), the completed data validation checklist, supporting documentation, and an explanation of the data qualifying flags employed. The review performed is based on the USEPA Region III Modifications to the National Functional Guidelines for Organic and Inorganic Data Review as pertains to the specifics of the analytical methods employed and provisions of the approved project-specific Quality Assurance Project Plan (QAPP).

Major Anomalies: None.

Minor Anomalies: For the VOC analyses, the method blank for batch 90044-113 contained acetone at 0.00770 mg/Kg. The method blank for batch 90044-213 contained acetone at 0.00940 mg/Kg and methylene chloride at 0.00330 mg/Kg. The method blank for batch 90044-114 contained acetone at 0.0100 mg/Kg. The method blank for batch 90037-115 contained acetone at 0.660 mg/Kg and methylene chloride at 0.0200 mg/Kg. Positive results less than ten times the blank concentration were flagged "B,z" in the associated samples.

The associated equipment blank EQB1 submitted with sample delivery group 36440-2 displayed positive detections for acetone at 2.9 ug/L and methylene chloride at 0.60 ug/L. The equipment blank detections for methylene chloride and acetone were previously qualified due to method blank detections. No further data qualifying action was required.

The continuing calibration analyzed on 10/13/03 at 1105 displayed percent differences greater than the control limit (i.e., 20%) with a negative bias for chloroethane at 28.4%, acetone at 34.2%, methylene chloride at 27.6%, and methyl acetate at 33.3%. The continuing calibration analyzed on 10/13/03 at 2159 displayed percent differences greater than the control limit with a negative bias for acetone at 25.9% and methyl acetate at 26.0% and with a positive bias for methyl-tert-butyl ether at 29.6%, 1,1-dichloroethane at 22.9%, and bromochloromethane at 24.5%. The continuing calibration analyzed on 10/14/03 at 0840 displayed percent differences greater than the control limit with a negative bias for acetone at 34.7%, methylene chloride at 23.8%, and methyl acetate at 21.9%. The continuing calibration analyzed on 10/15/03 at 0919 displayed a percent difference greater than the control limit with a negative bias for carbon disulfide at 27.5%. Non-detect associated field samples were flagged "UJ,c" while positive associated field sample results were flagged "J,c" for anomalous compounds with a negative bias, unless previously qualified for a method blank detection for acetone. The associated field samples were non-detect for the anomalous compounds that displayed a positive bias, thus, no data qualifying action was taken.

The laboratory control spike for batch 90044-213 displayed a percent recovery greater than the upper laboratory generated control limit (i.e., 127%) for methyl-tert-butyl ether at 130%. The associated field samples were non-detect while the laboratory control spike displayed a positive bias. No data qualifying action was taken.

The matrix spike pair for sample FSB2A displayed percent recoveries outside the laboratory generated control limits for 1,2-dibromo-3-chloropropane (147%), trans-1,2-dichloroethene (130%), acetone (21%), carbon disulfide (40%/48%), and methyl-tert-butyl ether (146%). The matrix spike duplicate for sample FSB2A displayed a recovery less than the laboratory generated lower control limit for methyl ethyl ketone at 0% while the matrix spike displayed an acceptable recovery at 113%. This matrix spike pair also displayed relative percent differences greater than the laboratory generated control limits for methyl ethyl ketone at 50% and acetone at 25%. The parent sample was non-detect for carbon disulfide and was flagged "UJ,m". The parent sample was positive for methyl ethyl ketone and was flagged "J,m". The parent sample acetone result was positive and previously qualified for a continuing calibration anomaly. The other anomalous compounds displayed a positive bias while the parent sample results were non-detect. No further data qualifying action was taken.

For the SVOC analyses, the associated equipment blank EQB1 submitted with sample delivery group 36440-2 contained bis(2-ethylhexyl)phthalate at 1.0 ug/L, butyl benzyl phthalate at 0.96 ug/L, diethylphthalate at 0.10 ug/L, and several tentatively identified compounds (TICs). Positive results less than ten times the blank concentration of these target phthalates and less than five times the blank concentration of the TICs were flagged "B,x" in the associated samples.

The continuing calibration analyzed on 10/14/03 at 0518 displayed percent differences greater than the control limit (i.e., 20%) with a negative bias for benzaldehyde at 28.2% and with a positive bias for 4-chloroaniline at 21.4%, 3-nitroaniline at 21.1%, 4,6-dinitro-2-methylphenol at 24.3%, 4-nitroaniline at 31.9%, and pentachlorophenol at 24.5%. All associated field sample results were non-detect for benzaldehyde and were flagged "UJ,c". All associated field sample results were non-detect for the other anomalous compounds while the continuing calibration displayed a positive bias, thus, no data qualifying action was required. The continuing calibration analyzed on 10/15/03 at 1103 displayed percent differences greater than the control limit with a negative bias for benzaldehyde at 29.7% and 4-chloroaniline at 24.2% and with a positive bias for bis(2-chloroethyl)ether at 20.8%, 2,4-dinitrophenol at 26.3%, and 4,6-dinitro-2-methylphenol at 20.1%. All associated field sample results were non-detect for benzaldehyde and 4-chloroaniline and were flagged "UJ,c". All associated field sample results were non-detect for the other anomalous compounds while the continuing calibration displayed a positive bias, thus, no data qualifying action was required.

The laboratory control spike recoveries were greater than the upper control limit for 3,3'-dichlorobenzidine at 116%, benzo(k)fluoranthene at 118%, and carbazole at 125%. All associated field sample results were non-detect while the laboratory control spike displayed a positive bias. No data qualifying action was taken.

The matrix spike pair for sample FSB2A displayed percent recoveries outside the laboratory generated control limits for 2,4,5-trichlorophenol (119%/129%), 2,6-

dinitrotoluene (119%/122%), 2-nitroaniline (114%), 3,3'-dichlorobenzidine (19%/27%), 4-bromophenyl phenyl ether (114%/117%), 4-chloroaniline (15%/14%), 4-nitroaniline (56%), diethylphthalate (120%/122%), and fluorene (114%). This matrix spike pair also displayed a relative percent difference greater than the laboratory generated control limit (i.e., 24%) for 3-nitroaniline at 34%. The parent sample results were non-detect for 2,4,5-trichlorophenol, 2,6-dinitrotoluene, 2-nitroaniline, 4-bromophenyl phenyl ether, 3-nitroaniline, and fluorene while the spike recoveries displayed a positive bias or imprecision, thus, no data qualifying action was taken. The parent sample result was positive for diethylphthalate and previously flagged due to an equipment blank detection, therefore, no further data qualifying action was taken. The parent sample results for 3,3'-dichlorobenzidine, 4-chloroaniline, and 4-nitroaniline were non-detect and were flagged "UJ,m".

Sample FSB1A displayed two acid fraction surrogate recoveries greater than the upper laboratory generated control limits for 2-fluorophenol at 125% and 2,4,6-tribromophenol at 114%. The positive associated acid target constituents were flagged "J,s". Sample FSB2C displayed one acid surrogate recovery greater than the upper laboratory generated control limit (i.e., 115%) for 2-fluorophenol at 117%. Sample FSB3A displayed one acid surrogate recovery greater than the upper laboratory generated control limit (i.e., 113%) for 2,4,6-tribromophenol at 117%. No data qualifying action is taken with only one acid fraction surrogate recovery outlier.

Sample 37SB1A was initially analyzed at a dilution of 16 due to the presence of a non-target matrix interference. This sample was re-analyzed at a dilution of 160. Both analytical runs displayed internal standard area counts less than the lower control limit (i.e., -50%) for perylene-d10 at -78.6% and -67.2%. The associated field sample results were non-detect and were flagged "UJ,i". The original analysis used be used for data interpretation.

For the PAH analyses, the laboratory control spike for batch 90138-110 displayed a recovery less than the lower laboratory generated control limit (i.e., 86%) but greater than the project QAPP lower control limit (i.e., 40%) for benzo(a)anthracene at 73%. The associated field sample results were non-detect and were flagged "UJ,l".

The matrix spike pair for sample FSB2A displayed recoveries less than the lower laboratory generated control limits for benzo(g,h,i)perylene (75%), fluoranthene (70%/74%), and phenanthrene (62%). The parent sample results were non-detect for these compounds and were flagged "UJ,m".

For the explosive analyses, the opening continuing calibration analyzed on 10/19/03 at 0414 displayed a percent difference greater than the control limit (i.e., 15%) with a negative bias for 3-nitrotoluene at 17.3%. The closing continuing calibration analyzed on 10/19/03 at 0852 displayed percent differences greater than the control limit with a negative bias for 3-nitrotoluene at 17.0% and HMX at 24.0%. All associated sample results were non-detect and were flagged "UJ,c".

For the pesticide analyses, the closing continuing calibration analyzed on 10/10/03 displayed percent differences greater than the control limit (i.e., 15%) with a positive bias for delta BHC at 18.6%, 4,4'-DDD at 19.73%, endosulfan II at 15.76%,

methoxychlor at 19.24%, and endosulfan sulfate at 15.16% on column one. The associated field sample results were non-detect or did not confirm on the passing analytical column two. No data qualifying action was taken based on these anomalies.

The matrix spike duplicate for sample FSB2A submitted with sample delivery group 36440-2 displayed several recoveries less than the lower laboratory generated control limits. This matrix spike duplicate was analyzed twice and the second analysis results were reported. This matrix spike pair also displayed several relative percent differences greater than the laboratory generated control limits. Since the matrix spike displayed acceptable recoveries and all recoveries were within the QAPP specified limits, no data qualifying action was taken based on these anomalies.

The relative percent difference between the two analytical column concentrations was greater than the control limit (i.e., 40%) for dieldrin in sample 37SB1A at 53%. This result was flagged "J,g".

For the herbicide analyses, the laboratory control spike displayed a recovery less than the lower control limit at for dinoseb at 0% and a recovery greater than the laboratory generated upper control limit (91%) for MCPP at 117%. The associated field sample results were non-detect for MCPP while the laboratory control spike displayed a positive bias, therefore, no data qualifying action was required. A re-extraction occurred on 10/17/03 that was 17 and 18 days after the sampling date because the initial extraction did not recover dinoseb. All dinoseb results from the original extraction were rejected and manually removed from the result forms by the reviewer. All dinoseb results from the re-extraction were non-detect and were flagged "UJ,h".

The re-extractions for samples FSB2A and 46SB1A displayed surrogate recoveries greater than the laboratory generated upper control limit (i.e., 114%) for 2,4-dichlorophenylacetic acid at 136% and 129%, respectively. The associated field sample results were non-detect, thus, no data qualifying action was required.

The matrix spike pair for sample FSB2A from the original extraction displayed recoveries less than the laboratory generated lower control limits for dinoseb (2%/7%) and dicamba (46%). This matrix spike pair also displayed a relative percent difference greater than the laboratory generated control limit (i.e., 40%) for dicamba at 90%. The matrix spike pair for sample FSB2A from the re-extraction displayed recoveries less than the lower control limit (i.e., 50%) for dinoseb (29%/42%). All dinoseb results from the original extraction were manually removed by the reviewer. Since the matrix spike duplicate displayed an acceptable recovery for dicamba and all recoveries were within the QAPP specified limits, no data qualifying action was taken based on these anomalies.

For the metal analyses by 6020, the method blank for batch 89772-103 contained arsenic at 0.0321 mg/Kg and silver at 0.00596 mg/Kg. The field sample results were greater than five times the associated method blank concentration for arsenic and silver, thus, no data qualifying action was required. The method blank for batch 89769-106 contained antimony at 0.45 mg/Kg. All associated field sample results for antimony were positive and less than five times the blank concentration. These results were flagged "B,p".

The associated equipment blank EQB1 submitted with sample delivery group 36440-2 contained lead at 0.3 ug/L. The associated field sample results were positive and greater than five times the equipment blank concentration. No data qualifying action was required.

The serial dilution performed on sample FSB2A displayed a percent difference greater than the control limit (i.e., 10%) for nickel at 15.4%. All associated field sample results were positive and were flagged "J,s".

For the metal analyses by 6010B, the method blank for batch 89813-103 contained positive results for cadmium at 0.255 mg/Kg, chromium at 0.930 mg/Kg, vanadium at 0.247 mg/Kg, and zinc at 1.63 mg/Kg. The method blank for batch 89817-107 contained positive results for barium at 0.128 mg/Kg, cadmium at 0.329 mg/Kg, iron at 2.87 mg/Kg, potassium at 12.5 mg/Kg, and sodium at 18.7 mg/Kg. Positive results less than five times the blank concentration for cadmium and sodium were flagged "B,p" in the associated samples. All other field sample results were greater than five times the associated method blank concentration and no data qualifying action was required.

The associated equipment blank EQB1 submitted with sample delivery group 36440-2 contained beryllium at 0.3 ug/L and sodium at 220 ug/L. Associated positive field sample results less than five times the equipment blank concentration were flagged "B,x", unless previously flagged due to a method blank detection.

The matrix spike pair performed on sample FSB2A displayed recoveries less than the lower laboratory generated control limit (i.e., 70%) for calcium (60%/62%). All associated field sample results were positive and were flagged "L,m". The post digestion spike performed on this parent sample displayed a recovery less than the lower control limit (i.e., 75%) for iron at 71%. No data qualifying action is taken based solely on a post digestion spike anomaly. The serial dilution performed on sample FSB2A displayed percent differences greater than the control limit (i.e., 10%) for cobalt at 28.6%, chromium at 20.0%, iron at 10.4%, and potassium at 11.0%. All associated field sample results were positive and were flagged "J,s".

The field duplicate pair (FSB2B and SBD1) displayed relative percent differences greater than the control limit (i.e., 35%) for aluminum at 38.6%, calcium at 101.4%, iron at 39.7%, and magnesium at 67.5%. The field sample results for calcium were previously flagged for low matrix spike recoveries and the field sample results for iron were previously flagged for a high percent difference in the serial dilution, thus, no further data qualifying action was taken. The positive results for aluminum and magnesium were flagged "J,f" in these two samples.

Correctable Anomalies:

The chain of custody incorrectly requested herbicide analyses for several samples that were subsequently cancelled by the client. The client requested that the analyses proceed for the field sample 37SB1C sampled on 10/1/03 to be relabeled as 37SB1B. The client requested also that the field sample 37SB1B sampled on 10/1/03 be discarded. The laboratory proceeded with this direction. However, the encores for volatile analyses were not transferred and preserved within holding time. The client cancelled the volatiles analysis for relabeled sample 37SB1B collected on 10/1/03, the client

recollected 37SB1B, and the volatiles results for this sample were submitted by the laboratory in sample delivery group 36440-6.

Comments: Sample 37SB1A was initially analyzed for SVOCs at a dilution of 16 due to non-target matrix interference with the internal standards. Sample 37SB1A was initially analyzed for herbicides at a dilution of 16 due to non-target matrix interference with the instrument detector. Due to the abundance of target compounds, most of the samples were analyzed at dilutions for the metals analyses. Cyanide results for FSB2B, SBD-1, and FSB2C were reported from dilutions due to matrix interference with the instrument detector. Therefore, the reporting limits were elevated.

A field cooler containing 37SB1A, 37SB1B, and 37SB1C was received at the laboratory with an internal temperature of 1.7°C. Since the sample aliquots were not frozen and the containers were intact, no data qualifying action was taken.

It should be noted that TIC results were flagged "NJ,t" in the associated samples. TIC results that were identified as unknown were manually lined out by the reviewer. No anomalies were encountered if a given fraction was not mentioned. Except for data flagged "R", all data are usable, as qualified, for their intended purpose based on the data reviewed.

Signed: Andrea Sansom

Andrea Sansom

Radford SSP

Submittal No.	Lab Sample ID	Field Sample ID	Matrix (Code)	Sample Date
36440-1	344823	FSB1A	SO	09/30/03
36440-1	344824	FSB1B	SO	09/30/03
36440-1	344825	FSB1C	SO	09/30/03
36440-1	344826	FSB2A	SO	09/30/03
36440-1	344827	FSB2B	SO	09/30/03
36440-1	344828	SBD-1	SO	09/30/03
36440-1	344829	FSB2C	SO	09/30/03
36440-1	344922	FSB3A	SO	10/01/03
36440-1	344923	FSB3B	SO	10/01/03
36440-1	344924	FSB3C	SO	10/01/03
36440-1	344925	46SB1A	SO	10/01/03
36440-1	344926	46SB1B	SO	10/01/03
36440-1	344927	46SB1C	SO	10/01/03
36440-1	344928	46SB2A	SO	10/01/03
36440-1	344929	46SB2B	SO	10/01/03
36440-1	344930	46SB2C	SO	10/01/03
36440-1	344931	SBD2	SO	10/01/03
36440-1	344932	37SB1A	SO	10/01/03
36440-1	345024	37SB1B	SO	10/01/03

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**FSB1A**	QC Batch:	90044 -113
Sample #:	**344823**	Anal. Batch:	208041
Matrix:	Soil	Percent Solids:	87
Unit:	ug/kg dry	Dilution Factor:	1.15

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	5.7 U		5.7	0.490
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.7 U		5.7	0.873
79-34-5	1,1,2,2-Tetrachloroethane	5.7 U		5.7	0.751
79-00-5	1,1,2-Trichloroethane	5.7 U		5.7	0.682
75-34-3	1,1-Dichloroethane	5.7 U		5.7	0.833
75-35-4	1,1-Dichloroethylene	5.7 U		5.7	0.843
106-93-4	1,2-Dibromoethane	5.7 U		5.7	0.788
96-12-8	1,2-Dibromo-3-chloropropane	11 U		11	2.39
95-50-1	1,2-Dichlorobenzene	5.7 U		5.7	0.557
107-06-2	1,2-Dichloroethane	5.7 U		5.7	0.496
156-59-2	**cis-1,2-Dichloroethene**	**7.8**		5.7	0.817
156-60-5	trans-1,2-Dichloroethene	5.7 U		5.7	0.808
78-87-5	1,2-Dichloropropane	5.7 U		5.7	0.674
87-61-6	1,2,3-Trichlorobenzene	5.7 U		5.7	0.626
120-82-1	1,2,4-Trichlorobenzene	5.7 U		5.7	0.472
541-73-1	1,3-Dichlorobenzene	5.7 U		5.7	0.308
106-46-7	1,4-Dichlorobenzene	5.7 U		5.7	0.817
78-93-3	**Methyl Ethyl Ketone**	**75**		22	5.75
591-78-6	**2-Hexanone**	**14**		11	2.60
108-10-1	4-Methyl-2-Pentanone	11 U		11	1.68
67-64-1	**Acetone**	**220**	J,c	22	5.75
71-43-2	Benzene	5.7 U		5.7	0.606
74-97-5	Bromochloromethane	5.7 U		5.7	0.875
75-27-4	Dichlorobromomethane	5.7 U		5.7	0.576
75-25-2	Bromoform	5.7 U		5.7	0.665
74-83-9	Bromomethane	5.7 U		5.7	1.73
75-15-0	Carbon Disulfide	5.7 U		5.7	1.67
56-23-5	Carbon Tetrachloride	5.7 U		5.7	0.536
108-90-7	Chlorobenzene	5.7 U		5.7	0.760
75-00-3	Chloroethane	5.7 U	UJ,c	5.7	1.55
67-66-3	Chloroform	5.7 U		5.7	0.513

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**FSB1A**	QC Batch:	90044 -113
Sample #:	**344823**	Anal. Batch:	208041
Matrix:	Soil	Percent Solids:	87
Unit:	ug/kg dry	Dilution Factor:	1.15

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	5.7 U		5.7	0.959
110-82-7	Cyclohexane	11 U		11	0.363
10061-01-5	cis-1,3-Dichloropropene	5.7 U		5.7	0.565
10061-02-6	trans-1,3-Dichloropropene	5.7 U		5.7	0.599
75-71-8	Dichlorodifluoromethane	5.7 U		5.7	0.768
124-48-1	Chlorodibromomethane	5.7 U		5.7	0.595
100-41-4	**Ethylbenzene**	**0.56 J**		5.7	0.486
98-82-8	Isopropylbenzene	5.7 U		5.7	0.628
79-20-9	Methyl Acetate	22 U	UJ,c	22	3.99
108-87-2	Methylcyclohexane	11 U		11	0.972
1634-04-4	Methyl(tert)butyl Ether	5.7 U		5.7	0.737
75-09-2	**Methylene Chloride**	**5.8 J**	J,c	22	3.23
100-42-5	Styrene	5.7 U		5.7	0.508
127-18-4	Tetrachloroethene	5.7 U		5.7	0.705
108-88-3	**Toluene**	**2.7 J**		5.7	0.534
79-01-6	**Trichloroethene**	**120**		5.7	0.779
75-69-4	**Trichlorofluoromethane**	**0.91 J**		5.7	0.854
75-01-4	Vinyl Chloride	5.7 U		5.7	0.426
1330-20-7	**Xylene (Total)**	**3.6 J**		5.7	0.484

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**FSB1A**	QC Batch:	90044 -113
Sample #:	**344823**	Anal. Batch:	208041
Matrix:	Soil	Percent Solids:	87
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
Butanal	123-72-8	5.3	E	NJ,+
Hexanal	66-25-1	6.4	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 14:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**FSB1B**	QC Batch:	90044 -113
Sample #:	**344824**	Anal. Batch:	208041
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.18

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	5.9 U		5.9	0.503
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.9 U		5.9	0.896
79-34-5	1,1,2,2-Tetrachloroethane	5.9 U		5.9	0.771
79-00-5	1,1,2-Trichloroethane	5.9 U		5.9	0.700
75-34-3	1,1-Dichloroethane	5.9 U		5.9	0.854
75-35-4	1,1-Dichloroethylene	5.9 U		5.9	0.865
106-93-4	1,2-Dibromoethane	5.9 U		5.9	0.808
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.45
95-50-1	1,2-Dichlorobenzene	5.9 U		5.9	0.571
107-06-2	1,2-Dichloroethane	5.9 U		5.9	0.509
156-59-2	cis-1,2-Dichloroethene	5.9 U		5.9	0.838
156-60-5	trans-1,2-Dichloroethene	5.9 U		5.9	0.830
78-87-5	1,2-Dichloropropane	5.9 U		5.9	0.691
87-61-6	1,2,3-Trichlorobenzene	5.9 U		5.9	0.642
120-82-1	1,2,4-Trichlorobenzene	5.9 U		5.9	0.484
541-73-1	1,3-Dichlorobenzene	5.9 U		5.9	0.316
106-46-7	1,4-Dichlorobenzene	5.9 U		5.9	0.838
78-93-3	**Methyl Ethyl Ketone**	**72**		24	5.90
591-78-6	2-Hexanone	12 U		12	2.67
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.72
67-64-1	**Acetone**	**80**	J,c	24	5.90
71-43-2	Benzene	5.9 U		5.9	0.622
74-97-5	Bromochloromethane	5.9 U		5.9	0.898
75-27-4	Dichlorobromomethane	5.9 U		5.9	0.591
75-25-2	Bromoform	5.9 U		5.9	0.682
74-83-9	Bromomethane	5.9 U		5.9	1.77
75-15-0	Carbon Disulfide	5.9 U		5.9	1.71
56-23-5	Carbon Tetrachloride	5.9 U		5.9	0.550
108-90-7	Chlorobenzene	5.9 U		5.9	0.780
75-00-3	Chloroethane	5.9 U	UJ,c	5.9	1.59
67-66-3	Chloroform	5.9 U		5.9	0.526

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 14:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**FSB1B**	QC Batch:	90044 -113
Sample #:	**344824**	Anal. Batch:	208041
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.18

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	5.9 U		5.9	0.984
110-82-7	Cyclohexane	12 U		12	0.373
10061-01-5	cis-1,3-Dichloropropene	5.9 U		5.9	0.579
10061-02-6	trans-1,3-Dichloropropene	5.9 U		5.9	0.615
75-71-8	Dichlorodifluoromethane	5.9 U		5.9	0.788
124-48-1	Chlorodibromomethane	5.9 U		5.9	0.610
100-41-4	Ethylbenzene	5.9 U		5.9	0.499
98-82-8	Isopropylbenzene	5.9 U		5.9	0.644
79-20-9	Methyl Acetate	24 U	UJ,c	24	4.09
108-87-2	Methylcyclohexane	12 U		12	0.997
1634-04-4	Methyl(tert)butyl Ether	5.9 U		5.9	0.756
75-09-2	**Methylene Chloride**	**4.0 J**	J,c	24	3.32
100-42-5	Styrene	5.9 U		5.9	0.522
127-18-4	Tetrachloroethene	5.9 U		5.9	0.723
108-88-3	Toluene	5.9 U		5.9	0.548
79-01-6	Trichloroethene	5.9 U		5.9	0.799
75-69-4	Trichlorofluoromethane	5.9 U		5.9	0.877
75-01-4	Vinyl Chloride	5.9 U		5.9	0.437
1330-20-7	Xylene (Total)	5.9 U		5.9	0.497

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 14:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**FSB1B**	QC Batch:	90044 -113
Sample #:	**344824**	Anal. Batch:	208041
Matrix:	Soil	Percent Solids:	85
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**FSB1C**	QC Batch:	90044 -113
Sample #:	**344825**	Anal. Batch:	208041
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.22

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.1 U		6.1	0.520
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.1 U		6.1	0.926
79-34-5	1,1,2,2-Tetrachloroethane	6.1 U		6.1	0.797
79-00-5	1,1,2-Trichloroethane	6.1 U		6.1	0.723
75-34-3	1,1-Dichloroethane	6.1 U		6.1	0.883
75-35-4	1,1-Dichloroethylene	6.1 U		6.1	0.894
106-93-4	1,2-Dibromoethane	6.1 U		6.1	0.836
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.54
95-50-1	1,2-Dichlorobenzene	6.1 U		6.1	0.590
107-06-2	1,2-Dichloroethane	6.1 U		6.1	0.526
156-59-2	cis-1,2-Dichloroethene	6.1 U		6.1	0.866
156-60-5	trans-1,2-Dichloroethene	6.1 U		6.1	0.858
78-87-5	1,2-Dichloropropane	6.1 U		6.1	0.715
87-61-6	1,2,3-Trichlorobenzene	6.1 U		6.1	0.664
120-82-1	1,2,4-Trichlorobenzene	6.1 U		6.1	0.500
541-73-1	1,3-Dichlorobenzene	6.1 U		6.1	0.327
106-46-7	1,4-Dichlorobenzene	6.1 U		6.1	0.866
78-93-3	**Methyl Ethyl Ketone**	**79**		24	6.10
591-78-6	**2-Hexanone**	**14**		12	2.76
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.78
67-64-1	**Acetone**	**110**	J,c	24	6.10
71-43-2	Benzene	6.1 U		6.1	0.643
74-97-5	Bromochloromethane	6.1 U		6.1	0.928
75-27-4	Dichlorobromomethane	6.1 U		6.1	0.611
75-25-2	Bromoform	6.1 U		6.1	0.705
74-83-9	Bromomethane	6.1 U		6.1	1.83
75-15-0	Carbon Disulfide	6.1 U		6.1	1.77
56-23-5	Carbon Tetrachloride	6.1 U		6.1	0.569
108-90-7	Chlorobenzene	6.1 U		6.1	0.806
75-00-3	Chloroethane	6.1 U	UJ,c	6.1	1.65
67-66-3	Chloroform	6.1 U		6.1	0.544

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**FSB1C**	QC Batch:	90044 -113
Sample #:	**344825**	Anal. Batch:	208041
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.22

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.1 U		6.1	1.02
110-82-7	Cyclohexane	21 U		21	0.386
10061-01-5	cis-1,3-Dichloropropene	6.1 U		6.1	0.599
10061-02-6	trans-1,3-Dichloropropene	6.1 U		6.1	0.636
75-71-8	Dichlorodifluoromethane	6.1 U		6.1	0.815
124-48-1	Chlorodibromomethane	6.1 U		6.1	0.631
100-41-4	Ethylbenzene	6.1 U		6.1	0.516
98-82-8	Isopropylbenzene	6.1 U		6.1	0.666
79-20-9	Methyl Acetate	24 U	UJ,C	24	4.23
108-87-2	Methylcyclohexane	21 U		21	1.03
1634-04-4	Methyl(tert)butyl Ether	6.1 U		6.1	0.782
75-09-2	**Methylene Chloride**	**6.4 J**	J,C	24	3.43
100-42-5	Styrene	6.1 U		6.1	0.539
127-18-4	Tetrachloroethene	6.1 U		6.1	0.748
108-88-3	Toluene	6.1 U		6.1	0.566
79-01-6	Trichloroethene	6.1 U		6.1	0.826
75-69-4	Trichlorofluoromethane	6.1 U		6.1	0.906
75-01-4	Vinyl Chloride	6.1 U		6.1	0.451
1330-20-7	Xylene (Total)	6.1 U		6.1	0.514

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**FSB1C**	QC Batch:	90044 -113
Sample #:	**344825**	Anal. Batch:	208041
Matrix:	Soil	Percent Solids:	82
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**FSB2A**	QC Batch:	90044 -113
Sample #:	**344826**	Anal. Batch:	208041
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.18

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	5.9 U		5.9	0.503
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.9 U		5.9	0.896
79-34-5	1,1,2,2-Tetrachloroethane	5.9 U		5.9	0.771
79-00-5	1,1,2-Trichloroethane	5.9 U		5.9	0.700
75-34-3	1,1-Dichloroethane	5.9 U		5.9	0.854
75-35-4	1,1-Dichloroethylene	5.9 U		5.9	0.865
106-93-4	1,2-Dibromoethane	5.9 U		5.9	0.808
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.45
95-50-1	1,2-Dichlorobenzene	5.9 U		5.9	0.571
107-06-2	1,2-Dichloroethane	5.9 U		5.9	0.509
156-59-2	cis-1,2-Dichloroethene	5.9 U		5.9	0.838
156-60-5	trans-1,2-Dichloroethene	5.9 U		5.9	0.830
78-87-5	1,2-Dichloropropane	5.9 U		5.9	0.691
87-61-6	1,2,3-Trichlorobenzene	5.9 U		5.9	0.642
120-82-1	1,2,4-Trichlorobenzene	5.9 U		5.9	0.484
541-73-1	1,3-Dichlorobenzene	5.9 U		5.9	0.316
106-46-7	1,4-Dichlorobenzene	5.9 U		5.9	0.838
78-93-3	**Methyl Ethyl Ketone**	**94**	J,M	24	5.90
591-78-6	**2-Hexanone**	**13**		12	2.67
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.72
67-64-1	**Acetone**	**150**	J,c	24	5.90
71-43-2	Benzene	5.9 U		5.9	0.622
74-97-5	Bromochloromethane	5.9 U		5.9	0.898
75-27-4	Dichlorobromomethane	5.9 U		5.9	0.591
75-25-2	Bromoform	5.9 U		5.9	0.682
74-83-9	Bromomethane	5.9 U		5.9	1.77
75-15-0	*Carbon Disulfide	5.9 U	UJ,M	5.9	1.71
56-23-5	Carbon Tetrachloride	5.9 U		5.9	0.550
108-90-7	Chlorobenzene	5.9 U		5.9	0.780
75-00-3	Chloroethane	5.9 U	UJ,c	5.9	1.59
67-66-3	Chloroform	5.9 U		5.9	0.526

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**FSB2A**	QC Batch:	90044 -113
Sample #:	**344826**	Anal. Batch:	208041
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.18

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	5.9 U		5.9	0.984
110-82-7	Cyclohexane	12 U		12	0.373
10061-01-5	cis-1,3-Dichloropropene	5.9 U		5.9	0.579
10061-02-6	trans-1,3-Dichloropropene	5.9 U		5.9	0.615
75-71-8	Dichlorodifluoromethane	5.9 U		5.9	0.788
124-48-1	Chlorodibromomethane	5.9 U		5.9	0.610
100-41-4	Ethylbenzene	5.9 U		5.9	0.499
98-82-8	Isopropylbenzene	5.9 U		5.9	0.644
79-20-9	Methyl Acetate	24 U	UJ,c	24	4.09
108-87-2	Methylcyclohexane	12 U		12	0.997
1634-04-4	Methyl(tert)butyl Ether	5.9 U		5.9	0.756
75-09-2	**Methylene Chloride**	**3.8 J**	J,c	24	3.32
100-42-5	Styrene	5.9 U		5.9	0.522
127-18-4	Tetrachloroethene	5.9 U		5.9	0.723
108-88-3	Toluene	5.9 U		5.9	0.548
79-01-6	Trichloroethene	5.9 U		5.9	0.799
75-69-4	Trichlorofluoromethane	5.9 U		5.9	0.877
75-01-4	Vinyl Chloride	5.9 U		5.9	0.437
1330-20-7	Xylene (Total)	5.9 U		5.9	0.497

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**FSB2A**	QC Batch:	90044 -113
Sample #:	**344826**	Anal. Batch:	208041
Matrix:	Soil	Percent Solids:	85
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
Butanal	123-72-8	7.6	E	NJ,+
Hexanal	66-25-1	6.7	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**FSB2B**	QC Batch:	90044 -113
Sample #:	**344827**	Anal. Batch:	208041
Matrix:	Soil	Percent Solids:	93
Unit:	ug/kg dry	Dilution Factor:	1.08

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	5.4 U		5.4	0.460
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.4 U		5.4	0.820
79-34-5	1,1,2,2-Tetrachloroethane	5.4 U		5.4	0.705
79-00-5	1,1,2-Trichloroethane	5.4 U		5.4	0.640
75-34-3	1,1-Dichloroethane	5.4 U		5.4	0.782
75-35-4	1,1-Dichloroethylene	5.4 U		5.4	0.792
106-93-4	1,2-Dibromoethane	5.4 U		5.4	0.740
96-12-8	1,2-Dibromo-3-chloropropane	11 U		11	2.25
95-50-1	1,2-Dichlorobenzene	5.4 U		5.4	0.523
107-06-2	1,2-Dichloroethane	5.4 U		5.4	0.465
156-59-2	cis-1,2-Dichloroethene	5.4 U		5.4	0.767
156-60-5	trans-1,2-Dichloroethene	5.4 U		5.4	0.759
78-87-5	1,2-Dichloropropane	5.4 U		5.4	0.633
87-61-6	1,2,3-Trichlorobenzene	5.4 U		5.4	0.588
120-82-1	1,2,4-Trichlorobenzene	5.4 U		5.4	0.443
541-73-1	1,3-Dichlorobenzene	5.4 U		5.4	0.289
106-46-7	1,4-Dichlorobenzene	5.4 U		5.4	0.767
78-93-3	**Methyl Ethyl Ketone**	**65**		22	5.40
591-78-6	2-Hexanone	11 U		11	2.44
108-10-1	4-Methyl-2-Pentanone	11 U		11	1.58
67-64-1	**Acetone**	**93**	J,c	22	5.40
71-43-2	Benzene	5.4 U		5.4	0.569
74-97-5	Bromochloromethane	5.4 U		5.4	0.822
75-27-4	Dichlorobromomethane	5.4 U		5.4	0.541
75-25-2	Bromoform	5.4 U		5.4	0.624
74-83-9	Bromomethane	5.4 U		5.4	1.62
75-15-0	Carbon Disulfide	5.4 U		5.4	1.57
56-23-5	Carbon Tetrachloride	5.4 U		5.4	0.503
108-90-7	Chlorobenzene	5.4 U		5.4	0.714
75-00-3	Chloroethane	5.4 U	UJ,c	5.4	1.46
67-66-3	Chloroform	5.4 U		5.4	0.482

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**FSB2B**	QC Batch:	90044 -113
Sample #:	**344827**	Anal. Batch:	208041
Matrix:	Soil	Percent Solids:	93
Unit:	ug/kg dry	Dilution Factor:	1.08

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	5.4 U		5.4	0.901
110-82-7	Cyclohexane	11 U		11	0.341
10061-01-5	cis-1,3-Dichloropropene	5.4 U		5.4	0.530
10061-02-6	trans-1,3-Dichloropropene	5.4 U		5.4	0.563
75-71-8	Dichlorodifluoromethane	5.4 U		5.4	0.721
124-48-1	Chlorodibromomethane	5.4 U		5.4	0.558
100-41-4	Ethylbenzene	5.4 U		5.4	0.457
98-82-8	Isopropylbenzene	5.4 U		5.4	0.590
79-20-9	Methyl Acetate	22 U	UJ,c	22	3.75
108-87-2	Methylcyclohexane	11 U		11	0.913
1634-04-4	Methyl(tert)butyl Ether	5.4 U		5.4	0.692
75-09-2	**Methylene Chloride**	**3.9 J**	J,c	22	3.03
100-42-5	Styrene	5.4 U		5.4	0.477
127-18-4	Tetrachloroethene	5.4 U		5.4	0.662
108-88-3	Toluene	5.4 U		5.4	0.501
79-01-6	Trichloroethene	5.4 U		5.4	0.731
75-69-4	Trichlorofluoromethane	5.4 U		5.4	0.802
75-01-4	Vinyl Chloride	5.4 U		5.4	0.400
1330-20-7	Xylene (Total)	5.4 U		5.4	0.455

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**FSB2B**	QC Batch:	90044 -113
Sample #:	**344827**	Anal. Batch:	208041
Matrix:	Soil	Percent Solids:	93
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD-1**	QC Batch:	90044 -113
Sample #:	**344828**	Anal. Batch:	208041
Matrix:	Soil	Percent Solids:	88
Unit:	ug/kg dry	Dilution Factor:	1.14

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	5.7 U		5.7	0.486
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.7 U		5.7	0.865
79-34-5	1,1,2,2-Tetrachloroethane	5.7 U		5.7	0.744
79-00-5	1,1,2-Trichloroethane	5.7 U		5.7	0.676
75-34-3	1,1-Dichloroethane	5.7 U		5.7	0.825
75-35-4	1,1-Dichloroethylene	5.7 U		5.7	0.836
106-93-4	1,2-Dibromoethane	5.7 U		5.7	0.781
96-12-8	1,2-Dibromo-3-chloropropane	11 U		11	2.37
95-50-1	1,2-Dichlorobenzene	5.7 U		5.7	0.552
107-06-2	1,2-Dichloroethane	5.7 U		5.7	0.491
156-59-2	cis-1,2-Dichloroethene	5.7 U		5.7	0.809
156-60-5	trans-1,2-Dichloroethene	5.7 U		5.7	0.801
78-87-5	1,2-Dichloropropane	5.7 U		5.7	0.668
87-61-6	1,2,3-Trichlorobenzene	5.7 U		5.7	0.620
120-82-1	1,2,4-Trichlorobenzene	5.7 U		5.7	0.467
541-73-1	1,3-Dichlorobenzene	5.7 U		5.7	0.306
106-46-7	1,4-Dichlorobenzene	5.7 U		5.7	0.809
78-93-3	**Methyl Ethyl Ketone**	**59**		22	5.70
591-78-6	2-Hexanone	11 U		11	2.58
108-10-1	4-Methyl-2-Pentanone	11 U		11	1.66
67-64-1	**Acetone**	**97**	J/c	22	5.70
71-43-2	Benzene	5.7 U		5.7	0.601
74-97-5	Bromochloromethane	5.7 U		5.7	0.868
75-27-4	Dichlorobromomethane	5.7 U		5.7	0.571
75-25-2	Bromoform	5.7 U		5.7	0.659
74-83-9	Bromomethane	5.7 U		5.7	1.71
75-15-0	Carbon Disulfide	5.7 U		5.7	1.65
56-23-5	Carbon Tetrachloride	5.7 U		5.7	0.531
108-90-7	Chlorobenzene	5.7 U		5.7	0.754
75-00-3	Chloroethane	5.7 U	UJc	5.7	1.54
67-66-3	Chloroform	5.7 U		5.7	0.508

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD-1**	QC Batch:	90044 -113
Sample #:	**344828**	Anal. Batch:	208041
Matrix:	Soil	Percent Solids:	88
Unit:	ug/kg dry	Dilution Factor:	1.14

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	5.7 U		5.7	0.951
110-82-7	Cyclohexane	11 U		11	0.360
10061-01-5	cis-1,3-Dichloropropene	5.7 U		5.7	0.560
10061-02-6	trans-1,3-Dichloropropene	5.7 U		5.7	0.594
75-71-8	Dichlorodifluoromethane	5.7 U		5.7	0.762
124-48-1	Chlorodibromomethane	5.7 U		5.7	0.589
100-41-4	Ethylbenzene	5.7 U		5.7	0.482
98-82-8	Isopropylbenzene	5.7 U		5.7	0.622
79-20-9	Methyl Acetate	22 U	UJ/c	22	3.96
108-87-2	Methylcyclohexane	11 U		11	0.963
1634-04-4	Methyl(tert)butyl Ether	5.7 U		5.7	0.731
75-09-2	**Methylene Chloride**	**9.5 J**	J/c	22	3.20
100-42-5	Styrene	5.7 U		5.7	0.504
127-18-4	Tetrachloroethene	5.7 U		5.7	0.699
108-88-3	Toluene	5.7 U		5.7	0.529
79-01-6	Trichloroethene	5.7 U		5.7	0.772
75-69-4	**Trichlorofluoromethane**	**1.2 J**		5.7	0.847
75-01-4	Vinyl Chloride	5.7 U		5.7	0.422
1330-20-7	Xylene (Total)	5.7 U		5.7	0.480

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD-1**	QC Batch:	90044 -113
Sample #:	**344828**	Anal. Batch:	208041
Matrix:	Soil	Percent Solids:	88
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**FSB2C**	QC Batch:	90044 -113
Sample #:	**344829**	Anal. Batch:	208041
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.18

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	5.9 U		5.9	0.503
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.9 U		5.9	0.896
79-34-5	1,1,2,2-Tetrachloroethane	5.9 U		5.9	0.771
79-00-5	1,1,2-Trichloroethane	5.9 U		5.9	0.700
75-34-3	1,1-Dichloroethane	5.9 U		5.9	0.854
75-35-4	1,1-Dichloroethylene	5.9 U		5.9	0.865
106-93-4	1,2-Dibromoethane	5.9 U		5.9	0.808
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.45
95-50-1	1,2-Dichlorobenzene	5.9 U		5.9	0.571
107-06-2	1,2-Dichloroethane	5.9 U		5.9	0.509
156-59-2	cis-1,2-Dichloroethene	5.9 U		5.9	0.838
156-60-5	trans-1,2-Dichloroethene	5.9 U		5.9	0.830
78-87-5	1,2-Dichloropropane	5.9 U		5.9	0.691
87-61-6	1,2,3-Trichlorobenzene	5.9 U		5.9	0.642
120-82-1	1,2,4-Trichlorobenzene	5.9 U		5.9	0.484
541-73-1	1,3-Dichlorobenzene	5.9 U		5.9	0.316
106-46-7	1,4-Dichlorobenzene	5.9 U		5.9	0.838
78-93-3	**Methyl Ethyl Ketone**	**78**		24	5.90
591-78-6	2-Hexanone	12 U		12	2.67
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.72
67-64-1	**Acetone**	**100**	J,c	24	5.90
71-43-2	Benzene	5.9 U		5.9	0.622
74-97-5	Bromochloromethane	5.9 U		5.9	0.898
75-27-4	Dichlorobromomethane	5.9 U		5.9	0.591
75-25-2	Bromoform	5.9 U		5.9	0.682
74-83-9	Bromomethane	5.9 U		5.9	1.77
75-15-0	Carbon Disulfide	5.9 U		5.9	1.71
56-23-5	Carbon Tetrachloride	5.9 U		5.9	0.550
108-90-7	Chlorobenzene	5.9 U		5.9	0.780
75-00-3	Chloroethane	5.9 U	UJ,c	5.9	1.59
67-66-3	Chloroform	5.9 U		5.9	0.526

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**FSB2C**	QC Batch:	90044 -113
Sample #:	**344829**	Anal. Batch:	208041
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.18

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	5.9 U		5.9	0.984
110-82-7	Cyclohexane	12 U		12	0.373
10061-01-5	cis-1,3-Dichloropropene	5.9 U		5.9	0.579
10061-02-6	trans-1,3-Dichloropropene	5.9 U		5.9	0.615
75-71-8	Dichlorodifluoromethane	5.9 U		5.9	0.788
124-48-1	Chlorodibromomethane	5.9 U		5.9	0.610
100-41-4	Ethylbenzene	5.9 U		5.9	0.499
98-82-8	Isopropylbenzene	5.9 U		5.9	0.644
79-20-9	Methyl Acetate	24 U	UJ,c	24	4.09
108-87-2	Methylcyclohexane	12 U		12	0.997
1634-04-4	Methyl(tert)butyl Ether	5.9 U		5.9	0.756
75-09-2	**Methylene Chloride**	**4.2 J**	J,c	24	3.32
100-42-5	Styrene	5.9 U		5.9	0.522
127-18-4	Tetrachloroethene	5.9 U		5.9	0.723
108-88-3	Toluene	5.9 U		5.9	0.548
79-01-6	Trichloroethene	5.9 U		5.9	0.799
75-69-4	Trichlorofluoromethane	5.9 U		5.9	0.877
75-01-4	Vinyl Chloride	5.9 U		5.9	0.437
1330-20-7	Xylene (Total)	5.9 U		5.9	0.497

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**FSB2C**	QC Batch:	90044 -113
Sample #:	**344829**	Anal. Batch:	208041
Matrix:	Soil	Percent Solids:	85
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
Butanal	123-72-8	6.9	E	NJ,+
Hexanal	66-25-1	30	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 08:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**FSB3A**	QC Batch:	90044 -113
Sample #:	**344922**	Anal. Batch:	208041
Matrix:	Soil	Percent Solids:	86
Unit:	ug/kg dry	Dilution Factor:	1.16

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	5.8 U		5.8	0.494
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.8 U		5.8	0.880
79-34-5	1,1,2,2-Tetrachloroethane	5.8 U		5.8	0.757
79-00-5	1,1,2-Trichloroethane	5.8 U		5.8	0.688
75-34-3	1,1-Dichloroethane	5.8 U		5.8	0.840
75-35-4	1,1-Dichloroethylene	5.8 U		5.8	0.850
106-93-4	1,2-Dibromoethane	5.8 U		5.8	0.795
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.41
95-50-1	1,2-Dichlorobenzene	5.8 U		5.8	0.561
107-06-2	1,2-Dichloroethane	5.8 U		5.8	0.500
156-59-2	cis-1,2-Dichloroethene	5.8 U		5.8	0.824
156-60-5	trans-1,2-Dichloroethene	5.8 U		5.8	0.815
78-87-5	1,2-Dichloropropane	5.8 U		5.8	0.680
87-61-6	1,2,3-Trichlorobenzene	5.8 U		5.8	0.631
120-82-1	1,2,4-Trichlorobenzene	5.8 U		5.8	0.476
541-73-1	1,3-Dichlorobenzene	5.8 U		5.8	0.311
106-46-7	1,4-Dichlorobenzene	5.8 U		5.8	0.824
78-93-3	**Methyl Ethyl Ketone**	**78**		24	5.80
591-78-6	2-Hexanone	12 U		12	2.62
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.69
67-64-1	**Acetone**	**77**	B,Z	24	5.80
71-43-2	Benzene	5.8 U		5.8	0.611
74-97-5	Bromochloromethane	5.8 U		5.8	0.883
75-27-4	Dichlorobromomethane	5.8 U		5.8	0.581
75-25-2	Bromoform	5.8 U		5.8	0.670
74-83-9	Bromomethane	5.8 U		5.8	1.74
75-15-0	Carbon Disulfide	5.8 U		5.8	1.68
56-23-5	Carbon Tetrachloride	5.8 U		5.8	0.541
108-90-7	Chlorobenzene	5.8 U		5.8	0.767
75-00-3	Chloroethane	5.8 U	UJ,C	5.8	1.57
67-66-3	Chloroform	5.8 U		5.8	0.517

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 08:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**FSB3A**	QC Batch:	90044 -113
Sample #:	**344922**	Anal. Batch:	208041
Matrix:	Soil	Percent Solids:	86
Unit:	ug/kg dry	Dilution Factor:	1.16

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	5.8 U		5.8	0.967
110-82-7	Cyclohexane	12 U		12	0.367
10061-01-5	cis-1,3-Dichloropropene	5.8 U		5.8	0.570
10061-02-6	trans-1,3-Dichloropropene	5.8 U		5.8	0.604
75-71-8	Dichlorodifluoromethane	5.8 U		5.8	0.775
124-48-1	Chlorodibromomethane	5.8 U		5.8	0.600
100-41-4	Ethylbenzene	5.8 U		5.8	0.491
98-82-8	Isopropylbenzene	5.8 U		5.8	0.633
79-20-9	Methyl Acetate	24 U	UJ,c	24	4.03
108-87-2	Methylcyclohexane	12 U		12	0.980
1634-04-4	Methyl(tert)butyl Ether	5.8 U		5.8	0.744
75-09-2	**Methylene Chloride**	**3.4 J**	J,c	24	3.26
100-42-5	Styrene	5.8 U		5.8	0.513
127-18-4	Tetrachloroethene	5.8 U		5.8	0.711
108-88-3	Toluene	5.8 U		5.8	0.538
79-01-6	Trichloroethene	5.8 U		5.8	0.785
75-69-4	Trichlorofluoromethane	5.8 U		5.8	0.862
75-01-4	Vinyl Chloride	5.8 U		5.8	0.429
1330-20-7	Xylene (Total)	5.8 U		5.8	0.488

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 08:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**FSB3A**	QC Batch:	90044 -113
Sample #:	**344922**	Anal. Batch:	208041
Matrix:	Soil	Percent Solids:	86
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 08:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**FSB3B**	QC Batch:	90044 -113
Sample #:	**344923**	Anal. Batch:	208041
Matrix:	Soil	Percent Solids:	90
Unit:	ug/kg dry	Dilution Factor:	1.11

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	5.6 U		5.6	0.473
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.6 U		5.6	0.842
79-34-5	1,1,2,2-Tetrachloroethane	5.6 U		5.6	0.725
79-00-5	1,1,2-Trichloroethane	5.6 U		5.6	0.658
75-34-3	1,1-Dichloroethane	5.6 U		5.6	0.804
75-35-4	1,1-Dichloroethylene	5.6 U		5.6	0.814
106-93-4	1,2-Dibromoethane	5.6 U		5.6	0.760
96-12-8	1,2-Dibromo-3-chloropropane	11 U		11	2.31
95-50-1	1,2-Dichlorobenzene	5.6 U		5.6	0.537
107-06-2	1,2-Dichloroethane	5.6 U		5.6	0.478
156-59-2	cis-1,2-Dichloroethene	5.6 U		5.6	0.788
156-60-5	trans-1,2-Dichloroethene	5.6 U		5.6	0.780
78-87-5	1,2-Dichloropropane	5.6 U		5.6	0.650
87-61-6	1,2,3-Trichlorobenzene	5.6 U		5.6	0.604
120-82-1	1,2,4-Trichlorobenzene	5.6 U		5.6	0.455
541-73-1	1,3-Dichlorobenzene	5.6 U		5.6	0.297
106-46-7	1,4-Dichlorobenzene	5.6 U		5.6	0.788
78-93-3	**Methyl Ethyl Ketone**	**58**		22	5.55
591-78-6	2-Hexanone	11 U		11	2.51
108-10-1	4-Methyl-2-Pentanone	11 U		11	1.62
67-64-1	**Acetone**	**71**	B,Z	22	5.55
71-43-2	Benzene	5.6 U		5.6	0.585
74-97-5	Bromochloromethane	5.6 U		5.6	0.845
75-27-4	Dichlorobromomethane	5.6 U		5.6	0.556
75-25-2	Bromoform	5.6 U		5.6	0.642
74-83-9	Bromomethane	5.6 U		5.6	1.67
75-15-0	Carbon Disulfide	5.6 U		5.6	1.61
56-23-5	Carbon Tetrachloride	5.6 U		5.6	0.517
108-90-7	Chlorobenzene	5.6 U		5.6	0.734
75-00-3	Chloroethane	5.6 U	VJ,C	5.6	1.50
67-66-3	Chloroform	5.6 U		5.6	0.495

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 08:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**FSB3B**	QC Batch:	90044 -113
Sample #:	**344923**	Anal. Batch:	208041
Matrix:	Soil	Percent Solids:	90
Unit:	ug/kg dry	Dilution Factor:	1.11

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	5.6 U		5.6	0.926
110-82-7	Cyclohexane	11 U		11	0.351
10061-01-5	cis-1,3-Dichloropropene	5.6 U		5.6	0.545
10061-02-6	trans-1,3-Dichloropropene	5.6 U		5.6	0.578
75-71-8	Dichlorodifluoromethane	5.6 U		5.6	0.741
124-48-1	Chlorodibromomethane	5.6 U		5.6	0.574
100-41-4	Ethylbenzene	5.6 U		5.6	0.470
98-82-8	Isopropylbenzene	5.6 U		5.6	0.606
79-20-9	Methyl Acetate	22 U	UJ,c	22	3.85
108-87-2	Methylcyclohexane	11 U		11	0.938
1634-04-4	Methyl(tert)butyl Ether	5.6 U		5.6	0.712
75-09-2	**Methylene Chloride**	**4.2 J**	J,c	22	3.12
100-42-5	Styrene	5.6 U		5.6	0.491
127-18-4	Tetrachloroethene	5.6 U		5.6	0.680
108-88-3	Toluene	5.6 U		5.6	0.515
79-01-6	Trichloroethene	5.6 U		5.6	0.751
75-69-4	Trichlorofluoromethane	5.6 U		5.6	0.825
75-01-4	Vinyl Chloride	5.6 U		5.6	0.411
1330-20-7	Xylene (Total)	5.6 U		5.6	0.467

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 08:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**FSB3B**	QC Batch:	90044 -113
Sample #:	**344923**	Anal. Batch:	208041
Matrix:	Soil	Percent Solids:	90
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 08:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**FSB3C**	QC Batch:	90044 -113
Sample #:	**344924**	Anal. Batch:	208041
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.41

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	7.0 U		7.0	0.601
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	7.0 U		7.0	1.07
79-34-5	1,1,2,2-Tetrachloroethane	7.0 U		7.0	0.921
79-00-5	1,1,2-Trichloroethane	7.0 U		7.0	0.836
75-34-3	1,1-Dichloroethane	7.0 U		7.0	1.02
75-35-4	1,1-Dichloroethylene	7.0 U		7.0	1.03
106-93-4	1,2-Dibromoethane	7.0 U		7.0	0.966
96-12-8	1,2-Dibromo-3-chloropropane	14 U		14	2.93
95-50-1	1,2-Dichlorobenzene	7.0 U		7.0	0.682
107-06-2	1,2-Dichloroethane	7.0 U		7.0	0.608
156-59-2	cis-1,2-Dichloroethene	7.0 U		7.0	1.00
156-60-5	trans-1,2-Dichloroethene	7.0 U		7.0	0.991
78-87-5	1,2-Dichloropropane	7.0 U		7.0	0.826
87-61-6	1,2,3-Trichlorobenzene	7.0 U		7.0	0.767
120-82-1	1,2,4-Trichlorobenzene	7.0 U		7.0	0.578
541-73-1	1,3-Dichlorobenzene	7.0 U		7.0	0.378
106-46-7	1,4-Dichlorobenzene	7.0 U		7.0	1.00
78-93-3	**Methyl Ethyl Ketone**	**150**		28	7.05
591-78-6	**2-Hexanone**	**19**		14	3.19
108-10-1	4-Methyl-2-Pentanone	14 U		14	2.06
67-64-1	**Acetone**	**290**	J,c	28	7.05
71-43-2	Benzene	7.0 U		7.0	0.743
74-97-5	Bromochloromethane	7.0 U		7.0	1.07
75-27-4	Dichlorobromomethane	7.0 U		7.0	0.706
75-25-2	Bromoform	7.0 U		7.0	0.815
74-83-9	Bromomethane	7.0 U		7.0	2.12
75-15-0	Carbon Disulfide	7.0 U		7.0	2.04
56-23-5	Carbon Tetrachloride	7.0 U		7.0	0.657
108-90-7	Chlorobenzene	7.0 U		7.0	0.932
75-00-3	Chloroethane	7.0 U	UJ,c	7.0	1.90
67-66-3	Chloroform	7.0 U		7.0	0.629

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 08:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**FSB3C**	QC Batch:	90044 -113
Sample #:	**344924**	Anal. Batch:	208041
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.41

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	7.0 U		7.0	1.18
110-82-7	Cyclohexane	14 U		14	0.446
10061-01-5	cis-1,3-Dichloropropene	7.0 U		7.0	0.692
10061-02-6	trans-1,3-Dichloropropene	7.0 U		7.0	0.735
75-71-8	Dichlorodifluoromethane	7.0 U		7.0	0.942
124-48-1	Chlorodibromomethane	7.0 U		7.0	0.729
100-41-4	Ethylbenzene	7.0 U		7.0	0.596
98-82-8	Isopropylbenzene	7.0 U		7.0	0.770
79-20-9	Methyl Acetate	28 U	UJ,c	28	4.89
108-87-2	Methylcyclohexane	14 U		14	1.19
1634-04-4	Methyl(tert)butyl Ether	7.0 U		7.0	0.904
75-09-2	**Methylene Chloride**	**5.9 J**	J,c	28	3.96
100-42-5	Styrene	7.0 U		7.0	0.623
127-18-4	Tetrachloroethene	7.0 U		7.0	0.864
108-88-3	Toluene	7.0 U		7.0	0.654
79-01-6	Trichloroethene	7.0 U		7.0	0.955
75-69-4	Trichlorofluoromethane	7.0 U		7.0	1.05
75-01-4	Vinyl Chloride	7.0 U		7.0	0.522
1330-20-7	Xylene (Total)	7.0 U		7.0	0.594

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 08:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**FSB3C**	QC Batch:	90044 -113
Sample #:	**344924**	Anal. Batch:	208041
Matrix:	Soil	Percent Solids:	71
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
Butanal	123-72-8	14	E NJ,+
Hexanal	66-25-1	49	E NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**46SB1A**	QC Batch:	90037 -115
Sample #:	**344925**	Anal. Batch:	207752
Matrix:	Soil	Percent Solids:	83
Unit:	ug/kg dry	Dilution Factor:	1

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	60 U		60	7.10
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	60 U		60	8.95
79-34-5	1,1,2,2-Tetrachloroethane	60 U		60	7.40
79-00-5	1,1,2-Trichloroethane	60 U		60	7.10
75-34-3	1,1-Dichloroethane	60 U		60	2.85
75-35-4	1,1-Dichloroethylene	60 U		60	6.65
106-93-4	1,2-Dibromoethane	60 U		60	8.55
96-12-8	1,2-Dibromo-3-chloropropane	120 U		120	13.5
95-50-1	1,2-Dichlorobenzene	60 U		60	8.20
107-06-2	1,2-Dichloroethane	60 U		60	5.55
156-59-2	cis-1,2-Dichloroethene	60 U		60	6.95
156-60-5	trans-1,2-Dichloroethene	60 U		60	7.15
78-87-5	1,2-Dichloropropane	60 U		60	12.8
87-61-6	1,2,3-Trichlorobenzene	60 U		60	11.4
120-82-1	1,2,4-Trichlorobenzene	60 U		60	9.45
541-73-1	1,3-Dichlorobenzene	60 U		60	8.00
106-46-7	1,4-Dichlorobenzene	60 U		60	6.20
78-93-3	**Methyl Ethyl Ketone**	**140 J**		600	20.8
591-78-6	2-Hexanone	600 U		600	22.8
108-10-1	4-Methyl-2-Pentanone	600 U		600	18.2
67-64-1	***Acetone**	**870**	B,Z	600	53.5
71-43-2	Benzene	60 U		60	1.08
74-97-5	Bromochloromethane	60 U		60	3.79
75-27-4	Dichlorobromomethane	60 U		60	21.6
75-25-2	Bromoform	60 U		60	5.50
74-83-9	Bromomethane	60 U		60	13.4
75-15-0	Carbon Disulfide	60 U	UJ,C	60	2.97
56-23-5	Carbon Tetrachloride	60 U		60	5.75
108-90-7	Chlorobenzene	60 U		60	7.85
75-00-3	Chloroethane	60 U		60	9.00
67-66-3	Chloroform	60 U		60	5.05

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**46SB1A**	QC Batch:	90037 -115
Sample #:	**344925**	Anal. Batch:	207752
Matrix:	Soil	Percent Solids:	83
Unit:	ug/kg dry	Dilution Factor:	1

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	60 U	60	5.15
110-82-7	Cyclohexane	600 U	600	10.8
10061-01-5	cis-1,3-Dichloropropene	60 U	60	9.45
10061-02-6	trans-1,3-Dichloropropene	60 U	60	5.85
75-71-8	Dichlorodifluoromethane	60 U	60	6.00
124-48-1	Chlorodibromomethane	60 U	60	5.40
100-41-4	Ethylbenzene	60 U	60	9.75
98-82-8	Isopropylbenzene	60 U	60	4.51
79-20-9	Methyl Acetate	600 U	600	11.6
108-87-2	Methylcyclohexane	600 U	600	8.40
1634-04-4	**Methyl(tert)butyl Ether**	**7.8 J**	60	3.85
75-09-2	Methylene Chloride	60 U	60	5.85
100-42-5	Styrene	60 U	60	6.85
127-18-4	Tetrachloroethene	60 U	60	9.65
108-88-3	Toluene	60 U	60	10.7
79-01-6	Trichloroethene	60 U	60	10.6
75-69-4	Trichlorofluoromethane	60 U	60	2.54
75-01-4	Vinyl Chloride	60 U	60	5.95
1330-20-7	Xylene (Total)	60 U	60	26.5

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**46SB1A**	QC Batch:	90037 -115
Sample #:	**344925**	Anal. Batch:	207752
Matrix:	Soil	Percent Solids:	83
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**46SB1B**	QC Batch:	90044 -213
Sample #:	**344926**	Anal. Batch:	208004
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.32

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.6 U		6.6	0.562
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.6 U		6.6	1.00
79-34-5	1,1,2,2-Tetrachloroethane	6.6 U		6.6	0.862
79-00-5	1,1,2-Trichloroethane	6.6 U		6.6	0.783
75-34-3	1,1-Dichloroethane	6.6 U		6.6	0.956
75-35-4	1,1-Dichloroethylene	6.6 U		6.6	0.968
106-93-4	1,2-Dibromoethane	6.6 U		6.6	0.904
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	2.75
95-50-1	1,2-Dichlorobenzene	6.6 U		6.6	0.639
107-06-2	1,2-Dichloroethane	6.6 U		6.6	0.569
156-59-2	cis-1,2-Dichloroethene	6.6 U		6.6	0.937
156-60-5	trans-1,2-Dichloroethene	6.6 U		6.6	0.928
78-87-5	1,2-Dichloropropane	6.6 U		6.6	0.774
87-61-6	1,2,3-Trichlorobenzene	6.6 U		6.6	0.718
120-82-1	1,2,4-Trichlorobenzene	6.6 U		6.6	0.541
541-73-1	1,3-Dichlorobenzene	6.6 U		6.6	0.354
106-46-7	1,4-Dichlorobenzene	6.6 U		6.6	0.937
78-93-3	**Methyl Ethyl Ketone**	**55**		26	6.60
591-78-6	2-Hexanone	13 U		13	2.98
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.93
67-64-1	**Acetone**	**98**	J,C	26	6.60
71-43-2	Benzene	6.6 U		6.6	0.696
74-97-5	Bromochloromethane	6.6 U		6.6	1.00
75-27-4	Dichlorobromomethane	6.6 U		6.6	0.661
75-25-2	Bromoform	6.6 U		6.6	0.763
74-83-9	Bromomethane	6.6 U		6.6	1.98
75-15-0	Carbon Disulfide	6.6 U		6.6	1.91
56-23-5	Carbon Tetrachloride	6.6 U		6.6	0.615
108-90-7	Chlorobenzene	6.6 U		6.6	0.873
75-00-3	Chloroethane	6.6 U		6.6	1.78
67-66-3	Chloroform	6.6 U		6.6	0.589

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**46SB1B**	QC Batch:	90044 -213
Sample #:	**344926**	Anal. Batch:	208004
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.32

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.6 U		6.6	1.10
110-82-7	Cyclohexane	13 U		13	0.417
10061-01-5	cis-1,3-Dichloropropene	6.6 U		6.6	0.648
10061-02-6	trans-1,3-Dichloropropene	6.6 U		6.6	0.688
75-71-8	Dichlorodifluoromethane	6.6 U		6.6	0.882
124-48-1	Chlorodibromomethane	6.6 U		6.6	0.682
100-41-4	Ethylbenzene	6.6 U		6.6	0.558
98-82-8	Isopropylbenzene	6.6 U		6.6	0.721
79-20-9	Methyl Acetate	26 U	VJ,c	26	4.58
108-87-2	Methylcyclohexane	13 U		13	1.12
1634-04-4	Methyl(tert)butyl Ether	6.6 U		6.6	0.846
75-09-2	**Methylene Chloride**	**4.1 J**	B,z	26	3.71
100-42-5	Styrene	6.6 U		6.6	0.583
127-18-4	Tetrachloroethene	6.6 U		6.6	0.809
108-88-3	Toluene	6.6 U		6.6	0.612
79-01-6	Trichloroethene	6.6 U		6.6	0.894
75-69-4	Trichlorofluoromethane	6.6 U		6.6	0.981
75-01-4	Vinyl Chloride	6.6 U		6.6	0.488
1330-20-7	Xylene (Total)	6.6 U		6.6	0.556

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**46SB1B**	QC Batch:	90044 -213
Sample #:	**344926**	Anal. Batch:	208004
Matrix:	Soil	Percent Solids:	76
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**46SB1C**	QC Batch:	90044 -213
Sample #:	**344927**	Anal. Batch:	208004
Matrix:	Soil	Percent Solids:	68
Unit:	ug/kg dry	Dilution Factor:	1.47

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	7.4 U		7.4	0.626
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	7.4 U		7.4	1.12
79-34-5	1,1,2,2-Tetrachloroethane	7.4 U		7.4	0.960
79-00-5	1,1,2-Trichloroethane	7.4 U		7.4	0.872
75-34-3	1,1-Dichloroethane	7.4 U		7.4	1.06
75-35-4	1,1-Dichloroethylene	7.4 U		7.4	1.08
106-93-4	1,2-Dibromoethane	7.4 U		7.4	1.01
96-12-8	1,2-Dibromo-3-chloropropane	15 U		15	3.06
95-50-1	1,2-Dichlorobenzene	7.4 U		7.4	0.711
107-06-2	1,2-Dichloroethane	7.4 U		7.4	0.634
156-59-2	cis-1,2-Dichloroethene	7.4 U		7.4	1.04
156-60-5	trans-1,2-Dichloroethene	7.4 U		7.4	1.03
78-87-5	1,2-Dichloropropane	7.4 U		7.4	0.861
87-61-6	1,2,3-Trichlorobenzene	7.4 U		7.4	0.800
120-82-1	1,2,4-Trichlorobenzene	7.4 U		7.4	0.603
541-73-1	1,3-Dichlorobenzene	7.4 U		7.4	0.394
106-46-7	1,4-Dichlorobenzene	7.4 U		7.4	1.04
78-93-3	**Methyl Ethyl Ketone**	**100**		30	7.35
591-78-6	2-Hexanone	15 U		15	3.32
108-10-1	4-Methyl-2-Pentanone	15 U		15	2.15
67-64-1	**Acetone**	**150**	J,C	30	7.35
71-43-2	Benzene	7.4 U		7.4	0.775
74-97-5	Bromochloromethane	7.4 U		7.4	1.12
75-27-4	Dichlorobromomethane	7.4 U		7.4	0.736
75-25-2	Bromoform	7.4 U		7.4	0.850
74-83-9	Bromomethane	7.4 U		7.4	2.21
75-15-0	Carbon Disulfide	7.4 U		7.4	2.13
56-23-5	Carbon Tetrachloride	7.4 U		7.4	0.685
108-90-7	Chlorobenzene	7.4 U		7.4	0.972
75-00-3	Chloroethane	7.4 U		7.4	1.98
67-66-3	Chloroform	7.4 U		7.4	0.656

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:50
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/02/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/14/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**46SB1C**	QC Batch:	90044 -213
Sample #:	**344927**	Anal. Batch:	208004
Matrix:	Soil	Percent Solids:	68
Unit:	ug/kg dry	Dilution Factor:	1.47

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	7.4 U		7.4	1.23
110-82-7	Cyclohexane	15 U		15	0.465
10061-01-5	cis-1,3-Dichloropropene	7.4 U		7.4	0.722
10061-02-6	trans-1,3-Dichloropropene	7.4 U		7.4	0.766
75-71-8	Dichlorodifluoromethane	7.4 U		7.4	0.982
124-48-1	Chlorodibromomethane	7.4 U		7.4	0.760
100-41-4	Ethylbenzene	7.4 U		7.4	0.622
98-82-8	Isopropylbenzene	7.4 U		7.4	0.803
79-20-9	Methyl Acetate	30 U	VJ,c	30	5.10
108-87-2	Methylcyclohexane	15 U		15	1.24
1634-04-4	Methyl(tert)butyl Ether	7.4 U		7.4	0.942
75-09-2	**Methylene Chloride**	**5.0 J**	B,z	30	4.13
100-42-5	Styrene	7.4 U		7.4	0.650
127-18-4	Tetrachloroethene	7.4 U		7.4	0.901
108-88-3	Toluene	7.4 U		7.4	0.682
79-01-6	Trichloroethene	7.4 U		7.4	0.995
75-69-4	Trichlorofluoromethane	7.4 U		7.4	1.09
75-01-4	Vinyl Chloride	7.4 U		7.4	0.544
1330-20-7	Xylene (Total)	7.4 U		7.4	0.619

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**46SB1C**	QC Batch:	90044 -213
Sample #:	**344927**	Anal. Batch:	208004
Matrix:	Soil	Percent Solids:	68
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 13:25
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**46SB2A**	QC Batch:	90044 -114
Sample #:	**344928**	Anal. Batch:	208007
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.19

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.0 U		6.0	0.507
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.0 U		6.0	0.903
79-34-5	1,1,2,2-Tetrachloroethane	6.0 U		6.0	0.777
79-00-5	1,1,2-Trichloroethane	6.0 U		6.0	0.706
75-34-3	1,1-Dichloroethane	6.0 U		6.0	0.862
75-35-4	1,1-Dichloroethylene	6.0 U		6.0	0.872
106-93-4	1,2-Dibromoethane	6.0 U		6.0	0.815
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.48
95-50-1	1,2-Dichlorobenzene	6.0 U		6.0	0.576
107-06-2	1,2-Dichloroethane	6.0 U		6.0	0.513
156-59-2	cis-1,2-Dichloroethene	6.0 U		6.0	0.845
156-60-5	trans-1,2-Dichloroethene	6.0 U		6.0	0.837
78-87-5	1,2-Dichloropropane	6.0 U		6.0	0.697
87-61-6	1,2,3-Trichlorobenzene	6.0 U		6.0	0.647
120-82-1	1,2,4-Trichlorobenzene	6.0 U		6.0	0.488
541-73-1	1,3-Dichlorobenzene	6.0 U		6.0	0.319
106-46-7	1,4-Dichlorobenzene	6.0 U		6.0	0.845
78-93-3	**Methyl Ethyl Ketone**	**71**		24	5.95
591-78-6	2-Hexanone	12 U		12	2.69
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.74
67-64-1	**Acetone**	**160**	J,C	24	5.95
71-43-2	Benzene	6.0 U		6.0	0.627
74-97-5	Bromochloromethane	6.0 U		6.0	0.906
75-27-4	Dichlorobromomethane	6.0 U		6.0	0.596
75-25-2	Bromoform	6.0 U		6.0	0.688
74-83-9	Bromomethane	6.0 U		6.0	1.79
75-15-0	Carbon Disulfide	6.0 U		6.0	1.73
56-23-5	Carbon Tetrachloride	6.0 U		6.0	0.555
108-90-7	Chlorobenzene	6.0 U		6.0	0.787
75-00-3	Chloroethane	6.0 U		6.0	1.61
67-66-3	Chloroform	6.0 U		6.0	0.531

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 13:25
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**46SB2A**	QC Batch:	90044 -114
Sample #:	**344928**	Anal. Batch:	208007
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.19

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.0 U		6.0	0.992
110-82-7	Cyclohexane	12 U		12	0.376
10061-01-5	cis-1,3-Dichloropropene	6.0 U		6.0	0.584
10061-02-6	trans-1,3-Dichloropropene	6.0 U		6.0	0.620
75-71-8	Dichlorodifluoromethane	6.0 U		6.0	0.795
124-48-1	Chlorodibromomethane	6.0 U		6.0	0.615
100-41-4	Ethylbenzene	6.0 U		6.0	0.503
98-82-8	Isopropylbenzene	6.0 U		6.0	0.650
79-20-9	Methyl Acetate	24 U	UJ,C	24	4.13
108-87-2	Methylcyclohexane	12 U		12	1.01
1634-04-4	Methyl(tert)butyl Ether	6.0 U		6.0	0.763
75-09-2	Methylene Chloride	24 U	UJ,C	24	3.34
100-42-5	Styrene	6.0 U		6.0	0.526
127-18-4	Tetrachloroethene	6.0 U		6.0	0.729
108-88-3	Toluene	6.0 U		6.0	0.552
79-01-6	**Trichloroethene**	**23**		6.0	0.806
75-69-4	Trichlorofluoromethane	6.0 U		6.0	0.884
75-01-4	Vinyl Chloride	6.0 U		6.0	0.440
1330-20-7	Xylene (Total)	6.0 U		6.0	0.501

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 13:25
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**46SB2A**	QC Batch:	90044 -114
Sample #:	**344928**	Anal. Batch:	208007
Matrix:	Soil	Percent Solids:	84
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
Butanal	123-72-8	7.0	E	NJ,+
Hexanal	66-25-1	30	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 13:40
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**46SB2B**	QC Batch:	90044 -114
Sample #:	**344929**	Anal. Batch:	208007
Matrix:	Soil	Percent Solids:	81
Unit:	ug/kg dry	Dilution Factor:	1.23

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.2 U		6.2	0.524
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.2 U		6.2	0.934
79-34-5	1,1,2,2-Tetrachloroethane	6.2 U		6.2	0.803
79-00-5	1,1,2-Trichloroethane	6.2 U		6.2	0.729
75-34-3	1,1-Dichloroethane	6.2 U		6.2	0.891
75-35-4	1,1-Dichloroethylene	6.2 U		6.2	0.902
106-93-4	1,2-Dibromoethane	6.2 U		6.2	0.843
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.56
95-50-1	1,2-Dichlorobenzene	6.2 U		6.2	0.595
107-06-2	1,2-Dichloroethane	6.2 U		6.2	0.530
156-59-2	**cis-1,2-Dichloroethene**	**1.6 J**		6.2	0.873
156-60-5	trans-1,2-Dichloroethene	6.2 U		6.2	0.865
78-87-5	1,2-Dichloropropane	6.2 U		6.2	0.721
87-61-6	1,2,3-Trichlorobenzene	6.2 U		6.2	0.669
120-82-1	1,2,4-Trichlorobenzene	6.2 U		6.2	0.504
541-73-1	1,3-Dichlorobenzene	6.2 U		6.2	0.330
106-46-7	1,4-Dichlorobenzene	6.2 U		6.2	0.873
78-93-3	**Methyl Ethyl Ketone**	**61**		24	6.15
591-78-6	2-Hexanone	12 U		12	2.78
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.80
67-64-1	**Acetone**	**89**	B,Z	24	6.15
71-43-2	Benzene	6.2 U		6.2	0.648
74-97-5	Bromochloromethane	6.2 U		6.2	0.936
75-27-4	Dichlorobromomethane	6.2 U		6.2	0.616
75-25-2	Bromoform	6.2 U		6.2	0.711
74-83-9	Bromomethane	6.2 U		6.2	1.85
75-15-0	Carbon Disulfide	6.2 U		6.2	1.78
56-23-5	Carbon Tetrachloride	6.2 U		6.2	0.573
108-90-7	Chlorobenzene	6.2 U		6.2	0.813
75-00-3	Chloroethane	6.2 U		6.2	1.66
67-66-3	Chloroform	6.2 U		6.2	0.549

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 13:40
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**46SB2B**	QC Batch:	90044 -114
Sample #:	**344929**	Anal. Batch:	208007
Matrix:	Soil	Percent Solids:	81
Unit:	ug/kg dry	Dilution Factor:	1.23

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.2 U		6.2	1.03
110-82-7	Cyclohexane	12 U		12	0.389
10061-01-5	cis-1,3-Dichloropropene	6.2 U		6.2	0.604
10061-02-6	trans-1,3-Dichloropropene	6.2 U		6.2	0.641
75-71-8	Dichlorodifluoromethane	6.2 U		6.2	0.822
124-48-1	Chlorodibromomethane	6.2 U		6.2	0.636
100-41-4	Ethylbenzene	6.2 U		6.2	0.520
98-82-8	Isopropylbenzene	6.2 U		6.2	0.672
79-20-9	Methyl Acetate	24 U	UJ,c	24	4.27
108-87-2	Methylcyclohexane	12 U		12	1.04
1634-04-4	Methyl(tert)butyl Ether	6.2 U		6.2	0.788
75-09-2	**Methylene Chloride**	**3.6 J**	J,c	24	3.46
100-42-5	Styrene	6.2 U		6.2	0.544
127-18-4	Tetrachloroethene	6.2 U		6.2	0.754
108-88-3	Toluene	6.2 U		6.2	0.571
79-01-6	**Trichloroethene**	**3.4 J**		6.2	0.833
75-69-4	Trichlorofluoromethane	6.2 U		6.2	0.914
75-01-4	Vinyl Chloride	6.2 U		6.2	0.455
1330-20-7	Xylene (Total)	6.2 U		6.2	0.518

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 13:40
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**46SB2B**	QC Batch:	90044 -114
Sample #:	**344929**	Anal. Batch:	208007
Matrix:	Soil	Percent Solids:	81
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 13:50
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/02/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/14/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**46SB2C**	QC Batch:	90044 -114
Sample #:	**344930**	Anal. Batch:	208007
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	1.49

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	7.5 U		7.5	0.635
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	7.5 U		7.5	1.13
79-34-5	1,1,2,2-Tetrachloroethane	7.5 U		7.5	0.973
79-00-5	1,1,2-Trichloroethane	7.5 U		7.5	0.884
75-34-3	1,1-Dichloroethane	7.5 U		7.5	1.08
75-35-4	1,1-Dichloroethylene	7.5 U		7.5	1.09
106-93-4	1,2-Dibromoethane	7.5 U		7.5	1.02
96-12-8	1,2-Dibromo-3-chloropropane	15 U		15	3.10
95-50-1	1,2-Dichlorobenzene	7.5 U		7.5	0.721
107-06-2	1,2-Dichloroethane	7.5 U		7.5	0.642
156-59-2	cis-1,2-Dichloroethene	7.5 U		7.5	1.06
156-60-5	trans-1,2-Dichloroethene	7.5 U		7.5	1.05
78-87-5	1,2-Dichloropropane	7.5 U		7.5	0.873
87-61-6	1,2,3-Trichlorobenzene	7.5 U		7.5	0.811
120-82-1	1,2,4-Trichlorobenzene	7.5 U		7.5	0.611
541-73-1	1,3-Dichlorobenzene	7.5 U		7.5	0.399
106-46-7	1,4-Dichlorobenzene	7.5 U		7.5	1.06
78-93-3	**Methyl Ethyl Ketone**	**76**		30	7.45
591-78-6	2-Hexanone	15 U		15	3.37
108-10-1	4-Methyl-2-Pentanone	15 U		15	2.18
67-64-1	**Acetone**	**80**	B,Z	30	7.45
71-43-2	Benzene	7.5 U		7.5	0.785
74-97-5	Bromochloromethane	7.5 U		7.5	1.13
75-27-4	Dichlorobromomethane	7.5 U		7.5	0.746
75-25-2	Bromoform	7.5 U		7.5	0.861
74-83-9	Bromomethane	7.5 U		7.5	2.24
75-15-0	Carbon Disulfide	7.5 U		7.5	2.16
56-23-5	Carbon Tetrachloride	7.5 U		7.5	0.694
108-90-7	Chlorobenzene	7.5 U		7.5	0.985
75-00-3	Chloroethane	7.5 U		7.5	2.01
67-66-3	Chloroform	7.5 U		7.5	0.665

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 13:50
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/02/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/14/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**46SB2C**	QC Batch:	90044 -114
Sample #:	**344930**	Anal. Batch:	208007
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	1.49

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	7.5 U		7.5	1.24
110-82-7	Cyclohexane	15 U		15	0.471
10061-01-5	cis-1,3-Dichloropropene	7.5 U		7.5	0.732
10061-02-6	trans-1,3-Dichloropropene	7.5 U		7.5	0.776
75-71-8	Dichlorodifluoromethane	7.5 U		7.5	0.995
124-48-1	Chlorodibromomethane	7.5 U		7.5	0.770
100-41-4	Ethylbenzene	7.5 U		7.5	0.630
98-82-8	Isopropylbenzene	7.5 U		7.5	0.814
79-20-9	Methyl Acetate	30 U	UJ,c	30	5.17
108-87-2	Methylcyclohexane	15 U		15	1.26
1634-04-4	Methyl(tert)butyl Ether	7.5 U		7.5	0.955
75-09-2	**Methylene Chloride**	**4.4 J**	J,c	30	4.19
100-42-5	Styrene	7.5 U		7.5	0.659
127-18-4	Tetrachloroethene	7.5 U		7.5	0.913
108-88-3	Toluene	7.5 U		7.5	0.691
79-01-6	Trichloroethene	7.5 U		7.5	1.01
75-69-4	Trichlorofluoromethane	7.5 U		7.5	1.11
75-01-4	Vinyl Chloride	7.5 U		7.5	0.551
1330-20-7	Xylene (Total)	7.5 U		7.5	0.627

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 13:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**46SB2C**	QC Batch:	90044 -114
Sample #:	**344930**	Anal. Batch:	208007
Matrix:	Soil	Percent Solids:	67
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD2**	QC Batch:	90044 -114
Sample #:	**344931**	Anal. Batch:	208007
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	1.49

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	7.5 U		7.5	0.635
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	7.5 U		7.5	1.13
79-34-5	1,1,2,2-Tetrachloroethane	7.5 U		7.5	0.973
79-00-5	1,1,2-Trichloroethane	7.5 U		7.5	0.884
75-34-3	1,1-Dichloroethane	7.5 U		7.5	1.08
75-35-4	1,1-Dichloroethylene	7.5 U		7.5	1.09
106-93-4	1,2-Dibromoethane	7.5 U		7.5	1.02
96-12-8	1,2-Dibromo-3-chloropropane	15 U		15	3.10
95-50-1	1,2-Dichlorobenzene	7.5 U		7.5	0.721
107-06-2	1,2-Dichloroethane	7.5 U		7.5	0.642
156-59-2	cis-1,2-Dichloroethene	7.5 U		7.5	1.06
156-60-5	trans-1,2-Dichloroethene	7.5 U		7.5	1.05
78-87-5	1,2-Dichloropropane	7.5 U		7.5	0.873
87-61-6	1,2,3-Trichlorobenzene	7.5 U		7.5	0.811
120-82-1	1,2,4-Trichlorobenzene	7.5 U		7.5	0.611
541-73-1	1,3-Dichlorobenzene	7.5 U		7.5	0.399
106-46-7	1,4-Dichlorobenzene	7.5 U		7.5	1.06
78-93-3	**Methyl Ethyl Ketone**	**79**		30	7.45
591-78-6	2-Hexanone	15 U		15	3.37
108-10-1	4-Methyl-2-Pentanone	15 U		15	2.18
67-64-1	**Acetone**	**91**	B,Z	30	7.45
71-43-2	Benzene	7.5 U		7.5	0.785
74-97-5	Bromochloromethane	7.5 U		7.5	1.13
75-27-4	Dichlorobromomethane	7.5 U		7.5	0.746
75-25-2	Bromoform	7.5 U		7.5	0.861
74-83-9	Bromomethane	7.5 U		7.5	2.24
75-15-0	Carbon Disulfide	7.5 U		7.5	2.16
56-23-5	Carbon Tetrachloride	7.5 U		7.5	0.694
108-90-7	Chlorobenzene	7.5 U		7.5	0.985
75-00-3	Chloroethane	7.5 U		7.5	2.01
67-66-3	Chloroform	7.5 U		7.5	0.665

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD2**	QC Batch:	90044 -114
Sample #:	**344931**	Anal. Batch:	208007
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	1.49

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	7.5 U		7.5	1.24
110-82-7	Cyclohexane	15 U		15	0.471
10061-01-5	cis-1,3-Dichloropropene	7.5 U		7.5	0.732
10061-02-6	trans-1,3-Dichloropropene	7.5 U		7.5	0.776
75-71-8	Dichlorodifluoromethane	7.5 U		7.5	0.995
124-48-1	Chlorodibromomethane	7.5 U		7.5	0.770
100-41-4	Ethylbenzene	7.5 U		7.5	0.630
98-82-8	Isopropylbenzene	7.5 U		7.5	0.814
79-20-9	Methyl Acetate	30 U	UJ,C	30	5.17
108-87-2	Methylcyclohexane	15 U		15	1.26
1634-04-4	Methyl(tert)butyl Ether	7.5 U		7.5	0.955
75-09-2	Methylene Chloride	30 U	UJ,C	30	4.19
100-42-5	Styrene	7.5 U		7.5	0.659
127-18-4	Tetrachloroethene	7.5 U		7.5	0.913
108-88-3	Toluene	7.5 U		7.5	0.691
79-01-6	Trichloroethene	7.5 U		7.5	1.01
75-69-4	Trichlorofluoromethane	7.5 U		7.5	1.11
75-01-4	Vinyl Chloride	7.5 U		7.5	0.551
1330-20-7	Xylene (Total)	7.5 U		7.5	0.627

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD2**	QC Batch:	90044 -114
Sample #:	**344931**	Anal. Batch:	208007
Matrix:	Soil	Percent Solids:	67
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 15:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/02/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/14/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**37SB1A**	QC Batch:	90044 -114
Sample #:	**344932**	Anal. Batch:	208007
Matrix:	Soil	Percent Solids:	61
Unit:	ug/kg dry	Dilution Factor:	1.64

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	8.2 U		8.2	0.699
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	8.2 U		8.2	1.24
79-34-5	1,1,2,2-Tetrachloroethane	8.2 U		8.2	1.07
79-00-5	1,1,2-Trichloroethane	8.2 U		8.2	0.973
75-34-3	1,1-Dichloroethane	8.2 U		8.2	1.19
75-35-4	1,1-Dichloroethylene	8.2 U		8.2	1.20
106-93-4	1,2-Dibromoethane	8.2 U		8.2	1.12
96-12-8	1,2-Dibromo-3-chloropropane	16 U		16	3.41
95-50-1	1,2-Dichlorobenzene	8.2 U		8.2	0.794
107-06-2	1,2-Dichloroethane	8.2 U		8.2	0.707
156-59-2	cis-1,2-Dichloroethene	8.2 U		8.2	1.16
156-60-5	trans-1,2-Dichloroethene	8.2 U		8.2	1.15
78-87-5	1,2-Dichloropropane	8.2 U		8.2	0.961
87-61-6	1,2,3-Trichlorobenzene	8.2 U		8.2	0.892
120-82-1	1,2,4-Trichlorobenzene	8.2 U		8.2	0.672
541-73-1	1,3-Dichlorobenzene	8.2 U		8.2	0.440
106-46-7	1,4-Dichlorobenzene	8.2 U		8.2	1.16
78-93-3	Methyl Ethyl Ketone	32 U		32	8.20
591-78-6	2-Hexanone	16 U		16	3.71
108-10-1	4-Methyl-2-Pentanone	16 U		16	2.39
67-64-1	**Acetone**	**110**	J,C	32	8.20
71-43-2	Benzene	8.2 U		8.2	0.864
74-97-5	Bromochloromethane	8.2 U		8.2	1.25
75-27-4	Dichlorobromomethane	8.2 U		8.2	0.822
75-25-2	Bromoform	8.2 U		8.2	0.948
74-83-9	Bromomethane	8.2 U		8.2	2.46
75-15-0	Carbon Disulfide	8.2 U		8.2	2.38
56-23-5	Carbon Tetrachloride	8.2 U		8.2	0.764
108-90-7	Chlorobenzene	8.2 U		8.2	1.08
75-00-3	Chloroethane	8.2 U		8.2	2.21
67-66-3	Chloroform	8.2 U		8.2	0.731

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 15:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/02/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/14/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**37SB1A**	QC Batch:	90044 -114
Sample #:	**344932**	Anal. Batch:	208007
Matrix:	Soil	Percent Solids:	61
Unit:	ug/kg dry	Dilution Factor:	1.64

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	8.2 U		8.2	1.37
110-82-7	Cyclohexane	16 U		16	0.518
10061-01-5	cis-1,3-Dichloropropene	8.2 U		8.2	0.805
10061-02-6	trans-1,3-Dichloropropene	8.2 U		8.2	0.854
75-71-8	Dichlorodifluoromethane	8.2 U		8.2	1.10
124-48-1	Chlorodibromomethane	8.2 U		8.2	0.848
100-41-4	Ethylbenzene	8.2 U		8.2	0.694
98-82-8	Isopropylbenzene	8.2 U		8.2	0.895
79-20-9	Methyl Acetate	32 U	UJ,c	32	5.69
108-87-2	Methylcyclohexane	16 U		16	1.39
1634-04-4	Methyl(tert)butyl Ether	8.2 U		8.2	1.05
75-09-2	Methylene Chloride	32 U	UJc	32	4.61
100-42-5	Styrene	8.2 U		8.2	0.725
127-18-4	Tetrachloroethene	8.2 U		8.2	1.01
108-88-3	Toluene	8.2 U		8.2	0.761
79-01-6	Trichloroethene	8.2 U		8.2	1.11
75-69-4	Trichlorofluoromethane	8.2 U		8.2	1.22
75-01-4	Vinyl Chloride	8.2 U		8.2	0.607
1330-20-7	Xylene (Total)	8.2 U		8.2	0.690

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**37SB1A**	QC Batch:	90044 -114
Sample #:	**344932**	Anal. Batch:	208007
Matrix:	Soil	Percent Solids:	61
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB1A**	QC Batch:	89845 -109
Sample #:	**344823**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	87
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	200 U		200	2.71
95-94-3	1,2,4,5-Tetrachloro-benzene	200 U		200	31.6
108-60-1	Bis (2-Chloroisopropyl)-Ether	200 U		200	1.45
95-95-4	2,4,5-Trichlorophenol	200 U		200	3.67
88-06-2	2,4,6-Trichlorophenol	200 U		200	2.88
120-83-2	2,4-Dichlorophenol	200 U		200	3.87
105-67-9	2,4-Dimethylphenol	200 U		200	8.73
51-28-5	2,4-Dinitrophenol	380 U		380	3.52
121-14-2	2,4-Dinitrotoluene	200 U		200	3.47
606-20-2	2,6-Dinitrotoluene	200 U		200	30.5
91-58-7	2-Chloronaphthalene	200 U		200	2.53
95-57-8	2-Chlorophenol	200 U		200	2.21
91-57-6	2-Methylnaphthalene	200 U		200	3.01
95-48-7	2-Methylphenol	200 U		200	5.32
88-74-4	2-Nitroaniline	200 U		200	5.06
88-75-5	2-Nitrophenol	200 U		200	1.87
91-94-1	3,3'-Dichlorobenzidine	200 U		200	73.4
99-09-2	3-Nitroaniline	200 U		200	36.6
534-52-1	4,6-Dinitro-2-Methylphenol	200 U		200	4.96
101-55-3	4-Bromophenyl Phenylether	200 U		200	3.72
59-50-7	**4-Chloro-3-Methylphenol**	**35 J**	J,S	200	5.73
106-47-8	4-Chloroaniline	200 U		200	1.39
7005-72-3	4-Chlorophenylphenyl-Ether	200 U		200	3.60
106-44-5	4-Methylphenol	200 U		200	7.01
100-01-6	4-Nitroaniline	200 U		200	7.98
100-02-7	4-Nitrophenol	380 U		380	3.11
83-32-9	Acenaphthene	200 U		200	1.89
208-96-8	Acenaphthylene	200 U		200	1.65
98-86-2	Acetophenone	200 U		200	2.09

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB1A**	QC Batch:	89845 -109
Sample #:	**344823**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	87
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	200 U		200	5.08
1912-24-9	Atrazine	200 U		200	7.57
100-52-7	Benzaldehyde	200 U	UJ,c	200	4.46
56-55-3	Benzo (a) Anthracene	200 U		200	14.6
50-32-8	Benzo (a) Pyrene	200 U		200	6.28
205-99-2	Benzo (b) Fluoranthene	200 U		200	10.7
191-24-2	Benzo (g,h,i,) Perylene	200 U		200	9.59
207-08-9	Benzo (k) Fluoranthene	200 U		200	14.7
111-91-1	Bis (2-Chloroethoxy)-Methane	200 U		200	3.45
111-44-4	Bis (2-Chloroethyl) Ether	200 U		200	1.90
117-81-7	Bis (2-ethylhexyl)-Phthalate	200 U		200	2.28
85-68-7	Butyl Benzyl Phthalate	200 U		200	4.93
105-60-2	Caprolactam	380 U		380	7.02
86-74-8	Carbazole	200 U		200	6.71
218-01-9	Chrysene	200 U		200	11.2
53-70-3	Dibenzo (a,h) Anthracene	200 U		200	6.49
132-64-9	Dibenzofuran	200 U		200	3.48
84-66-2	**Diethylphthalate**	**10 J**	B,x	200	2.09
131-11-3	Dimethylphthalate	200 U		200	3.64
84-74-2	**Di-n-Butylphthalate**	**25 J**		200	4.20
117-84-0	Di-n-Octylphthalate	200 U		200	3.41
206-44-0	Fluoranthene	200 U		200	2.59
86-73-7	Fluorene	200 U		200	1.85
118-74-1	Hexachlorobenzene	200 U		200	2.76
87-68-3	Hexachlorobutadiene	200 U		200	4.26
77-47-4	Hexachlorocyclopentadiene	200 U		200	2.18
67-72-1	Hexachloroethane	200 U		200	2.57
193-39-5	Indeno (1,2,3-cd) Pyrene	200 U		200	4.31
78-59-1	Isophorone	200 U		200	1.90
91-20-3	Naphthalene	200 U		200	3.03
98-95-3	Nitrobenzene	200 U		200	3.52

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB1A**	QC Batch:	89845 -109
Sample #:	**344823**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	87
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	200 U	200	3.62
86-30-6	N-Nitroso-di-Phenylamine	200 U	200	5.23
87-86-5	Pentachlorophenol	380 U	380	4.83
85-01-8	Phenanthrene	200 U	200	2.53
108-95-2	Phenol	200 U	200	4.36
129-00-0	Pyrene	200 U	200	1.63

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB1A**	QC Batch:	89845 -109
Sample #:	**344823**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	87
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	35	E	B,X
2(3H)-Furanone, 5-acetyldihydro-	029393-32-6	74	E	NJ,T
2,5-Cyclohexadiene-1,4-dione, 2,6-bis(1,1-dimethylethyl	719-22-2	86	E	NJ,T
2-Cyclopentene-1,4-dione	930-60-9	61	E	NJ,T
2-Ethyl-1-Hexanol	104-76-7	22	E	NJ,T

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 14:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB1B**	QC Batch:	89845 -109
Sample #:	**344824**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	200 U	200	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	200 U	200	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	200 U	200	1.58
95-95-4	2,4,5-Trichlorophenol	200 U	200	4.01
88-06-2	2,4,6-Trichlorophenol	200 U	200	3.14
120-83-2	2,4-Dichlorophenol	200 U	200	4.22
105-67-9	2,4-Dimethylphenol	200 U	200	9.53
51-28-5	2,4-Dinitrophenol	390 U	390	3.84
121-14-2	2,4-Dinitrotoluene	200 U	200	3.78
606-20-2	2,6-Dinitrotoluene	200 U	200	33.2
91-58-7	2-Chloronaphthalene	200 U	200	2.76
95-57-8	2-Chlorophenol	200 U	200	2.41
91-57-6	2-Methylnaphthalene	200 U	200	3.29
95-48-7	2-Methylphenol	200 U	200	5.81
88-74-4	2-Nitroaniline	200 U	200	5.52
88-75-5	2-Nitrophenol	200 U	200	2.04
91-94-1	3,3'-Dichlorobenzidine	200 U	200	80.0
99-09-2	3-Nitroaniline	200 U	200	40.0
534-52-1	4,6-Dinitro-2-Methylphenol	200 U	200	5.41
101-55-3	4-Bromophenyl Phenylether	200 U	200	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**36 J**	200	6.25
106-47-8	4-Chloroaniline	200 U	200	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	200 U	200	3.92
106-44-5	4-Methylphenol	200 U	200	7.64
100-01-6	4-Nitroaniline	200 U	200	8.70
100-02-7	4-Nitrophenol	390 U	390	3.40
83-32-9	Acenaphthene	200 U	200	2.06
208-96-8	Acenaphthylene	200 U	200	1.80
98-86-2	Acetophenone	200 U	200	2.28

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 14:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB1B**	QC Batch:	89845 -109
Sample #:	**344824**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	200 U		200	5.54
1912-24-9	Atrazine	200 U		200	8.26
100-52-7	Benzaldehyde	200 U	J,C	200	4.86
56-55-3	Benzo (a) Anthracene	200 U		200	16.0
50-32-8	Benzo (a) Pyrene	200 U		200	6.85
205-99-2	Benzo (b) Fluoranthene	200 U		200	11.7
191-24-2	Benzo (g,h,i,) Perylene	200 U		200	10.5
207-08-9	Benzo (k) Fluoranthene	200 U		200	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	200 U		200	3.77
111-44-4	Bis (2-Chloroethyl) Ether	200 U		200	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**51 J**	B,X	200	2.48
85-68-7	**Butyl Benzyl Phthalate**	**40 J**	B,X	200	5.38
105-60-2	Caprolactam	390 U		390	7.66
86-74-8	Carbazole	200 U		200	7.32
218-01-9	Chrysene	200 U		200	12.2
53-70-3	Dibenzo (a,h) Anthracene	200 U		200	7.08
132-64-9	Dibenzofuran	200 U		200	3.79
84-66-2	**Diethylphthalate**	**4.3 J**	B,X	200	2.28
131-11-3	Dimethylphthalate	200 U		200	3.97
84-74-2	**Di-n-Butylphthalate**	**40 J**		200	4.58
117-84-0	Di-n-Octylphthalate	200 U		200	3.72
206-44-0	Fluoranthene	200 U		200	2.82
86-73-7	Fluorene	200 U		200	2.02
118-74-1	Hexachlorobenzene	200 U		200	3.01
87-68-3	Hexachlorobutadiene	200 U		200	4.64
77-47-4	Hexachlorocyclopentadiene	200 U		200	2.38
67-72-1	Hexachloroethane	200 U		200	2.80
193-39-5	Indeno (1,2,3-cd) Pyrene	200 U		200	4.70
78-59-1	Isophorone	200 U		200	2.08
91-20-3	Naphthalene	200 U		200	3.30
98-95-3	Nitrobenzene	200 U		200	3.84

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 14:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB1B**	QC Batch:	89845 -109
Sample #:	**344824**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	200 U	200	3.95
86-30-6	N-Nitroso-di-Phenylamine	200 U	200	5.70
87-86-5	Pentachlorophenol	390 U	390	5.27
85-01-8	Phenanthrene	200 U	200	2.76
108-95-2	Phenol	200 U	200	4.75
129-00-0	Pyrene	200 U	200	1.78

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 14:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB1B**	QC Batch:	89845 -109
Sample #:	**344824**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	85
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	63	E	B,x
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	94	E	B,x
2-Ethyl-1-Hexanol	104-76-7	30	E	NJ,+
Erucylamide	112-84-5	640	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB1C**	QC Batch:	89845 -109
Sample #:	**344825**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	210 U	210	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	210 U	210	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	210 U	210	1.58
95-95-4	2,4,5-Trichlorophenol	210 U	210	4.01
88-06-2	2,4,6-Trichlorophenol	210 U	210	3.14
120-83-2	2,4-Dichlorophenol	210 U	210	4.22
105-67-9	2,4-Dimethylphenol	210 U	210	9.53
51-28-5	2,4-Dinitrophenol	400 U	400	3.84
121-14-2	2,4-Dinitrotoluene	210 U	210	3.78
606-20-2	2,6-Dinitrotoluene	210 U	210	33.2
91-58-7	2-Chloronaphthalene	210 U	210	2.76
95-57-8	2-Chlorophenol	210 U	210	2.41
91-57-6	2-Methylnaphthalene	210 U	210	3.29
95-48-7	2-Methylphenol	210 U	210	5.81
88-74-4	2-Nitroaniline	210 U	210	5.52
88-75-5	2-Nitrophenol	210 U	210	2.04
91-94-1	3,3'-Dichlorobenzidine	210 U	210	80.0
99-09-2	3-Nitroaniline	210 U	210	40.0
534-52-1	4,6-Dinitro-2-Methylphenol	210 U	210	5.41
101-55-3	4-Bromophenyl Phenylether	210 U	210	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**25 J**	210	6.25
106-47-8	4-Chloroaniline	210 U	210	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	210 U	210	3.92
106-44-5	4-Methylphenol	210 U	210	7.64
100-01-6	4-Nitroaniline	210 U	210	8.70
100-02-7	4-Nitrophenol	400 U	400	3.40
83-32-9	Acenaphthene	210 U	210	2.06
208-96-8	Acenaphthylene	210 U	210	1.80
98-86-2	Acetophenone	210 U	210	2.28

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB1C**	QC Batch:	89845 -109
Sample #:	**344825**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	210 U		210	5.54
1912-24-9	Atrazine	210 U		210	8.26
100-52-7	Benzaldehyde	210 U	UJ,c	210	4.86
56-55-3	Benzo (a) Anthracene	210 U		210	16.0
50-32-8	Benzo (a) Pyrene	210 U		210	6.85
205-99-2	Benzo (b) Fluoranthene	210 U		210	11.7
191-24-2	Benzo (g,h,i,) Perylene	210 U		210	10.5
207-08-9	Benzo (k) Fluoranthene	210 U		210	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	210 U		210	3.77
111-44-4	Bis (2-Chloroethyl) Ether	210 U		210	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**46 J**	B,X	210	2.48
85-68-7	Butyl Benzyl Phthalate	210 U		210	5.38
105-60-2	Caprolactam	400 U		400	7.66
86-74-8	Carbazole	210 U		210	7.32
218-01-9	Chrysene	210 U		210	12.2
53-70-3	Dibenzo (a,h) Anthracene	210 U		210	7.08
132-64-9	Dibenzofuran	210 U		210	3.79
84-66-2	**Diethylphthalate**	**2.8 J**	B,X	210	2.28
131-11-3	Dimethylphthalate	210 U		210	3.97
84-74-2	**Di-n-Butylphthalate**	**35 J**		210	4.58
117-84-0	Di-n-Octylphthalate	210 U		210	3.72
206-44-0	Fluoranthene	210 U		210	2.82
86-73-7	Fluorene	210 U		210	2.02
118-74-1	Hexachlorobenzene	210 U		210	3.01
87-68-3	Hexachlorobutadiene	210 U		210	4.64
77-47-4	Hexachlorocyclopentadiene	210 U		210	2.38
67-72-1	Hexachloroethane	210 U		210	2.80
193-39-5	Indeno (1,2,3-cd) Pyrene	210 U		210	4.70
78-59-1	Isophorone	210 U		210	2.08
91-20-3	Naphthalene	210 U		210	3.30
98-95-3	Nitrobenzene	210 U		210	3.84

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB1C**	QC Batch:	89845 -109
Sample #:	**344825**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	210 U	210	3.95
86-30-6	N-Nitroso-di-Phenylamine	210 U	210	5.70
87-86-5	Pentachlorophenol	400 U	400	5.27
85-01-8	Phenanthrene	210 U	210	2.76
108-95-2	Phenol	210 U	210	4.75
129-00-0	Pyrene	210 U	210	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB1C**	QC Batch:	89845 -109
Sample #:	**344825**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	82
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	CAS Number	Result (ug/kg dr	Qualifier	
(Z)-9-Octadecenamide	301-02-0	100	E	B,X
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	47	E	B,X
1-Octadecanol	112-92-5	28	E	NJ,+
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	70	E	B,X
2-Ethyl-1-Hexanol	104-76-7	23	E	NJ,+
Erucylamide	112-84-5	490	E	NJ,+
Phenytoin	57-41-0	480	E	NJ,+
~~Unknown Acid~~	~~XXX-XX-XXXX~~	~~21~~	~~E~~	

AS 12/10/03

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB2A**	QC Batch:	89845 -109
Sample #:	**344826**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	200 U		200	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	200 U		200	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	200 U		200	1.58
95-95-4	2,4,5-Trichlorophenol	200 U		200	4.01
88-06-2	2,4,6-Trichlorophenol	200 U		200	3.14
120-83-2	2,4-Dichlorophenol	200 U		200	4.22
105-67-9	2,4-Dimethylphenol	200 U		200	9.53
51-28-5	2,4-Dinitrophenol	390 U		390	3.84
121-14-2	2,4-Dinitrotoluene	200 U		200	3.78
606-20-2	2,6-Dinitrotoluene	200 U		200	33.2
91-58-7	2-Chloronaphthalene	200 U		200	2.76
95-57-8	2-Chlorophenol	200 U		200	2.41
91-57-6	2-Methylnaphthalene	200 U		200	3.29
95-48-7	2-Methylphenol	200 U		200	5.81
88-74-4	2-Nitroaniline	200 U		200	5.52
88-75-5	2-Nitrophenol	200 U		200	2.04
91-94-1	3,3'-Dichlorobenzidine	200 U	UJ,M	200	80.0
99-09-2	3-Nitroaniline	200 U		200	40.0
534-52-1	4,6-Dinitro-2-Methylphenol	200 U		200	5.41
101-55-3	4-Bromophenyl Phenylether	200 U		200	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**38 J**		200	6.25
106-47-8	4-Chloroaniline	200 U	UJ,M	200	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	200 U		200	3.92
106-44-5	4-Methylphenol	200 U		200	7.64
100-01-6	4-Nitroaniline	200 U	UJ,M	200	8.70
100-02-7	4-Nitrophenol	390 U		390	3.40
83-32-9	Acenaphthene	200 U		200	2.06
208-96-8	Acenaphthylene	200 U		200	1.80
98-86-2	Acetophenone	200 U		200	2.28

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB2A**	QC Batch:	89845 -109
Sample #:	**344826**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	200 U		200	5.54
1912-24-9	Atrazine	200 U		200	8.26
100-52-7	Benzaldehyde	200 U	UJ,c	200	4.86
56-55-3	Benzo (a) Anthracene	200 U		200	16.0
50-32-8	Benzo (a) Pyrene	200 U		200	6.85
205-99-2	Benzo (b) Fluoranthene	200 U		200	11.7
191-24-2	Benzo (g,h,i,) Perylene	200 U		200	10.5
207-08-9	Benzo (k) Fluoranthene	200 U		200	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	200 U		200	3.77
111-44-4	Bis (2-Chloroethyl) Ether	200 U		200	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**54 J**	B,x	200	2.48
85-68-7	**Butyl Benzyl Phthalate**	**38 J**	B,x	200	5.38
105-60-2	Caprolactam	390 U		390	7.66
86-74-8	Carbazole	200 U		200	7.32
218-01-9	Chrysene	200 U		200	12.2
53-70-3	Dibenzo (a,h) Anthracene	200 U		200	7.08
132-64-9	Dibenzofuran	200 U		200	3.79
84-66-2	**Diethylphthalate**	**3.9 J**	B,x	200	2.28
131-11-3	Dimethylphthalate	200 U		200	3.97
84-74-2	**Di-n-Butylphthalate**	**45 J**		200	4.58
117-84-0	Di-n-Octylphthalate	200 U		200	3.72
206-44-0	Fluoranthene	200 U		200	2.82
86-73-7	Fluorene	200 U		200	2.02
118-74-1	Hexachlorobenzene	200 U		200	3.01
87-68-3	Hexachlorobutadiene	200 U		200	4.64
77-47-4	Hexachlorocyclopentadiene	200 U		200	2.38
67-72-1	Hexachloroethane	200 U		200	2.80
193-39-5	Indeno (1,2,3-cd) Pyrene	200 U		200	4.70
78-59-1	Isophorone	200 U		200	2.08
91-20-3	Naphthalene	200 U		200	3.30
98-95-3	Nitrobenzene	200 U		200	3.84

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB2A**	QC Batch:	89845 -109
Sample #:	**344826**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	200 U	200	3.95
86-30-6	N-Nitroso-di-Phenylamine	200 U	200	5.70
87-86-5	Pentachlorophenol	390 U	390	5.27
85-01-8	Phenanthrene	200 U	200	2.76
108-95-2	Phenol	200 U	200	4.75
129-00-0	Pyrene	200 U	200	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB2A**	QC Batch:	89845 -109
Sample #:	**344826**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	85
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(M) 1-Eicosanol	629-96-9	44	E	NJ,+
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	69	E	B,X
1-Heptadecanol	1454-85-9	22	E	NJ,+
2-Ethyl-1-Hexanol	104-76-7	30	E	NJ,+
Butyl Ester Octadecanioc	123-95-5	35	E	NJ,+
Erucylamide	112-84-5	730	E	NJ,+
Hexadecanoic acid, 1,1-dimethylethyl ester	31158-91-5	42	E	NJ,+
~~Unknown Acid~~	~~XXX-XX-XXXX~~	~~30~~	~~E~~	AS 12/10/03

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB2B**	QC Batch:	89845 -109
Sample #:	**344827**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	93
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	180 U	180	2.71
95-94-3	1,2,4,5-Tetrachloro-benzene	180 U	180	31.6
108-60-1	Bis (2-Chloroisopropyl)-Ether	180 U	180	1.45
95-95-4	2,4,5-Trichlorophenol	180 U	180	3.67
88-06-2	2,4,6-Trichlorophenol	180 U	180	2.88
120-83-2	2,4-Dichlorophenol	180 U	180	3.87
105-67-9	2,4-Dimethylphenol	180 U	180	8.73
51-28-5	2,4-Dinitrophenol	350 U	350	3.52
121-14-2	2,4-Dinitrotoluene	180 U	180	3.47
606-20-2	2,6-Dinitrotoluene	180 U	180	30.5
91-58-7	2-Chloronaphthalene	180 U	180	2.53
95-57-8	2-Chlorophenol	180 U	180	2.21
91-57-6	2-Methylnaphthalene	180 U	180	3.01
95-48-7	2-Methylphenol	180 U	180	5.32
88-74-4	2-Nitroaniline	180 U	180	5.06
88-75-5	2-Nitrophenol	180 U	180	1.87
91-94-1	3,3'-Dichlorobenzidine	180 U	180	73.4
99-09-2	3-Nitroaniline	180 U	180	36.6
534-52-1	4,6-Dinitro-2-Methylphenol	180 U	180	4.96
101-55-3	4-Bromophenyl Phenylether	180 U	180	3.72
59-50-7	**4-Chloro-3-Methylphenol**	**33 J**	180	5.73
106-47-8	4-Chloroaniline	180 U	180	1.39
7005-72-3	4-Chlorophenylphenyl-Ether	180 U	180	3.60
106-44-5	4-Methylphenol	180 U	180	7.01
100-01-6	4-Nitroaniline	180 U	180	7.98
100-02-7	4-Nitrophenol	350 U	350	3.11
83-32-9	Acenaphthene	180 U	180	1.89
208-96-8	Acenaphthylene	180 U	180	1.65
98-86-2	Acetophenone	180 U	180	2.09

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB2B**	QC Batch:	89845 -109
Sample #:	**344827**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	93
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	180 U		180	5.08
1912-24-9	Atrazine	180 U		180	7.57
100-52-7	Benzaldehyde	180 U	VJ,c	180	4.46
56-55-3	Benzo (a) Anthracene	180 U		180	14.6
50-32-8	**Benzo (a) Pyrene**	**17 J**		180	6.28
205-99-2	**Benzo (b) Fluoranthene**	**40 J**		180	10.7
191-24-2	Benzo (g,h,i,) Perylene	180 U		180	9.59
207-08-9	Benzo (k) Fluoranthene	180 U		180	14.7
111-91-1	Bis (2-Chloroethoxy)-Methane	180 U		180	3.45
111-44-4	Bis (2-Chloroethyl) Ether	180 U		180	1.90
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**56 J**	B,x	180	2.28
85-68-7	**Butyl Benzyl Phthalate**	**39 J**	B,x	180	4.93
105-60-2	Caprolactam	350 U		350	7.02
86-74-8	Carbazole	180 U		180	6.71
218-01-9	Chrysene	180 U		180	11.2
53-70-3	Dibenzo (a,h) Anthracene	180 U		180	6.49
132-64-9	Dibenzofuran	180 U		180	3.48
84-66-2	**Diethylphthalate**	**35 J**		180	2.09
131-11-3	Dimethylphthalate	180 U		180	3.64
84-74-2	**Di-n-Butylphthalate**	**39 J**		180	4.20
117-84-0	Di-n-Octylphthalate	180 U		180	3.41
206-44-0	**Fluoranthene**	**7.0 J**		180	2.59
86-73-7	Fluorene	180 U		180	1.85
118-74-1	Hexachlorobenzene	180 U		180	2.76
87-68-3	Hexachlorobutadiene	180 U		180	4.26
77-47-4	Hexachlorocyclopentadiene	180 U		180	2.18
67-72-1	Hexachloroethane	180 U		180	2.57
193-39-5	Indeno (1,2,3-cd) Pyrene	180 U		180	4.31
78-59-1	Isophorone	180 U		180	1.90
91-20-3	Naphthalene	180 U		180	3.03
98-95-3	Nitrobenzene	180 U		180	3.52

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB2B**	QC Batch:	89845 -109
Sample #:	**344827**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	93
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	180 U	180	3.62
86-30-6	N-Nitroso-di-Phenylamine	180 U	180	5.23
87-86-5	Pentachlorophenol	350 U	350	4.83
85-01-8	**Phenanthrene**	**3.0 J**	180	2.53
108-95-2	Phenol	180 U	180	4.36
129-00-0	**Pyrene**	**6.0 J**	180	1.63

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB2B**	QC Batch:	89845 -109
Sample #:	**344827**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	93
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	CAS Number	Result (ug/kg dr	Qualifier	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	55	E	B,X
1-Pentadecanol	629-76-5	62	E	NJ,T
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	92	E	B,X
2-Ethyl-1-Hexanol	104-76-7	31	E	NJ,T
Erucylamide	112-84-5	590	E	NJ,T
Phenytoin	57-41-0	29	E	NJ,T
~~Unknown Acid~~	~~XXX-XX-XXXX~~	~~22~~	~~E~~	~~A~~ 12/10/03

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD-1**	QC Batch:	89845 -109
Sample #:	**344828**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	88
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	190 U	190	2.71
95-94-3	1,2,4,5-Tetrachloro-benzene	190 U	190	31.6
108-60-1	Bis (2-Chloroisopropyl)-Ether	190 U	190	1.45
95-95-4	2,4,5-Trichlorophenol	190 U	190	3.67
88-06-2	2,4,6-Trichlorophenol	190 U	190	2.88
120-83-2	2,4-Dichlorophenol	190 U	190	3.87
105-67-9	2,4-Dimethylphenol	190 U	190	8.73
51-28-5	2,4-Dinitrophenol	380 U	380	3.52
121-14-2	2,4-Dinitrotoluene	190 U	190	3.47
606-20-2	2,6-Dinitrotoluene	190 U	190	30.5
91-58-7	2-Chloronaphthalene	190 U	190	2.53
95-57-8	2-Chlorophenol	190 U	190	2.21
91-57-6	2-Methylnaphthalene	190 U	190	3.01
95-48-7	2-Methylphenol	190 U	190	5.32
88-74-4	2-Nitroaniline	190 U	190	5.06
88-75-5	2-Nitrophenol	190 U	190	1.87
91-94-1	3,3'-Dichlorobenzidine	190 U	190	73.4
99-09-2	3-Nitroaniline	190 U	190	36.6
534-52-1	4,6-Dinitro-2-Methylphenol	190 U	190	4.96
101-55-3	4-Bromophenyl Phenylether	190 U	190	3.72
59-50-7	**4-Chloro-3-Methylphenol**	**19 J**	190	5.73
106-47-8	4-Chloroaniline	190 U	190	1.39
7005-72-3	4-Chlorophenylphenyl-Ether	190 U	190	3.60
106-44-5	4-Methylphenol	190 U	190	7.01
100-01-6	4-Nitroaniline	190 U	190	7.98
100-02-7	4-Nitrophenol	380 U	380	3.11
83-32-9	Acenaphthene	190 U	190	1.89
208-96-8	Acenaphthylene	190 U	190	1.65
98-86-2	Acetophenone	190 U	190	2.09

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD-1**	QC Batch:	89845 -109
Sample #:	**344828**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	88
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	190 U		190	5.08
1912-24-9	Atrazine	190 U		190	7.57
100-52-7	Benzaldehyde	190 U	VJ,C	190	4.46
56-55-3	Benzo (a) Anthracene	190 U		190	14.6
50-32-8	**Benzo (a) Pyrene**	**19 J**		190	6.28
205-99-2	**Benzo (b) Fluoranthene**	**40 J**		190	10.7
191-24-2	Benzo (g,h,i,) Perylene	190 U		190	9.59
207-08-9	Benzo (k) Fluoranthene	190 U		190	14.7
111-91-1	Bis (2-Chloroethoxy)-Methane	190 U		190	3.45
111-44-4	Bis (2-Chloroethyl) Ether	190 U		190	1.90
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**50 J**	B,X	190	2.28
85-68-7	**Butyl Benzyl Phthalate**	**37 J**	B,X	190	4.93
105-60-2	Caprolactam	380 U		380	7.02
86-74-8	Carbazole	190 U		190	6.71
218-01-9	Chrysene	190 U		190	11.2
53-70-3	Dibenzo (a,h) Anthracene	190 U		190	6.49
132-64-9	Dibenzofuran	190 U		190	3.48
84-66-2	**Diethylphthalate**	**24 J**	B,X	190	2.09
131-11-3	Dimethylphthalate	190 U		190	3.64
84-74-2	**Di-n-Butylphthalate**	**31 J**		190	4.20
117-84-0	Di-n-Octylphthalate	190 U		190	3.41
206-44-0	**Fluoranthene**	**13 J**		190	2.59
86-73-7	Fluorene	190 U		190	1.85
118-74-1	Hexachlorobenzene	190 U		190	2.76
87-68-3	Hexachlorobutadiene	190 U		190	4.26
77-47-4	Hexachlorocyclopentadiene	190 U		190	2.18
67-72-1	Hexachloroethane	190 U		190	2.57
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**32 J**		190	4.31
78-59-1	Isophorone	190 U		190	1.90
91-20-3	Naphthalene	190 U		190	3.03
98-95-3	Nitrobenzene	190 U		190	3.52

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD-1**	QC Batch:	89845 -109
Sample #:	**344828**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	88
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	190 U	190	3.62
86-30-6	N-Nitroso-di-Phenylamine	190 U	190	5.23
87-86-5	Pentachlorophenol	380 U	380	4.83
85-01-8	**Phenanthrene**	**6.0 J**	190	2.53
108-95-2	Phenol	190 U	190	4.36
129-00-0	**Pyrene**	**11 J**	190	1.63

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD-1**	QC Batch:	89845 -109
Sample #:	**344828**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	88
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(M) 1-Eicosanol	629-96-9	51	E	NJ,+
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	46	E	B,X
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	54	E	B,X
2-Ethyl-1-Hexanol	104-76-7	28	E	NJ,+
Erucylamide	112-84-5	340	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB2C**	QC Batch:	89845 -109
Sample #:	**344829**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	200 U	200	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	200 U	200	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	200 U	200	1.58
95-95-4	2,4,5-Trichlorophenol	200 U	200	4.01
88-06-2	2,4,6-Trichlorophenol	200 U	200	3.14
120-83-2	2,4-Dichlorophenol	200 U	200	4.22
105-67-9	2,4-Dimethylphenol	200 U	200	9.53
51-28-5	2,4-Dinitrophenol	390 U	390	3.84
121-14-2	2,4-Dinitrotoluene	200 U	200	3.78
606-20-2	2,6-Dinitrotoluene	200 U	200	33.2
91-58-7	2-Chloronaphthalene	200 U	200	2.76
95-57-8	2-Chlorophenol	200 U	200	2.41
91-57-6	2-Methylnaphthalene	200 U	200	3.29
95-48-7	2-Methylphenol	200 U	200	5.81
88-74-4	2-Nitroaniline	200 U	200	5.52
88-75-5	2-Nitrophenol	200 U	200	2.04
91-94-1	3,3'-Dichlorobenzidine	200 U	200	80.0
99-09-2	3-Nitroaniline	200 U	200	40.0
534-52-1	4,6-Dinitro-2-Methylphenol	200 U	200	5.41
101-55-3	4-Bromophenyl Phenylether	200 U	200	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**27 J**	200	6.25
106-47-8	4-Chloroaniline	200 U	200	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	200 U	200	3.92
106-44-5	4-Methylphenol	200 U	200	7.64
100-01-6	4-Nitroaniline	200 U	200	8.70
100-02-7	4-Nitrophenol	390 U	390	3.40
83-32-9	Acenaphthene	200 U	200	2.06
208-96-8	Acenaphthylene	200 U	200	1.80
98-86-2	Acetophenone	200 U	200	2.28

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB2C**	QC Batch:	89845 -109
Sample #:	**344829**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	200 U		200	5.54
1912-24-9	Atrazine	200 U		200	8.26
100-52-7	Benzaldehyde	200 U	U5,c	200	4.86
56-55-3	Benzo (a) Anthracene	200 U		200	16.0
50-32-8	Benzo (a) Pyrene	200 U		200	6.85
205-99-2	Benzo (b) Fluoranthene	200 U		200	11.7
191-24-2	Benzo (g,h,i,) Perylene	200 U		200	10.5
207-08-9	Benzo (k) Fluoranthene	200 U		200	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	200 U		200	3.77
111-44-4	Bis (2-Chloroethyl) Ether	200 U		200	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**50 J**	B,x	200	2.48
85-68-7	**Butyl Benzyl Phthalate**	**40 J**	B,x	200	5.38
105-60-2	Caprolactam	390 U		390	7.66
86-74-8	Carbazole	200 U		200	7.32
218-01-9	Chrysene	200 U		200	12.2
53-70-3	Dibenzo (a,h) Anthracene	200 U		200	7.08
132-64-9	Dibenzofuran	200 U		200	3.79
84-66-2	**Diethylphthalate**	**17 J**	B,x	200	2.28
131-11-3	Dimethylphthalate	200 U		200	3.97
84-74-2	**Di-n-Butylphthalate**	**44 J**		200	4.58
117-84-0	Di-n-Octylphthalate	200 U		200	3.72
206-44-0	Fluoranthene	200 U		200	2.82
86-73-7	Fluorene	200 U		200	2.02
118-74-1	Hexachlorobenzene	200 U		200	3.01
87-68-3	Hexachlorobutadiene	200 U		200	4.64
77-47-4	Hexachlorocyclopentadiene	200 U		200	2.38
67-72-1	Hexachloroethane	200 U		200	2.80
193-39-5	Indeno (1,2,3-cd) Pyrene	200 U		200	4.70
78-59-1	Isophorone	200 U		200	2.08
91-20-3	Naphthalene	200 U		200	3.30
98-95-3	Nitrobenzene	200 U		200	3.84

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB2C**	QC Batch:	89845 -109
Sample #:	**344829**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	200 U	200	3.95
86-30-6	N-Nitroso-di-Phenylamine	200 U	200	5.70
87-86-5	Pentachlorophenol	390 U	390	5.27
85-01-8	Phenanthrene	200 U	200	2.76
108-95-2	Phenol	200 U	200	4.75
129-00-0	Pyrene	200 U	200	1.78

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB2C**	QC Batch:	89845 -109
Sample #:	**344829**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	85
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	500	E	B,X
1,2-Benzenedicarboxylic acid, butyl 2-methylpropyl ester	17851-53-5	49	E	NJ,+
1-Octadecanol	112-92-5	51	E	NJ,+
2-Ethyl-1-Hexanol	104-76-7	32	E	NJ,+
Cyclopentadecane	295-48-7	92	E	NJ,+
Docosane	629-97-0	34	E	NJ,+
Oxirane, hexadecyl-	7390-81-0	91	E	NJ,+
~~Unknown Acid~~	~~XXX-XX-XXXX~~	~~20~~	~~E~~	~~B~~ 12/10/03

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 08:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB3A**	QC Batch:	89845 -109
Sample #:	**344922**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	86
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	200 U	200	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	200 U	200	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	200 U	200	1.58
95-95-4	2,4,5-Trichlorophenol	200 U	200	4.01
88-06-2	2,4,6-Trichlorophenol	200 U	200	3.14
120-83-2	2,4-Dichlorophenol	200 U	200	4.22
105-67-9	2,4-Dimethylphenol	200 U	200	9.53
51-28-5	2,4-Dinitrophenol	380 U	380	3.84
121-14-2	2,4-Dinitrotoluene	200 U	200	3.78
606-20-2	2,6-Dinitrotoluene	200 U	200	33.2
91-58-7	2-Chloronaphthalene	200 U	200	2.76
95-57-8	2-Chlorophenol	200 U	200	2.41
91-57-6	2-Methylnaphthalene	200 U	200	3.29
95-48-7	2-Methylphenol	200 U	200	5.81
88-74-4	2-Nitroaniline	200 U	200	5.52
88-75-5	2-Nitrophenol	200 U	200	2.04
91-94-1	3,3'-Dichlorobenzidine	200 U	200	80.0
99-09-2	3-Nitroaniline	200 U	200	40.0
534-52-1	4,6-Dinitro-2-Methylphenol	200 U	200	5.41
101-55-3	4-Bromophenyl Phenylether	200 U	200	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**28 J**	200	6.25
106-47-8	4-Chloroaniline	200 U	200	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	200 U	200	3.92
106-44-5	4-Methylphenol	200 U	200	7.64
100-01-6	4-Nitroaniline	200 U	200	8.70
100-02-7	4-Nitrophenol	380 U	380	3.40
83-32-9	Acenaphthene	200 U	200	2.06
208-96-8	Acenaphthylene	200 U	200	1.80
98-86-2	Acetophenone	200 U	200	2.28

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 08:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/14/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**FSB3A**	QC Batch:	89845 -109
Sample #:	**344922**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	86
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	200 U		200	5.54
1912-24-9	Atrazine	200 U		200	8.26
100-52-7	Benzaldehyde	200 U	UJ,C	200	4.86
56-55-3	Benzo (a) Anthracene	200 U		200	16.0
50-32-8	Benzo (a) Pyrene	200 U		200	6.85
205-99-2	Benzo (b) Fluoranthene	200 U		200	11.7
191-24-2	Benzo (g,h,i,) Perylene	200 U		200	10.5
207-08-9	Benzo (k) Fluoranthene	200 U		200	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	200 U		200	3.77
111-44-4	Bis (2-Chloroethyl) Ether	200 U		200	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**51 J**	B,X	200	2.48
85-68-7	Butyl Benzyl Phthalate	200 U		200	5.38
105-60-2	Caprolactam	380 U		380	7.66
86-74-8	Carbazole	200 U		200	7.32
218-01-9	Chrysene	200 U		200	12.2
53-70-3	Dibenzo (a,h) Anthracene	200 U		200	7.08
132-64-9	Dibenzofuran	200 U		200	3.79
84-66-2	**Diethylphthalate**	**4.0 J**	B,X	200	2.28
131-11-3	Dimethylphthalate	200 U		200	3.97
84-74-2	**Di-n-Butylphthalate**	**27 J**		200	4.58
117-84-0	Di-n-Octylphthalate	200 U		200	3.72
206-44-0	Fluoranthene	200 U		200	2.82
86-73-7	Fluorene	200 U		200	2.02
118-74-1	Hexachlorobenzene	200 U		200	3.01
87-68-3	Hexachlorobutadiene	200 U		200	4.64
77-47-4	Hexachlorocyclopentadiene	200 U		200	2.38
67-72-1	Hexachloroethane	200 U		200	2.80
193-39-5	Indeno (1,2,3-cd) Pyrene	200 U		200	4.70
78-59-1	Isophorone	200 U		200	2.08
91-20-3	Naphthalene	200 U		200	3.30
98-95-3	Nitrobenzene	200 U		200	3.84

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 08:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB3A**	QC Batch:	89845 -109
Sample #:	**344922**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	86
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	200 U	200	3.95
86-30-6	N-Nitroso-di-Phenylamine	200 U	200	5.70
87-86-5	Pentachlorophenol	380 U	380	5.27
85-01-8	Phenanthrene	200 U	200	2.76
108-95-2	Phenol	200 U	200	4.75
129-00-0	Pyrene	200 U	200	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 08:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB3A**	QC Batch:	89845 -109
Sample #:	**344922**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	86
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	42	E	B,X
3-Hexene-2,5-dione	4436-75-3	230	E	NJ,+
Erucylamide	112-84-5	190	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 08:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB3B**	QC Batch:	89845 -109
Sample #:	**344923**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	90
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	190 U	190	2.71
95-94-3	1,2,4,5-Tetrachloro-benzene	190 U	190	31.6
108-60-1	Bis (2-Chloroisopropyl)-Ether	190 U	190	1.45
95-95-4	2,4,5-Trichlorophenol	190 U	190	3.67
88-06-2	2,4,6-Trichlorophenol	190 U	190	2.88
120-83-2	2,4-Dichlorophenol	190 U	190	3.87
105-67-9	2,4-Dimethylphenol	190 U	190	8.73
51-28-5	2,4-Dinitrophenol	370 U	370	3.52
121-14-2	2,4-Dinitrotoluene	190 U	190	3.47
606-20-2	2,6-Dinitrotoluene	190 U	190	30.5
91-58-7	2-Chloronaphthalene	190 U	190	2.53
95-57-8	2-Chlorophenol	190 U	190	2.21
91-57-6	2-Methylnaphthalene	190 U	190	3.01
95-48-7	2-Methylphenol	190 U	190	5.32
88-74-4	2-Nitroaniline	190 U	190	5.06
88-75-5	2-Nitrophenol	190 U	190	1.87
91-94-1	3,3'-Dichlorobenzidine	190 U	190	73.4
99-09-2	3-Nitroaniline	190 U	190	36.6
534-52-1	4,6-Dinitro-2-Methylphenol	190 U	190	4.96
101-55-3	4-Bromophenyl Phenylether	190 U	190	3.72
59-50-7	**4-Chloro-3-Methylphenol**	**18 J**	190	5.73
106-47-8	4-Chloroaniline	190 U	190	1.39
7005-72-3	4-Chlorophenylphenyl-Ether	190 U	190	3.60
106-44-5	4-Methylphenol	190 U	190	7.01
100-01-6	4-Nitroaniline	190 U	190	7.98
100-02-7	4-Nitrophenol	370 U	370	3.11
83-32-9	Acenaphthene	190 U	190	1.89
208-96-8	Acenaphthylene	190 U	190	1.65
98-86-2	Acetophenone	190 U	190	2.09

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 08:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB3B**	QC Batch:	89845 -109
Sample #:	**344923**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	90
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	190 U		190	5.08
1912-24-9	Atrazine	190 U		190	7.57
100-52-7	Benzaldehyde	190 U	VJ,C	190	4.46
56-55-3	Benzo (a) Anthracene	190 U		190	14.6
50-32-8	Benzo (a) Pyrene	190 U		190	6.28
205-99-2	Benzo (b) Fluoranthene	190 U		190	10.7
191-24-2	Benzo (g,h,i,) Perylene	190 U		190	9.59
207-08-9	Benzo (k) Fluoranthene	190 U		190	14.7
111-91-1	Bis (2-Chloroethoxy)-Methane	190 U		190	3.45
111-44-4	Bis (2-Chloroethyl) Ether	190 U		190	1.90
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**44 J**	B,X	190	2.28
85-68-7	Butyl Benzyl Phthalate	190 U		190	4.93
105-60-2	Caprolactam	370 U		370	7.02
86-74-8	Carbazole	190 U		190	6.71
218-01-9	Chrysene	190 U		190	11.2
53-70-3	Dibenzo (a,h) Anthracene	190 U		190	6.49
132-64-9	Dibenzofuran	190 U		190	3.48
84-66-2	**Diethylphthalate**	**3.0 J**	B,X	190	2.09
131-11-3	Dimethylphthalate	190 U		190	3.64
84-74-2	**Di-n-Butylphthalate**	**24 J**		190	4.20
117-84-0	Di-n-Octylphthalate	190 U		190	3.41
206-44-0	Fluoranthene	190 U		190	2.59
86-73-7	Fluorene	190 U		190	1.85
118-74-1	Hexachlorobenzene	190 U		190	2.76
87-68-3	Hexachlorobutadiene	190 U		190	4.26
77-47-4	Hexachlorocyclopentadiene	190 U		190	2.18
67-72-1	Hexachloroethane	190 U		190	2.57
193-39-5	Indeno (1,2,3-cd) Pyrene	190 U		190	4.31
78-59-1	Isophorone	190 U		190	1.90
91-20-3	Naphthalene	190 U		190	3.03
98-95-3	Nitrobenzene	190 U		190	3.52

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 08:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB3B**	QC Batch:	89845 -109
Sample #:	**344923**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	90
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	190 U	190	3.62
86-30-6	N-Nitroso-di-Phenylamine	190 U	190	5.23
87-86-5	Pentachlorophenol	370 U	370	4.83
85-01-8	Phenanthrene	190 U	190	2.53
108-95-2	Phenol	190 U	190	4.36
129-00-0	Pyrene	190 U	190	1.63

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 08:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB3B**	QC Batch:	89845 -109
Sample #:	**344923**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	90
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	27	E	B,x
1,2-Benzenedicarboxylic acid, butyl 2-methylpropyl ester	17851-53-5	31	E	NJ,+
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	59	E	B,x
2-Ethyl-1-Hexanol	104-76-7	28	E	NJ,+
Erucylamide	112-84-5	380	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 08:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB3C**	QC Batch:	89845 -109
Sample #:	**344924**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	240 U	240	3.44
95-94-3	1,2,4,5-Tetrachloro-benzene	240 U	240	40.2
108-60-1	Bis (2-Chloroisopropyl)-Ether	240 U	240	1.85
95-95-4	2,4,5-Trichlorophenol	240 U	240	4.68
88-06-2	2,4,6-Trichlorophenol	240 U	240	3.67
120-83-2	2,4-Dichlorophenol	240 U	240	4.93
105-67-9	2,4-Dimethylphenol	240 U	240	11.1
51-28-5	2,4-Dinitrophenol	460 U	460	4.48
121-14-2	2,4-Dinitrotoluene	240 U	240	4.41
606-20-2	2,6-Dinitrotoluene	240 U	240	38.8
91-58-7	2-Chloronaphthalene	240 U	240	3.22
95-57-8	2-Chlorophenol	240 U	240	2.81
91-57-6	2-Methylnaphthalene	240 U	240	3.84
95-48-7	2-Methylphenol	240 U	240	6.78
88-74-4	2-Nitroaniline	240 U	240	6.44
88-75-5	2-Nitrophenol	240 U	240	2.38
91-94-1	3,3'-Dichlorobenzidine	240 U	240	93.4
99-09-2	3-Nitroaniline	240 U	240	46.6
534-52-1	4,6-Dinitro-2-Methylphenol	240 U	240	6.31
101-55-3	4-Bromophenyl Phenylether	240 U	240	4.73
59-50-7	**4-Chloro-3-Methylphenol**	**41 J**	240	7.29
106-47-8	4-Chloroaniline	240 U	240	1.76
7005-72-3	4-Chlorophenylphenyl-Ether	240 U	240	4.58
106-44-5	4-Methylphenol	240 U	240	8.92
100-01-6	4-Nitroaniline	240 U	240	10.2
100-02-7	4-Nitrophenol	460 U	460	3.96
83-32-9	Acenaphthene	240 U	240	2.41
208-96-8	Acenaphthylene	240 U	240	2.10
98-86-2	Acetophenone	240 U	240	2.66

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 08:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB3C**	QC Batch:	89845 -109
Sample #:	**344924**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	240 U		240	6.47
1912-24-9	Atrazine	240 U		240	9.63
100-52-7	Benzaldehyde	240 U	UJ,C	240	5.67
56-55-3	Benzo (a) Anthracene	240 U		240	18.6
50-32-8	Benzo (a) Pyrene	240 U		240	7.99
205-99-2	Benzo (b) Fluoranthene	240 U		240	13.7
191-24-2	Benzo (g,h,i,) Perylene	240 U		240	12.2
207-08-9	Benzo (k) Fluoranthene	240 U		240	18.8
111-91-1	Bis (2-Chloroethoxy)-Methane	240 U		240	4.40
111-44-4	Bis (2-Chloroethyl) Ether	240 U		240	2.42
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**61 J**	B,X	240	2.90
85-68-7	**Butyl Benzyl Phthalate**	**49 J**	B,X	240	6.27
105-60-2	Caprolactam	460 U		460	8.93
86-74-8	Carbazole	240 U		240	8.54
218-01-9	Chrysene	240 U		240	14.3
53-70-3	Dibenzo (a,h) Anthracene	240 U		240	8.26
132-64-9	Dibenzofuran	240 U		240	4.42
84-66-2	**Diethylphthalate**	**5.0 J**	B,X	240	2.66
131-11-3	Dimethylphthalate	240 U		240	4.63
84-74-2	**Di-n-Butylphthalate**	**48 J**		240	5.35
117-84-0	Di-n-Octylphthalate	240 U		240	4.34
206-44-0	Fluoranthene	240 U		240	3.29
86-73-7	Fluorene	240 U		240	2.35
118-74-1	Hexachlorobenzene	240 U		240	3.51
87-68-3	Hexachlorobutadiene	240 U		240	5.42
77-47-4	Hexachlorocyclopentadiene	240 U		240	2.77
67-72-1	Hexachloroethane	240 U		240	3.27
193-39-5	Indeno (1,2,3-cd) Pyrene	240 U		240	5.49
78-59-1	Isophorone	240 U		240	2.42
91-20-3	Naphthalene	240 U		240	3.85
98-95-3	Nitrobenzene	240 U		240	4.48

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 08:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB3C**	QC Batch:	89845 -109
Sample #:	**344924**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	240 U	240	4.61
86-30-6	N-Nitroso-di-Phenylamine	240 U	240	6.65
87-86-5	Pentachlorophenol	460 U	460	6.15
85-01-8	Phenanthrene	240 U	240	3.22
108-95-2	Phenol	240 U	240	5.54
129-00-0	Pyrene	240 U	240	2.07

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 08:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB3C**	QC Batch:	89845 -109
Sample #:	**344924**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	71
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	65	E	B,X
1-Hexadecanol	36653-82-4	27	E	NJ,+
1-Octadecanol	112-92-5	61	E	NJ,+
3-Hexene-2,5-dione	4436-75-3	230	E	NJ,+
Erucylamide	112-84-5	1000	E	NJ,+
~~Unknown Acid~~	~~XXX-XX-XXXX~~	~~41~~	~~E~~	

* 12/10/03

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**46SB1A**	QC Batch:	89845 -109
Sample #:	**344925**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	83
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	200 U	200	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	200 U	200	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	200 U	200	1.58
95-95-4	2,4,5-Trichlorophenol	200 U	200	4.01
88-06-2	2,4,6-Trichlorophenol	200 U	200	3.14
120-83-2	2,4-Dichlorophenol	200 U	200	4.22
105-67-9	2,4-Dimethylphenol	200 U	200	9.53
51-28-5	2,4-Dinitrophenol	400 U	400	3.84
121-14-2	2,4-Dinitrotoluene	200 U	200	3.78
606-20-2	2,6-Dinitrotoluene	200 U	200	33.2
91-58-7	2-Chloronaphthalene	200 U	200	2.76
95-57-8	2-Chlorophenol	200 U	200	2.41
91-57-6	2-Methylnaphthalene	200 U	200	3.29
95-48-7	2-Methylphenol	200 U	200	5.81
88-74-4	2-Nitroaniline	200 U	200	5.52
88-75-5	2-Nitrophenol	200 U	200	2.04
91-94-1	3,3'-Dichlorobenzidine	200 U	200	80.0
99-09-2	3-Nitroaniline	200 U	200	40.0
534-52-1	4,6-Dinitro-2-Methylphenol	200 U	200	5.41
101-55-3	4-Bromophenyl Phenylether	200 U	200	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**13 J**	200	6.25
106-47-8	4-Chloroaniline	200 U	200	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	200 U	200	3.92
106-44-5	4-Methylphenol	200 U	200	7.64
100-01-6	4-Nitroaniline	200 U	200	8.70
100-02-7	4-Nitrophenol	400 U	400	3.40
83-32-9	Acenaphthene	200 U	200	2.06
208-96-8	Acenaphthylene	200 U	200	1.80
98-86-2	Acetophenone	200 U	200	2.28

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**46SB1A**	QC Batch:	89845 -109
Sample #:	**344925**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	83
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	200 U		200	5.54
1912-24-9	Atrazine	400 U		400	8.26
100-52-7	Benzaldehyde	200 U	UJ,c	200	4.86
56-55-3	Benzo (a) Anthracene	200 U		200	16.0
50-32-8	Benzo (a) Pyrene	200 U		200	6.85
205-99-2	Benzo (b) Fluoranthene	200 U		200	11.7
191-24-2	Benzo (g,h,i,) Perylene	200 U		200	10.5
207-08-9	Benzo (k) Fluoranthene	200 U		200	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	200 U		200	3.77
111-44-4	Bis (2-Chloroethyl) Ether	200 U		200	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**52 J**	B,x	200	2.48
85-68-7	Butyl Benzyl Phthalate	200 U		200	5.38
105-60-2	Caprolactam	400 U		400	7.66
86-74-8	Carbazole	200 U		200	7.32
218-01-9	Chrysene	200 U		200	12.2
53-70-3	Dibenzo (a,h) Anthracene	200 U		200	7.08
132-64-9	Dibenzofuran	200 U		200	3.79
84-66-2	Diethylphthalate	200 U		200	2.28
131-11-3	Dimethylphthalate	200 U		200	3.97
84-74-2	**Di-n-Butylphthalate**	**21 J**		200	4.58
117-84-0	Di-n-Octylphthalate	200 U		200	3.72
206-44-0	Fluoranthene	200 U		200	2.82
86-73-7	Fluorene	200 U		200	2.02
118-74-1	Hexachlorobenzene	200 U		200	3.01
87-68-3	Hexachlorobutadiene	200 U		200	4.64
77-47-4	Hexachlorocyclopentadiene	200 U		200	2.38
67-72-1	Hexachloroethane	200 U		200	2.80
193-39-5	Indeno (1,2,3-cd) Pyrene	200 U		200	4.70
78-59-1	Isophorone	200 U		200	2.08
91-20-3	Naphthalene	200 U		200	3.30
98-95-3	Nitrobenzene	200 U		200	3.84

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**46SB1A**	QC Batch:	89845 -109
Sample #:	**344925**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	83
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	200 U	200	3.95
86-30-6	N-Nitroso-di-Phenylamine	200 U	200	5.70
87-86-5	Pentachlorophenol	400 U	400	5.27
85-01-8	Phenanthrene	200 U	200	2.76
108-95-2	Phenol	200 U	200	4.75
129-00-0	**Pyrene**	**2.0 J**	200	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**46SB1A**	QC Batch:	89845 -109
Sample #:	**344925**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	83
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(M) 1-Eicosanol	629-96-9	42	E	NJ,+
(Z)-9-Octadecenamide	301-02-0	440	E	B,X
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	24	E	B,X
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	43	E	B,X

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:20
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/14/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**46SB1B**	QC Batch:	89845 -109
Sample #:	**344926**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U	220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U	220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U	220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U	220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U	220	3.41
120-83-2	2,4-Dichlorophenol	220 U	220	4.58
105-67-9	2,4-Dimethylphenol	220 U	220	10.3
51-28-5	2,4-Dinitrophenol	430 U	430	4.16
121-14-2	2,4-Dinitrotoluene	220 U	220	4.10
606-20-2	2,6-Dinitrotoluene	220 U	220	36.0
91-58-7	2-Chloronaphthalene	220 U	220	2.99
95-57-8	2-Chlorophenol	220 U	220	2.61
91-57-6	2-Methylnaphthalene	220 U	220	3.56
95-48-7	2-Methylphenol	220 U	220	6.29
88-74-4	2-Nitroaniline	220 U	220	5.98
88-75-5	2-Nitrophenol	220 U	220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U	220	86.7
99-09-2	3-Nitroaniline	220 U	220	43.3
534-52-1	4,6-Dinitro-2-Methylphenol	220 U	220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U	220	4.39
59-50-7	**4-Chloro-3-Methylphenol**	**22 J**	220	6.77
106-47-8	4-Chloroaniline	220 U	220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U	220	4.25
106-44-5	4-Methylphenol	220 U	220	8.28
100-01-6	4-Nitroaniline	220 U	220	9.43
100-02-7	4-Nitrophenol	430 U	430	3.68
83-32-9	Acenaphthene	220 U	220	2.24
208-96-8	Acenaphthylene	220 U	220	1.95
98-86-2	Acetophenone	220 U	220	2.47

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:20
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/14/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**46SB1B**	QC Batch:	89845 -109
Sample #:	**344926**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	220 U		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U	VJ,c	220	5.27
56-55-3	Benzo (a) Anthracene	220 U		220	17.3
50-32-8	Benzo (a) Pyrene	220 U		220	7.42
205-99-2	Benzo (b) Fluoranthene	220 U		220	12.7
191-24-2	Benzo (g,h,i,) Perylene	220 U		220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**52 J**	B,x	220	2.69
85-68-7	Butyl Benzyl Phthalate	220 U		220	5.82
105-60-2	Caprolactam	430 U		430	8.29
86-74-8	Carbazole	220 U		220	7.93
218-01-9	Chrysene	220 U		220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U		220	7.67
132-64-9	Dibenzofuran	220 U		220	4.11
84-66-2	**Diethylphthalate**	**3.0 J**	B,x	220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**30 J**		220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	Fluoranthene	220 U		220	3.06
86-73-7	Fluorene	220 U		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U		220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	Indeno (1,2,3-cd) Pyrene	220 U		220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	Naphthalene	220 U		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**46SB1B**	QC Batch:	89845 -109
Sample #:	**344926**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	N-Nitroso-di-Phenylamine	220 U	220	6.18
87-86-5	Pentachlorophenol	430 U	430	5.71
85-01-8	Phenanthrene	220 U	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	Pyrene	220 U	220	1.92

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**46SB1B**	QC Batch:	89845 -109
Sample #:	**344926**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	76
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	770	E	B,x
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	34	E	B,x
17-Pentatriacontene	6971-40-0	52	E	NJ,+
2-Ethyl-1-Hexanol	104-76-7	26	E	NJ,+
3-Hexene-2,5-dione	4436-75-3	160	E	NJ,+
Ditriacontane	544-85-4	40	E	NJ,+
Docosane	629-97-0	45	E	NJ,+
Heptacosane	593-49-7	60	E	NJ,+
Tetratriacontane	14167-59-0	44	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**46SB1C**	QC Batch:	89845 -109
Sample #:	**344927**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	68
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	250 U	250	3.69
95-94-3	1,2,4,5-Tetrachloro-benzene	250 U	250	43.1
108-60-1	Bis (2-Chloroisopropyl)-Ether	250 U	250	1.98
95-95-4	2,4,5-Trichlorophenol	250 U	250	5.01
88-06-2	2,4,6-Trichlorophenol	250 U	250	3.93
120-83-2	2,4-Dichlorophenol	250 U	250	5.28
105-67-9	2,4-Dimethylphenol	250 U	250	11.9
51-28-5	2,4-Dinitrophenol	490 U	490	4.80
121-14-2	2,4-Dinitrotoluene	250 U	250	4.73
606-20-2	2,6-Dinitrotoluene	250 U	250	41.6
91-58-7	2-Chloronaphthalene	250 U	250	3.45
95-57-8	2-Chlorophenol	250 U	250	3.02
91-57-6	2-Methylnaphthalene	250 U	250	4.11
95-48-7	2-Methylphenol	250 U	250	7.26
88-74-4	2-Nitroaniline	250 U	250	6.90
88-75-5	2-Nitrophenol	250 U	250	2.55
91-94-1	3,3'-Dichlorobenzidine	250 U	250	100
99-09-2	3-Nitroaniline	250 U	250	50.0
534-52-1	4,6-Dinitro-2-Methylphenol	250 U	250	6.77
101-55-3	4-Bromophenyl Phenylether	250 U	250	5.07
59-50-7	**4-Chloro-3-Methylphenol**	**27 J**	250	7.82
106-47-8	4-Chloroaniline	250 U	250	1.89
7005-72-3	4-Chlorophenylphenyl-Ether	250 U	250	4.91
106-44-5	4-Methylphenol	250 U	250	9.56
100-01-6	4-Nitroaniline	250 U	250	10.9
100-02-7	4-Nitrophenol	480 U	480	4.25
83-32-9	Acenaphthene	250 U	250	2.58
208-96-8	Acenaphthylene	250 U	250	2.25
98-86-2	Acetophenone	250 U	250	2.85

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:50
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/14/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**46SB1C**	QC Batch:	89845 -109
Sample #:	**344927**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	68
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	250 U		250	6.93
1912-24-9	Atrazine	250 U		250	10.3
100-52-7	Benzaldehyde	250 U	VJ,C	250	6.08
56-55-3	Benzo (a) Anthracene	250 U		250	20.0
50-32-8	Benzo (a) Pyrene	250 U		250	8.57
205-99-2	Benzo (b) Fluoranthene	250 U		250	14.6
191-24-2	Benzo (g,h,i,) Perylene	250 U		250	13.1
207-08-9	Benzo (k) Fluoranthene	250 U		250	20.1
111-91-1	Bis (2-Chloroethoxy)-Methane	250 U		250	4.71
111-44-4	Bis (2-Chloroethyl) Ether	250 U		250	2.60
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**56 J**	B,X	250	3.11
85-68-7	Butyl Benzyl Phthalate	250 U		250	6.72
105-60-2	Caprolactam	480 U		480	9.57
86-74-8	Carbazole	250 U		250	9.15
218-01-9	Chrysene	250 U		250	15.3
53-70-3	Dibenzo (a,h) Anthracene	250 U		250	8.85
132-64-9	Dibenzofuran	250 U		250	4.74
84-66-2	**Diethylphthalate**	**3.0 J**	B,X	250	2.85
131-11-3	Dimethylphthalate	250 U		250	4.97
84-74-2	**Di-n-Butylphthalate**	**31 J**		250	5.73
117-84-0	Di-n-Octylphthalate	250 U		250	4.65
206-44-0	Fluoranthene	250 U		250	3.53
86-73-7	Fluorene	250 U		250	2.52
118-74-1	Hexachlorobenzene	250 U		250	3.77
87-68-3	Hexachlorobutadiene	250 U		250	5.81
77-47-4	Hexachlorocyclopentadiene	250 U		250	2.97
67-72-1	Hexachloroethane	250 U		250	3.50
193-39-5	Indeno (1,2,3-cd) Pyrene	250 U		250	5.88
78-59-1	Isophorone	250 U		250	2.60
91-20-3	Naphthalene	250 U		250	4.13
98-95-3	Nitrobenzene	250 U		250	4.80

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**46SB1C**	QC Batch:	89845 -109
Sample #:	**344927**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	68
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	250 U	250	4.94
86-30-6	N-Nitroso-di-Phenylamine	250 U	250	7.13
87-86-5	Pentachlorophenol	480 U	480	6.59
85-01-8	Phenanthrene	250 U	250	3.45
108-95-2	Phenol	250 U	250	5.94
129-00-0	Pyrene	250 U	250	2.22

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**46SB1C**	QC Batch:	89845 -109
Sample #:	**344927**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	68
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	1000	E	B,X
1,2-Benzenedicarboxylic acid, butyl 2-methylpropyl ester	17851-53-5	49	E	NJ,+
1-Octadecanol	112-92-5	54	E	NJ,+
2-Ethyl-1-Hexanol	104-76-7	29	E	NJ,+
~~Unknown Acid~~	~~XXX-XX-XXXX~~	~~30~~	~~E~~	~~A~~ 12/10/03

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 13:25
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/14/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**46SB2A**	QC Batch:	89845 -109
Sample #:	**344928**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	200 U	200	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	200 U	200	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	200 U	200	1.58
95-95-4	2,4,5-Trichlorophenol	200 U	200	4.01
88-06-2	2,4,6-Trichlorophenol	200 U	200	3.14
120-83-2	2,4-Dichlorophenol	200 U	200	4.22
105-67-9	2,4-Dimethylphenol	200 U	200	9.53
51-28-5	2,4-Dinitrophenol	390 U	390	3.84
121-14-2	2,4-Dinitrotoluene	200 U	200	3.78
606-20-2	2,6-Dinitrotoluene	200 U	200	33.2
91-58-7	2-Chloronaphthalene	200 U	200	2.76
95-57-8	2-Chlorophenol	200 U	200	2.41
91-57-6	2-Methylnaphthalene	200 U	200	3.29
95-48-7	2-Methylphenol	200 U	200	5.81
88-74-4	2-Nitroaniline	200 U	200	5.52
88-75-5	2-Nitrophenol	200 U	200	2.04
91-94-1	3,3'-Dichlorobenzidine	200 U	200	80.0
99-09-2	3-Nitroaniline	200 U	200	40.0
534-52-1	4,6-Dinitro-2-Methylphenol	200 U	200	5.41
101-55-3	4-Bromophenyl Phenylether	200 U	200	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**25 J**	200	6.25
106-47-8	4-Chloroaniline	200 U	200	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	200 U	200	3.92
106-44-5	4-Methylphenol	200 U	200	7.64
100-01-6	4-Nitroaniline	200 U	200	8.70
100-02-7	4-Nitrophenol	390 U	390	3.40
83-32-9	Acenaphthene	200 U	200	2.06
208-96-8	Acenaphthylene	200 U	200	1.80
98-86-2	Acetophenone	200 U	200	2.28

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 13:25
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**46SB2A**	QC Batch:	89845 -109
Sample #:	**344928**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	200 U		200	5.54
1912-24-9	Atrazine	200 U		200	8.26
100-52-7	Benzaldehyde	200 U	UJ,C	200	4.86
56-55-3	Benzo (a) Anthracene	200 U		200	16.0
50-32-8	Benzo (a) Pyrene	200 U		200	6.85
205-99-2	Benzo (b) Fluoranthene	200 U		200	11.7
191-24-2	Benzo (g,h,i,) Perylene	200 U		200	10.5
207-08-9	Benzo (k) Fluoranthene	200 U		200	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	200 U		200	3.77
111-44-4	Bis (2-Chloroethyl) Ether	200 U		200	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**51 J**	B,X	200	2.48
85-68-7	Butyl Benzyl Phthalate	200 U		200	5.38
105-60-2	Caprolactam	390 U		390	7.66
86-74-8	Carbazole	200 U		200	7.32
218-01-9	Chrysene	200 U		200	12.2
53-70-3	Dibenzo (a,h) Anthracene	200 U		200	7.08
132-64-9	Dibenzofuran	200 U		200	3.79
84-66-2	**Diethylphthalate**	**3.0 J**	B,X	200	2.28
131-11-3	Dimethylphthalate	200 U		200	3.97
84-74-2	**Di-n-Butylphthalate**	**28 J**		200	4.58
117-84-0	Di-n-Octylphthalate	200 U		200	3.72
206-44-0	Fluoranthene	200 U		200	2.82
86-73-7	Fluorene	200 U		200	2.02
118-74-1	Hexachlorobenzene	200 U		200	3.01
87-68-3	Hexachlorobutadiene	200 U		200	4.64
77-47-4	Hexachlorocyclopentadiene	200 U		200	2.38
67-72-1	Hexachloroethane	200 U		200	2.80
193-39-5	Indeno (1,2,3-cd) Pyrene	200 U		200	4.70
78-59-1	Isophorone	200 U		200	2.08
91-20-3	Naphthalene	200 U		200	3.30
98-95-3	Nitrobenzene	200 U		200	3.84

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 13:25
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**46SB2A**	QC Batch:	89845 -109
Sample #:	**344928**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	200 U	200	3.95
86-30-6	N-Nitroso-di-Phenylamine	200 U	200	5.70
87-86-5	Pentachlorophenol	390 U	390	5.27
85-01-8	Phenanthrene	200 U	200	2.76
108-95-2	Phenol	200 U	200	4.75
129-00-0	Pyrene	200 U	200	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 13:25
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**46SB2A**	QC Batch:	89845 -109
Sample #:	**344928**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	84
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	46	E	B,X
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	84	E	B,X
2-Ethyl-1-Hexanol	104-76-7	28	E	NJ,+
Erucylamide	112-84-5	700	E	NJ,+
Octacosane	630-02-4	22	E	NJ,+
Phosphonic acid, dioctadecyl ester	19047-85-9	20	E	NJ,+
~~Unknown Acid~~	~~XXX-XX-XXXX~~	~~23~~	~~E~~	~~B~~ 12/10/03

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 13:40
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**46SB2B**	QC Batch:	89845 -109
Sample #:	**344929**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	81
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	210 U	210	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	210 U	210	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	210 U	210	1.58
95-95-4	2,4,5-Trichlorophenol	210 U	210	4.01
88-06-2	2,4,6-Trichlorophenol	210 U	210	3.14
120-83-2	2,4-Dichlorophenol	210 U	210	4.22
105-67-9	2,4-Dimethylphenol	210 U	210	9.53
51-28-5	2,4-Dinitrophenol	410 U	410	3.84
121-14-2	2,4-Dinitrotoluene	210 U	210	3.78
606-20-2	2,6-Dinitrotoluene	210 U	210	33.2
91-58-7	2-Chloronaphthalene	210 U	210	2.76
95-57-8	2-Chlorophenol	210 U	210	2.41
91-57-6	2-Methylnaphthalene	210 U	210	3.29
95-48-7	2-Methylphenol	210 U	210	5.81
88-74-4	2-Nitroaniline	210 U	210	5.52
88-75-5	2-Nitrophenol	210 U	210	2.04
91-94-1	3,3'-Dichlorobenzidine	210 U	210	80.0
99-09-2	3-Nitroaniline	210 U	210	40.0
534-52-1	4,6-Dinitro-2-Methylphenol	210 U	210	5.41
101-55-3	4-Bromophenyl Phenylether	210 U	210	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**21 J**	210	6.25
106-47-8	4-Chloroaniline	210 U	210	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	210 U	210	3.92
106-44-5	4-Methylphenol	210 U	210	7.64
100-01-6	4-Nitroaniline	210 U	210	8.70
100-02-7	4-Nitrophenol	410 U	410	3.40
83-32-9	Acenaphthene	210 U	210	2.06
208-96-8	Acenaphthylene	210 U	210	1.80
98-86-2	Acetophenone	210 U	210	2.28

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 13:40
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/01/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/14/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**46SB2B**	QC Batch:	89845 -109
Sample #:	**344929**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	81
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	210 U		210	5.54
1912-24-9	Atrazine	210 U		210	8.26
100-52-7	Benzaldehyde	210 U	VJ,c	210	4.86
56-55-3	Benzo (a) Anthracene	210 U		210	16.0
50-32-8	Benzo (a) Pyrene	210 U		210	6.85
205-99-2	Benzo (b) Fluoranthene	210 U		210	11.7
191-24-2	Benzo (g,h,i,) Perylene	210 U		210	10.5
207-08-9	Benzo (k) Fluoranthene	210 U		210	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	210 U		210	3.77
111-44-4	Bis (2-Chloroethyl) Ether	210 U		210	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**49 J**	B,X	210	2.48
85-68-7	Butyl Benzyl Phthalate	210 U		210	5.38
105-60-2	Caprolactam	410 U		410	7.66
86-74-8	Carbazole	210 U		210	7.32
218-01-9	Chrysene	210 U		210	12.2
53-70-3	Dibenzo (a,h) Anthracene	210 U		210	7.08
132-64-9	Dibenzofuran	210 U		210	3.79
84-66-2	**Diethylphthalate**	**3.0 J**	B,X	210	2.28
131-11-3	Dimethylphthalate	210 U		210	3.97
84-74-2	**Di-n-Butylphthalate**	**24 J**		210	4.58
117-84-0	Di-n-Octylphthalate	210 U		210	3.72
206-44-0	Fluoranthene	210 U		210	2.82
86-73-7	Fluorene	210 U		210	2.02
118-74-1	Hexachlorobenzene	210 U		210	3.01
87-68-3	Hexachlorobutadiene	210 U		210	4.64
77-47-4	Hexachlorocyclopentadiene	210 U		210	2.38
67-72-1	Hexachloroethane	210 U		210	2.80
193-39-5	Indeno (1,2,3-cd) Pyrene	210 U		210	4.70
78-59-1	Isophorone	210 U		210	2.08
91-20-3	Naphthalene	210 U		210	3.30
98-95-3	Nitrobenzene	210 U		210	3.84

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 13:40
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**46SB2B**	QC Batch:	89845 -109
Sample #:	**344929**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	81
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	210 U	210	3.95
86-30-6	N-Nitroso-di-Phenylamine	210 U	210	5.70
87-86-5	Pentachlorophenol	410 U	410	5.27
85-01-8	Phenanthrene	210 U	210	2.76
108-95-2	Phenol	210 U	210	4.75
129-00-0	Pyrene	210 U	210	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 13:40
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/01/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/14/03 JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**46SB2B**	QC Batch:	89845 -109
Sample #:	**344929**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	81
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	110	E	B,X
1,2-Benzenedicarboxylic acid, butyl 2-methylpropyl ester	17851-53-5	31	E	NJ,+
1-Heptadecanol	1454-85-9	37	E	NJ,+
Erucylamide	112-84-5	560	E	NJ,+
~~Unknown Acid~~	~~XXX-XX-XXXX~~	~~21~~	~~E~~	

AS 12/10/03

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 13:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**46SB2C**	QC Batch:	89845 -109
Sample #:	**344930**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	250 U	250	3.69
95-94-3	1,2,4,5-Tetrachloro-benzene	250 U	250	43.1
108-60-1	Bis (2-Chloroisopropyl)-Ether	250 U	250	1.98
95-95-4	2,4,5-Trichlorophenol	250 U	250	5.01
88-06-2	2,4,6-Trichlorophenol	250 U	250	3.93
120-83-2	2,4-Dichlorophenol	250 U	250	5.28
105-67-9	2,4-Dimethylphenol	250 U	250	11.9
51-28-5	2,4-Dinitrophenol	490 U	490	4.80
121-14-2	2,4-Dinitrotoluene	250 U	250	4.73
606-20-2	2,6-Dinitrotoluene	250 U	250	41.6
91-58-7	2-Chloronaphthalene	250 U	250	3.45
95-57-8	2-Chlorophenol	250 U	250	3.02
91-57-6	2-Methylnaphthalene	250 U	250	4.11
95-48-7	2-Methylphenol	250 U	250	7.26
88-74-4	2-Nitroaniline	250 U	250	6.90
88-75-5	2-Nitrophenol	250 U	250	2.55
91-94-1	3,3'-Dichlorobenzidine	250 U	250	100
99-09-2	3-Nitroaniline	250 U	250	50.0
534-52-1	4,6-Dinitro-2-Methylphenol	250 U	250	6.77
101-55-3	4-Bromophenyl Phenylether	250 U	250	5.07
59-50-7	**4-Chloro-3-Methylphenol**	**26 J**	250	7.82
106-47-8	4-Chloroaniline	250 U	250	1.89
7005-72-3	4-Chlorophenylphenyl-Ether	250 U	250	4.91
106-44-5	4-Methylphenol	250 U	250	9.56
100-01-6	4-Nitroaniline	250 U	250	10.9
100-02-7	4-Nitrophenol	490 U	490	4.25
83-32-9	Acenaphthene	250 U	250	2.58
208-96-8	Acenaphthylene	250 U	250	2.25
98-86-2	Acetophenone	250 U	250	2.85

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 13:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**46SB2C**	QC Batch:	89845 -109
Sample #:	**344930**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	250 U		250	6.93
1912-24-9	Atrazine	250 U		250	10.3
100-52-7	Benzaldehyde	250 U	VJ,c	250	6.08
56-55-3	Benzo (a) Anthracene	250 U		250	20.0
50-32-8	Benzo (a) Pyrene	250 U		250	8.57
205-99-2	Benzo (b) Fluoranthene	250 U		250	14.6
191-24-2	Benzo (g,h,i,) Perylene	250 U		250	13.1
207-08-9	Benzo (k) Fluoranthene	250 U		250	20.1
111-91-1	Bis (2-Chloroethoxy)-Methane	250 U		250	4.71
111-44-4	Bis (2-Chloroethyl) Ether	250 U		250	2.60
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**64 J**	B,x	250	3.11
85-68-7	Butyl Benzyl Phthalate	250 U		250	6.72
105-60-2	Caprolactam	490 U		490	9.57
86-74-8	Carbazole	250 U		250	9.15
218-01-9	Chrysene	250 U		250	15.3
53-70-3	Dibenzo (a,h) Anthracene	250 U		250	8.85
132-64-9	Dibenzofuran	250 U		250	4.74
84-66-2	**Diethylphthalate**	**3.0 J**	B,x	250	2.85
131-11-3	Dimethylphthalate	250 U		250	4.97
84-74-2	**Di-n-Butylphthalate**	**28 J**		250	5.73
117-84-0	Di-n-Octylphthalate	250 U		250	4.65
206-44-0	Fluoranthene	250 U		250	3.53
86-73-7	Fluorene	250 U		250	2.52
118-74-1	Hexachlorobenzene	250 U		250	3.77
87-68-3	Hexachlorobutadiene	250 U		250	5.81
77-47-4	Hexachlorocyclopentadiene	250 U		250	2.97
67-72-1	Hexachloroethane	250 U		250	3.50
193-39-5	Indeno (1,2,3-cd) Pyrene	250 U		250	5.88
78-59-1	Isophorone	250 U		250	2.60
91-20-3	Naphthalene	250 U		250	4.13
98-95-3	Nitrobenzene	250 U		250	4.80

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 13:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**46SB2C**	QC Batch:	89845 -109
Sample #:	**344930**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	250 U	250	4.94
86-30-6	N-Nitroso-di-Phenylamine	250 U	250	7.13
87-86-5	Pentachlorophenol	490 U	490	6.59
85-01-8	Phenanthrene	250 U	250	3.45
108-95-2	Phenol	250 U	250	5.94
129-00-0	Pyrene	250 U	250	2.22

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 13:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**46SB2C**	QC Batch:	89845 -109
Sample #:	**344930**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	67
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	140	E	B,X
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	44	E	B,X
1-Octadecanol	112-92-5	56	E	NJ,+
2-Ethyl-1-Hexanol	104-76-7	28	E	NJ,+
3-Hexene-2,5-dione	4436-75-3	150	E	NJ,+
Erucylamide	112-84-5	710	E	NJ,+
~~Unknown Acid~~	~~XXX-XX-XXXX~~	~~27~~	~~E~~	~~NJ,+~~ AS 12/10/03

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD2**	QC Batch:	89845 -109
Sample #:	**344931**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	250 U	250	3.69
95-94-3	1,2,4,5-Tetrachloro-benzene	250 U	250	43.1
108-60-1	Bis (2-Chloroisopropyl)-Ether	250 U	250	1.98
95-95-4	2,4,5-Trichlorophenol	250 U	250	5.01
88-06-2	2,4,6-Trichlorophenol	250 U	250	3.93
120-83-2	2,4-Dichlorophenol	250 U	250	5.28
105-67-9	2,4-Dimethylphenol	250 U	250	11.9
51-28-5	2,4-Dinitrophenol	490 U	490	4.80
121-14-2	2,4-Dinitrotoluene	250 U	250	4.73
606-20-2	2,6-Dinitrotoluene	250 U	250	41.6
91-58-7	2-Chloronaphthalene	250 U	250	3.45
95-57-8	2-Chlorophenol	250 U	250	3.02
91-57-6	2-Methylnaphthalene	250 U	250	4.11
95-48-7	2-Methylphenol	250 U	250	7.26
88-74-4	2-Nitroaniline	250 U	250	6.90
88-75-5	2-Nitrophenol	250 U	250	2.55
91-94-1	3,3'-Dichlorobenzidine	250 U	250	100
99-09-2	3-Nitroaniline	250 U	250	50.0
534-52-1	4,6-Dinitro-2-Methylphenol	250 U	250	6.77
101-55-3	4-Bromophenyl Phenylether	250 U	250	5.07
59-50-7	**4-Chloro-3-Methylphenol**	**41 J**	250	7.82
106-47-8	4-Chloroaniline	250 U	250	1.89
7005-72-3	4-Chlorophenylphenyl-Ether	250 U	250	4.91
106-44-5	4-Methylphenol	250 U	250	9.56
100-01-6	4-Nitroaniline	250 U	250	10.9
100-02-7	4-Nitrophenol	490 U	490	4.25
83-32-9	Acenaphthene	250 U	250	2.58
208-96-8	Acenaphthylene	250 U	250	2.25
98-86-2	Acetophenone	250 U	250	2.85

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD2**	QC Batch:	89845 -109
Sample #:	**344931**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	250 U		250	6.93
1912-24-9	Atrazine	250 U		250	10.3
100-52-7	Benzaldehyde	250 U	UJ,c	250	6.08
56-55-3	Benzo (a) Anthracene	250 U		250	20.0
50-32-8	Benzo (a) Pyrene	250 U		250	8.57
205-99-2	Benzo (b) Fluoranthene	250 U		250	14.6
191-24-2	Benzo (g,h,i,) Perylene	250 U		250	13.1
207-08-9	Benzo (k) Fluoranthene	250 U		250	20.1
111-91-1	Bis (2-Chloroethoxy)-Methane	250 U		250	4.71
111-44-4	Bis (2-Chloroethyl) Ether	250 U		250	2.60
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**65 J**	B,x	250	3.11
85-68-7	Butyl Benzyl Phthalate	250 U		250	6.72
105-60-2	Caprolactam	490 U		490	9.57
86-74-8	Carbazole	250 U		250	9.15
218-01-9	Chrysene	250 U		250	15.3
53-70-3	Dibenzo (a,h) Anthracene	250 U		250	8.85
132-64-9	Dibenzofuran	250 U		250	4.74
84-66-2	**Diethylphthalate**	**5.0 J**	B,x	250	2.85
131-11-3	Dimethylphthalate	250 U		250	4.97
84-74-2	**Di-n-Butylphthalate**	**48 J**		250	5.73
117-84-0	Di-n-Octylphthalate	250 U		250	4.65
206-44-0	Fluoranthene	250 U		250	3.53
86-73-7	Fluorene	250 U		250	2.52
118-74-1	Hexachlorobenzene	250 U		250	3.77
87-68-3	Hexachlorobutadiene	250 U		250	5.81
77-47-4	Hexachlorocyclopentadiene	250 U		250	2.97
67-72-1	Hexachloroethane	250 U		250	3.50
193-39-5	Indeno (1,2,3-cd) Pyrene	250 U		250	5.88
78-59-1	Isophorone	250 U		250	2.60
91-20-3	Naphthalene	250 U		250	4.13
98-95-3	Nitrobenzene	250 U		250	4.80

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD2**	QC Batch:	89845 -109
Sample #:	**344931**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	250 U	250	4.94
86-30-6	N-Nitroso-di-Phenylamine	250 U	250	7.13
87-86-5	Pentachlorophenol	490 U	490	6.59
85-01-8	Phenanthrene	250 U	250	3.45
108-95-2	Phenol	250 U	250	5.94
129-00-0	Pyrene	250 U	250	2.22

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 00:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/14/03 JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**SBD2**	QC Batch:	89845 -109
Sample #:	**344931**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	67
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	240	E	B,x
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	66	E	B,x
1-Heptadecanol	1454-85-9	31	E	NJ,+
2-Ethyl-1-Hexanol	104-76-7	36	E	NJ,+
9-HEPTADECANONE	540-08-9	25	E	NJ,+
Erucylamide	112-84-5	1100	E	NJ,+
Phosphonic acid, dioctadecyl ester	19047-85-9	55	E	NJ,+
Squalene	7683-64-9	170	E	NJ,+
~~Unknown Acid~~	~~XXX-XX-XXXX~~	~~41~~	~~E~~	As 12/10/03

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 15:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/14/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**37SB1A**	QC Batch:	89845 -109
Sample #:	**344932**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	61
Unit:	ug/kg dry	Dilution Factor:	16

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	2800 U	2800	39.4
95-94-3	1,2,4,5-Tetrachloro-benzene	2800 U	2800	459
108-60-1	Bis (2-Chloroisopropyl)-Ether	2800 U	2800	21.1
95-95-4	2,4,5-Trichlorophenol	2800 U	2800	53.4
88-06-2	2,4,6-Trichlorophenol	2800 U	2800	41.9
120-83-2	2,4-Dichlorophenol	2800 U	2800	56.3
105-67-9	2,4-Dimethylphenol	2800 U	2800	127
51-28-5	2,4-Dinitrophenol	5600 U	5600	51.2
121-14-2	**2,4-Dinitrotoluene**	**260 J**	2800	50.4
606-20-2	2,6-Dinitrotoluene	2800 U	2800	443
91-58-7	2-Chloronaphthalene	2800 U	2800	36.8
95-57-8	2-Chlorophenol	2800 U	2800	32.2
91-57-6	2-Methylnaphthalene	2800 U	2800	43.8
95-48-7	2-Methylphenol	2800 U	2800	77.4
88-74-4	2-Nitroaniline	2800 U	2800	73.6
88-75-5	2-Nitrophenol	2800 U	2800	27.2
91-94-1	3,3'-Dichlorobenzidine	2800 U	2800	1070
99-09-2	3-Nitroaniline	2800 U	2800	533
534-52-1	4,6-Dinitro-2-Methylphenol	2800 U	2800	72.2
101-55-3	4-Bromophenyl Phenylether	2800 U	2800	54.1
59-50-7	4-Chloro-3-Methylphenol	2800 U	2800	83.4
106-47-8	4-Chloroaniline	2800 U	2800	20.2
7005-72-3	4-Chlorophenylphenyl-Ether	2800 U	2800	52.3
106-44-5	4-Methylphenol	2800 U	2800	102
100-01-6	4-Nitroaniline	2800 U	2800	116
100-02-7	4-Nitrophenol	5600 U	5600	45.3
83-32-9	Acenaphthene	2800 U	2800	27.5
208-96-8	Acenaphthylene	2800 U	2800	24.0
98-86-2	Acetophenone	2800 U	2800	30.4

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 15:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/14/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**37SB1A**	QC Batch:	89845 -109
Sample #:	**344932**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	61
Unit:	ug/kg dry	Dilution Factor:	16

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	2800 U		2800	73.9
1912-24-9	Atrazine	2800 U		2800	110
100-52-7	Benzaldehyde	2800 U	UJ,c	2800	64.8
56-55-3	Benzo (a) Anthracene	2800 U		2800	213
50-32-8	*Benzo (a) Pyrene	2800 UR	UJ,i	2800	91.4
205-99-2	*Benzo (b) Fluoranthene	2800 UR	UJ,i	2800	156
191-24-2	*Benzo (g,h,i,) Perylene	2800 UR	UJ,i	2800	140
207-08-9	*Benzo (k) Fluoranthene	2800 UR	UJ,i	2800	214
111-91-1	Bis (2-Chloroethoxy)-Methane	2800 U		2800	50.2
111-44-4	Bis (2-Chloroethyl) Ether	2800 U		2800	27.7
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**890 J**	B,X	2800	33.1
85-68-7	Butyl Benzyl Phthalate	2800 U		2800	71.7
105-60-2	Caprolactam	5600 U		5600	102
86-74-8	Carbazole	2800 U		2800	97.6
218-01-9	Chrysene	2800 U		2800	163
53-70-3	*Dibenzo (a,h) Anthracene	2800 UR	UJ,i	2800	94.4
132-64-9	Dibenzofuran	2800 U		2800	50.6
84-66-2	Diethylphthalate	2800 U		2800	30.4
131-11-3	Dimethylphthalate	2800 U		2800	53.0
84-74-2	**Di-n-Butylphthalate**	**14000**		2800	61.1
117-84-0	Di-n-Octylphthalate	2800 U		2800	49.6
206-44-0	**Fluoranthene**	**120 J**		2800	37.6
86-73-7	Fluorene	2800 U		2800	26.9
118-74-1	Hexachlorobenzene	2800 U		2800	40.2
87-68-3	Hexachlorobutadiene	2800 U		2800	61.9
77-47-4	Hexachlorocyclopentadiene	2800 U		2800	31.7
67-72-1	Hexachloroethane	2800 U		2800	37.3
193-39-5	*Indeno (1,2,3-cd) Pyrene	2800 UR	UJ,i	2800	62.7
78-59-1	Isophorone	2800 U		2800	27.7
91-20-3	Naphthalene	2800 U		2800	44.0
98-95-3	Nitrobenzene	2800 U		2800	51.2

* See attached Statement of Data Qualifications.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB1A**	QC Batch:	89845 -109
Sample #:	**344932**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	61
Unit:	ug/kg dry	Dilution Factor:	16

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	2800 U	2800	52.6
86-30-6	**N-Nitroso-di-Phenylamine**	**450 J**	2800	76.0
87-86-5	Pentachlorophenol	5600 U	5600	70.2
85-01-8	**Phenanthrene**	**40 J**	2800	36.8
108-95-2	Phenol	2800 U	2800	63.4
129-00-0	**Pyrene**	**110 J**	2800	23.7

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 15:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/14/03 JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**37SB1A**	QC Batch:	89845 -109
Sample #:	**344932**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	61
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
1,2-Benzenedicarboxylic acid, butyl 8-methylnonyl ester	89-18-9	280	E NJ,+
2 (5H)-Furanone	497-23-4	320	E NJ,+
~~Unknown Acid~~	~~XXX-XX-XXXX~~	~~3800~~	~~E~~

12/10/03

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB1A**	QC Batch:	89845 -109
Sample #:	**344932DL**	Anal. Batch:	207828
Matrix:	Soil	Percent Solids:	61
Unit:	ug/kg dry	Dilution Factor:	160

See DF 16 dh 12/10/03

CAS Number	Semivolatile Organics *OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	28000 U		28000	394
95-94-3	1,2,4,5-Tetrachloro-benzene	28000 U		28000	4590
108-60-1	Bis (2-Chloroisopropyl)-Ether	28000 U		28000	211
95-95-4	2,4,5-Trichlorophenol	28000 U		28000	534
88-06-2	2,4,6-Trichlorophenol	28000 U		28000	419
120-83-2	2,4-Dichlorophenol	28000 U		28000	563
105-67-9	2,4-Dimethylphenol	28000 U		28000	1270
51-28-5	2,4-Dinitrophenol	56000 U		56000	512
121-14-2	2,4-Dinitrotoluene	28000 U		28000	504
606-20-2	2,6-Dinitrotoluene	28000 U		28000	4430
91-58-7	2-Chloronaphthalene	28000 U		28000	368
95-57-8	2-Chlorophenol	28000 U		28000	322
91-57-6	2-Methylnaphthalene	28000 U		28000	438
95-48-7	2-Methylphenol	28000 U		28000	774
88-74-4	2-Nitroaniline	28000 U		28000	736
88-75-5	2-Nitrophenol	28000 U		28000	272
91-94-1	3,3'-Dichlorobenzidine	28000 U		28000	10700
99-09-2	3-Nitroaniline	28000 U		28000	5330
534-52-1	4,6-Dinitro-2-Methylphenol	28000 U		28000	722
101-55-3	4-Bromophenyl Phenylether	28000 U		28000	541
59-50-7	4-Chloro-3-Methylphenol	28000 U		28000	834
106-47-8	4-Chloroaniline	28000 U	UJ,c	28000	202
7005-72-3	4-Chlorophenylphenyl-Ether	28000 U		28000	523
106-44-5	4-Methylphenol	28000 U		28000	1020
100-01-6	4-Nitroaniline	28000 U		28000	1160
100-02-7	4-Nitrophenol	56000 U		56000	453
83-32-9	Acenaphthene	28000 U		28000	275
208-96-8	Acenaphthylene	28000 U		28000	240
98-86-2	Acetophenone	28000 U		28000	304

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB1A**	QC Batch:	89845 -109
Sample #:	**344932DL**	Anal. Batch:	207828
Matrix:	Soil	Percent Solids:	61
Unit:	ug/kg dry	Dilution Factor:	160

See DF 16 JM 12/16/03

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	28000 U		28000	739
1912-24-9	Atrazine	28000 U		28000	1100
100-52-7	Benzaldehyde	28000 U	UJ,c	28000	648
56-55-3	Benzo (a) Anthracene	28000 U		28000	2130
50-32-8	*Benzo (a) Pyrene	28000 UJ	UJ,i	28000	914
205-99-2	*Benzo (b) Fluoranthene	28000 UJ	UJ,i	28000	1560
191-24-2	*Benzo (g,h,i,) Perylene	28000 UJ	UJ,i	28000	1400
207-08-9	*Benzo (k) Fluoranthene	28000 UJ	UJ,i	28000	2140
111-91-1	Bis (2-Chloroethoxy)-Methane	28000 U		28000	502
111-44-4	Bis (2-Chloroethyl) Ether	28000 U		28000	277
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**4500 J**	B,x	28000	331
85-68-7	Butyl Benzyl Phthalate	28000 U		28000	717
105-60-2	Caprolactam	56000 U		56000	1020
86-74-8	Carbazole	28000 U		28000	976
218-01-9	Chrysene	28000 U		28000	1630
53-70-3	*Dibenzo (a,h) Anthracene	28000 UJ	UJ,i	28000	944
132-64-9	Dibenzofuran	28000 U		28000	506
84-66-2	**Diethylphthalate**	**4200 J**	B,x	28000	304
131-11-3	Dimethylphthalate	28000 U		28000	530
84-74-2	**Di-n-Butylphthalate**	**13000 J**		28000	611
117-84-0	Di-n-Octylphthalate	28000 U		28000	496
206-44-0	Fluoranthene	28000 U		28000	376
86-73-7	Fluorene	28000 U		28000	269
118-74-1	Hexachlorobenzene	28000 U		28000	402
87-68-3	Hexachlorobutadiene	28000 U		28000	619
77-47-4	Hexachlorocyclopentadiene	28000 U		28000	317
67-72-1	Hexachloroethane	28000 U		28000	373
193-39-5	*Indeno (1,2,3-cd) Pyrene	28000 UJ	UJ,i	28000	627
78-59-1	Isophorone	28000 U		28000	277
91-20-3	Naphthalene	28000 U		28000	440
98-95-3	Nitrobenzene	28000 U		28000	512

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB1A**	QC Batch:	89845 -109
Sample #:	**344932DL**	Anal. Batch:	207828
Matrix:	Soil	Percent Solids:	61
Unit:	ug/kg dry	Dilution Factor:	160

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	28000 U	28000	526
86-30-6	N-Nitroso-di-Phenylamine	28000 U	28000	760
87-86-5	Pentachlorophenol	56000 U	56000	702
85-01-8	Phenanthrene	28000 U	28000	368
108-95-2	Phenol	28000 U	28000	634
129-00-0	Pyrene	28000 U	28000	237

See DF 16 & 12/10/03

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 16:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/15/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**37SB1B**	QC Batch:	89845 -109
Sample #:	**345024**	Anal. Batch:	207828
Matrix:	Soil	Percent Solids:	83
Unit:	ug/kg dry	Dilution Factor:	1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	200 U		200	2.46
95-94-3	1,2,4,5-Tetrachloro-benzene	200 U		200	28.7
108-60-1	Bis (2-Chloroisopropyl)-Ether	200 U		200	1.32
95-95-4	2,4,5-Trichlorophenol	200 U		200	3.34
88-06-2	2,4,6-Trichlorophenol	200 U		200	2.62
120-83-2	2,4-Dichlorophenol	200 U		200	3.52
105-67-9	2,4-Dimethylphenol	200 U		200	7.94
51-28-5	2,4-Dinitrophenol	400 U		400	3.20
121-14-2	2,4-Dinitrotoluene	200 U		200	3.15
606-20-2	2,6-Dinitrotoluene	200 U		200	27.7
91-58-7	2-Chloronaphthalene	200 U		200	2.30
95-57-8	2-Chlorophenol	200 U		200	2.01
91-57-6	2-Methylnaphthalene	200 U		200	2.74
95-48-7	2-Methylphenol	200 U		200	4.84
88-74-4	2-Nitroaniline	200 U		200	4.60
88-75-5	2-Nitrophenol	200 U		200	1.70
91-94-1	3,3'-Dichlorobenzidine	200 U		200	66.7
99-09-2	3-Nitroaniline	200 U		200	33.3
534-52-1	4,6-Dinitro-2-Methylphenol	200 U		200	4.51
101-55-3	4-Bromophenyl Phenylether	200 U		200	3.38
59-50-7	**4-Chloro-3-Methylphenol**	**24 J**		200	5.21
106-47-8	4-Chloroaniline	200 U	UJ,c	200	1.26
7005-72-3	4-Chlorophenylphenyl-Ether	200 U		200	3.27
106-44-5	4-Methylphenol	200 U		200	6.37
100-01-6	4-Nitroaniline	200 U		200	7.25
100-02-7	4-Nitrophenol	400 U		400	2.83
83-32-9	Acenaphthene	200 U		200	1.72
208-96-8	Acenaphthylene	200 U		200	1.50
98-86-2	Acetophenone	200 U		200	1.90

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB1B**	QC Batch:	89845 -109
Sample #:	**345024**	Anal. Batch:	207828
Matrix:	Soil	Percent Solids:	83
Unit:	ug/kg dry	Dilution Factor:	1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	200 U		200	4.62
1912-24-9	Atrazine	200 U		200	6.88
100-52-7	Benzaldehyde	200 U	UJ,C	200	4.05
56-55-3	Benzo (a) Anthracene	200 U		200	13.3
50-32-8	Benzo (a) Pyrene	200 U		200	5.71
205-99-2	Benzo (b) Fluoranthene	200 U		200	9.76
191-24-2	Benzo (g,h,i,) Perylene	200 U		200	8.72
207-08-9	Benzo (k) Fluoranthene	200 U		200	13.4
111-91-1	Bis (2-Chloroethoxy)-Methane	200 U		200	3.14
111-44-4	Bis (2-Chloroethyl) Ether	200 U		200	1.73
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**46 J**	B,X	200	2.07
85-68-7	Butyl Benzyl Phthalate	200 U		200	4.48
105-60-2	Caprolactam	400 U		400	6.38
86-74-8	Carbazole	200 U		200	6.10
218-01-9	Chrysene	200 U		200	10.2
53-70-3	Dibenzo (a,h) Anthracene	200 U		200	5.90
132-64-9	Dibenzofuran	200 U		200	3.16
84-66-2	Diethylphthalate	200 U		200	1.90
131-11-3	**Dimethylphthalate**	**30 J**		200	3.31
84-74-2	**Di-n-Butylphthalate**	**33 J**		200	3.82
117-84-0	Di-n-Octylphthalate	200 U		200	3.10
206-44-0	Fluoranthene	200 U		200	2.35
86-73-7	Fluorene	200 U		200	1.68
118-74-1	Hexachlorobenzene	200 U		200	2.51
87-68-3	Hexachlorobutadiene	200 U		200	3.87
77-47-4	Hexachlorocyclopentadiene	200 U		200	1.98
67-72-1	Hexachloroethane	200 U		200	2.33
193-39-5	Indeno (1,2,3-cd) Pyrene	200 U		200	3.92
78-59-1	Isophorone	200 U		200	1.73
91-20-3	Naphthalene	200 U		200	2.75
98-95-3	Nitrobenzene	200 U		200	3.20

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB1B**	QC Batch:	89845 -109
Sample #:	**345024**	Anal. Batch:	207828
Matrix:	Soil	Percent Solids:	83
Unit:	ug/kg dry	Dilution Factor:	1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	200 U	200	3.29
86-30-6	N-Nitroso-di-Phenylamine	200 U	200	4.75
87-86-5	Pentachlorophenol	400 U	400	4.39
85-01-8	Phenanthrene	200 U	200	2.30
108-95-2	Phenol	200 U	200	3.96
129-00-0	Pyrene	200 U	200	1.48

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB1B**	QC Batch:	89845 -109
Sample #:	**345024**	Anal. Batch:	207828
Matrix:	Soil	Percent Solids:	83
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	110	E	B,X
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	45	E	B,X
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	100	E	B,X
~~Unknown Acid~~	~~XXX-XX-XXXX~~	~~22~~	~~E~~	

~~*~~ 12/10/03

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**FSB1A**	QC Batch:	90138 -110
Sample #:	**344823**	Anal. Batch:	208174
Matrix:	Soil	Percent Solids:	87
Unit:	ug/kg dry	Dilution Factor:	1.15

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	110 U		110	10.8
208-96-8	Acenaphthylene	240 U		240	13.3
120-12-7	Anthracene	24 U		24	0.805
56-55-3	Benzo (a) Anthracene	24 U	UJ,I	24	0.920
50-32-8	Benzo (a) Pyrene	24 U		24	1.15
205-99-2	Benzo (b) Fluoranthene	24 U		24	1.50
191-24-2	Benzo (g,h,i,) Perylene	110 U		110	14.4
207-08-9	Benzo (k) Fluoranthene	24 U		24	1.15
218-01-9	Chrysene	24 U		24	1.38
53-70-3	Dibenzo (a,h) Anthracene	24 U		24	1.61
206-44-0	Fluoranthene	24 U		24	1.96
86-73-7	Fluorene	24 U		24	1.50
193-39-5	Indeno (1,2,3-cd) Pyrene	24 U		24	0.805
91-20-3	Naphthalene	110 U		110	9.09
85-01-8	Phenanthrene	24 U		24	0.690
129-00-0	Pyrene	24 U		24	1.04

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 14:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**FSB1B**	QC Batch:	90138 -110
Sample #:	**344824**	Anal. Batch:	208174
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.18

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	120 U		120	11.1
208-96-8	Acenaphthylene	250 U		250	13.7
120-12-7	Anthracene	25 U		25	0.826
56-55-3	Benzo (a) Anthracene	25 U	VJ,I	25	0.944
50-32-8	Benzo (a) Pyrene	25 U		25	1.18
205-99-2	Benzo (b) Fluoranthene	25 U		25	1.53
191-24-2	Benzo (g,h,i,) Perylene	120 U		120	14.8
207-08-9	Benzo (k) Fluoranthene	25 U		25	1.18
218-01-9	Chrysene	25 U		25	1.42
53-70-3	Dibenzo (a,h) Anthracene	25 U		25	1.65
206-44-0	Fluoranthene	25 U		25	2.01
86-73-7	Fluorene	25 U		25	1.53
193-39-5	Indeno (1,2,3-cd) Pyrene	25 U		25	0.826
91-20-3	Naphthalene	120 U		120	9.32
85-01-8	Phenanthrene	25 U		25	0.708
129-00-0	Pyrene	25 U		25	1.06

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 14:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/01/03 @ 09:15
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/13/03 by TAJ
		Anal. Method:	USEPA-8310
Sample ID:	**FSB1C**	QC Batch:	90138 -110
Sample #:	**344825**	Anal. Batch:	208174
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.22

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	120 U		120	11.5
208-96-8	Acenaphthylene	260 U		260	14.2
120-12-7	Anthracene	26 U		26	0.854
56-55-3	Benzo (a) Anthracene	26 U	UJ,I	26	0.976
50-32-8	Benzo (a) Pyrene	26 U		26	1.22
205-99-2	Benzo (b) Fluoranthene	26 U		26	1.59
191-24-2	Benzo (g,h,i,) Perylene	120 U		120	15.3
207-08-9	Benzo (k) Fluoranthene	26 U		26	1.22
218-01-9	Chrysene	26 U		26	1.46
53-70-3	Dibenzo (a,h) Anthracene	26 U		26	1.71
206-44-0	Fluoranthene	26 U		26	2.07
86-73-7	Fluorene	26 U		26	1.59
193-39-5	Indeno (1,2,3-cd) Pyrene	26 U		26	0.854
91-20-3	Naphthalene	120 U		120	9.64
85-01-8	Phenanthrene	26 U		26	0.732
129-00-0	Pyrene	26 U		26	1.10

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**FSB2A**	QC Batch:	90138 -110
Sample #:	**344826**	Anal. Batch:	208174
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.18

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	120 U		120	11.1
208-96-8	Acenaphthylene	250 U		250	13.7
120-12-7	Anthracene	25 U		25	0.826
56-55-3	Benzo (a) Anthracene	25 U	UJ,I	25	0.944
50-32-8	Benzo (a) Pyrene	25 U		25	1.18
205-99-2	Benzo (b) Fluoranthene	25 U		25	1.53
191-24-2	Benzo (g,h,i,) Perylene	120 U	UJ,M	120	14.8
207-08-9	Benzo (k) Fluoranthene	25 U		25	1.18
218-01-9	Chrysene	25 U		25	1.42
53-70-3	Dibenzo (a,h) Anthracene	25 U		25	1.65
206-44-0	Fluoranthene	25 U	UJ,M	25	2.01
86-73-7	Fluorene	25 U		25	1.53
193-39-5	Indeno (1,2,3-cd) Pyrene	25 U		25	0.826
91-20-3	Naphthalene	120 U		120	9.32
85-01-8	Phenanthrene	25 U	UJ,M	25	0.708
129-00-0	Pyrene	25 U		25	1.06

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**FSB2B**	QC Batch:	90138 -110
Sample #:	**344827**	Anal. Batch:	208174
Matrix:	Soil	Percent Solids:	93
Unit:	ug/kg dry	Dilution Factor:	1.07

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	110 U		110	10.1
208-96-8	Acenaphthylene	230 U		230	12.4
120-12-7	Anthracene	23 U		23	0.749
56-55-3	Benzo (a) Anthracene	23 U	UJ,I	23	0.856
50-32-8	Benzo (a) Pyrene	23 U		23	1.07
205-99-2	Benzo (b) Fluoranthene	23 U		23	1.39
191-24-2	Benzo (g,h,i,) Perylene	110 U		110	13.4
207-08-9	Benzo (k) Fluoranthene	23 U		23	1.07
218-01-9	Chrysene	23 U		23	1.28
53-70-3	Dibenzo (a,h) Anthracene	23 U		23	1.50
206-44-0	Fluoranthene	23 U		23	1.82
86-73-7	Fluorene	23 U		23	1.39
193-39-5	Indeno (1,2,3-cd) Pyrene	23 U		23	0.749
91-20-3	Naphthalene	110 U		110	8.45
85-01-8	Phenanthrene	23 U		23	0.642
129-00-0	Pyrene	23 U		23	0.963

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**SBD-1**	QC Batch:	90138 -110
Sample #:	**344828**	Anal. Batch:	208174
Matrix:	Soil	Percent Solids:	88
Unit:	ug/kg dry	Dilution Factor:	1.14

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	110 U		110	10.7
208-96-8	Acenaphthylene	240 U		240	13.2
120-12-7	Anthracene	24 U		24	0.798
56-55-3	Benzo (a) Anthracene	24 U	UJ,I	24	0.912
50-32-8	Benzo (a) Pyrene	24 U		24	1.14
205-99-2	Benzo (b) Fluoranthene	24 U		24	1.48
191-24-2	Benzo (g,h,i,) Perylene	110 U		110	14.3
207-08-9	Benzo (k) Fluoranthene	24 U		24	1.14
218-01-9	Chrysene	24 U		24	1.37
53-70-3	Dibenzo (a,h) Anthracene	24 U		24	1.60
206-44-0	Fluoranthene	24 U		24	1.94
86-73-7	Fluorene	24 U		24	1.48
193-39-5	Indeno (1,2,3-cd) Pyrene	24 U		24	0.798
91-20-3	Naphthalene	110 U		110	9.01
85-01-8	Phenanthrene	24 U		24	0.684
129-00-0	Pyrene	24 U		24	1.03

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**FSB2C**	QC Batch:	90138 -110
Sample #:	**344829**	Anal. Batch:	208174
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.18

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	120 U		120	11.1
208-96-8	Acenaphthylene	250 U		250	13.7
120-12-7	Anthracene	25 U		25	0.826
56-55-3	Benzo (a) Anthracene	25 U	VJ,1	25	0.944
50-32-8	Benzo (a) Pyrene	25 U		25	1.18
205-99-2	Benzo (b) Fluoranthene	25 U		25	1.53
191-24-2	Benzo (g,h,i,) Perylene	120 U		120	14.8
207-08-9	Benzo (k) Fluoranthene	25 U		25	1.18
218-01-9	Chrysene	25 U		25	1.42
53-70-3	Dibenzo (a,h) Anthracene	25 U		25	1.65
206-44-0	Fluoranthene	25 U		25	2.01
86-73-7	Fluorene	25 U		25	1.53
193-39-5	Indeno (1,2,3-cd) Pyrene	25 U		25	0.826
91-20-3	Naphthalene	120 U		120	9.32
85-01-8	Phenanthrene	25 U		25	0.708
129-00-0	Pyrene	25 U		25	1.06

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 08:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**FSB3A**	QC Batch:	90138 -110
Sample #:	**344922**	Anal. Batch:	208174
Matrix:	Soil	Percent Solids:	86
Unit:	ug/kg dry	Dilution Factor:	1.16

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	120 U		120	10.9
208-96-8	Acenaphthylene	240 U		240	13.5
120-12-7	Anthracene	24 U		24	0.812
56-55-3	Benzo (a) Anthracene	24 U	UJ,I	24	0.928
50-32-8	Benzo (a) Pyrene	24 U		24	1.16
205-99-2	Benzo (b) Fluoranthene	24 U		24	1.51
191-24-2	Benzo (g,h,i,) Perylene	120 U		120	14.5
207-08-9	Benzo (k) Fluoranthene	24 U		24	1.16
218-01-9	Chrysene	24 U		24	1.39
53-70-3	Dibenzo (a,h) Anthracene	24 U		24	1.62
206-44-0	Fluoranthene	24 U		24	1.97
86-73-7	Fluorene	24 U		24	1.51
193-39-5	Indeno (1,2,3-cd) Pyrene	24 U		24	0.812
91-20-3	Naphthalene	120 U		120	9.16
85-01-8	Phenanthrene	24 U		24	0.696
129-00-0	Pyrene	24 U		24	1.04

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 08:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**FSB3B**	QC Batch:	90138 -110
Sample #:	**344923**	Anal. Batch:	208174
Matrix:	Soil	Percent Solids:	90
Unit:	ug/kg dry	Dilution Factor:	1.11

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	110 U		110	10.4
208-96-8	Acenaphthylene	230 U		230	12.9
120-12-7	Anthracene	23 U		23	0.777
56-55-3	Benzo (a) Anthracene	23 U	VJ,1	23	0.888
50-32-8	Benzo (a) Pyrene	23 U		23	1.11
205-99-2	Benzo (b) Fluoranthene	23 U		23	1.44
191-24-2	Benzo (g,h,i,) Perylene	110 U		110	13.9
207-08-9	Benzo (k) Fluoranthene	23 U		23	1.11
218-01-9	Chrysene	23 U		23	1.33
53-70-3	Dibenzo (a,h) Anthracene	23 U		23	1.55
206-44-0	Fluoranthene	23 U		23	1.89
86-73-7	Fluorene	23 U		23	1.44
193-39-5	Indeno (1,2,3-cd) Pyrene	23 U		23	0.777
91-20-3	Naphthalene	110 U		110	8.77
85-01-8	Phenanthrene	23 U		23	0.666
129-00-0	Pyrene	23 U		23	0.999

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 08:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**FSB3C**	QC Batch:	90138 -110
Sample #:	**344924**	Anal. Batch:	208174
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.41

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	140 U		140	13.3
208-96-8	Acenaphthylene	300 U		300	16.4
120-12-7	Anthracene	30 U		30	0.987
56-55-3	Benzo (a) Anthracene	30 U	UJ, I	30	1.13
50-32-8	Benzo (a) Pyrene	30 U		30	1.41
205-99-2	Benzo (b) Fluoranthene	30 U		30	1.83
191-24-2	Benzo (g,h,i,) Perylene	140 U		140	17.6
207-08-9	Benzo (k) Fluoranthene	30 U		30	1.41
218-01-9	Chrysene	30 U		30	1.69
53-70-3	Dibenzo (a,h) Anthracene	30 U		30	1.97
206-44-0	Fluoranthene	30 U		30	2.40
86-73-7	Fluorene	30 U		30	1.83
193-39-5	Indeno (1,2,3-cd) Pyrene	30 U		30	0.987
91-20-3	Naphthalene	140 U		140	11.1
85-01-8	Phenanthrene	30 U		30	0.846
129-00-0	Pyrene	30 U		30	1.27

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**46SB1A**	QC Batch:	90138 -110
Sample #:	**344925**	Anal. Batch:	208174
Matrix:	Soil	Percent Solids:	83
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	120 U		120	11.3
208-96-8	Acenaphthylene	250 U		250	13.9
120-12-7	Anthracene	25 U		25	0.840
56-55-3	Benzo (a) Anthracene	25 U	UJ, I	25	0.960
50-32-8	Benzo (a) Pyrene	25 U		25	1.20
205-99-2	Benzo (b) Fluoranthene	25 U		25	1.56
191-24-2	Benzo (g,h,i,) Perylene	120 U		120	15.0
207-08-9	Benzo (k) Fluoranthene	25 U		25	1.20
218-01-9	Chrysene	25 U		25	1.44
53-70-3	Dibenzo (a,h) Anthracene	25 U		25	1.68
206-44-0	Fluoranthene	25 U		25	2.04
86-73-7	Fluorene	25 U		25	1.56
193-39-5	Indeno (1,2,3-cd) Pyrene	25 U		25	0.840
91-20-3	Naphthalene	120 U		120	9.48
85-01-8	Phenanthrene	25 U		25	0.720
129-00-0	Pyrene	25 U		25	1.08

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**46SB1B**	QC Batch:	90138 -110
Sample #:	**344926**	Anal. Batch:	208174
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.31

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	130 U		130	12.3
208-96-8	Acenaphthylene	280 U		280	15.2
120-12-7	Anthracene	28 U		28	0.917
56-55-3	Benzo (a) Anthracene	28 U	VJ, I	28	1.05
50-32-8	Benzo (a) Pyrene	28 U		28	1.31
205-99-2	Benzo (b) Fluoranthene	28 U		28	1.70
191-24-2	Benzo (g,h,i,) Perylene	130 U		130	16.4
207-08-9	Benzo (k) Fluoranthene	28 U		28	1.31
218-01-9	Chrysene	28 U		28	1.57
53-70-3	Dibenzo (a,h) Anthracene	28 U		28	1.83
206-44-0	Fluoranthene	28 U		28	2.23
86-73-7	Fluorene	28 U		28	1.70
193-39-5	Indeno (1,2,3-cd) Pyrene	28 U		28	0.917
91-20-3	Naphthalene	130 U		130	10.3
85-01-8	Phenanthrene	28 U		28	0.786
129-00-0	Pyrene	28 U		28	1.18

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**46SB1C**	QC Batch:	90138 -110
Sample #:	**344927**	Anal. Batch:	208174
Matrix:	Soil	Percent Solids:	68
Unit:	ug/kg dry	Dilution Factor:	1.47

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	150 U	150	13.8
208-96-8	Acenaphthylene	310 U	310	17.1
120-12-7	Anthracene	31 U	31	1.03
56-55-3	Benzo (a) Anthracene	31 U	31	1.18
50-32-8	Benzo (a) Pyrene	31 U	31	1.47
205-99-2	Benzo (b) Fluoranthene	31 U	31	1.91
191-24-2	Benzo (g,h,i,) Perylene	150 U	150	18.4
207-08-9	Benzo (k) Fluoranthene	31 U	31	1.47
218-01-9	Chrysene	31 U	31	1.76
53-70-3	Dibenzo (a,h) Anthracene	31 U	31	2.06
206-44-0	Fluoranthene	31 U	31	2.50
86-73-7	Fluorene	31 U	31	1.91
193-39-5	Indeno (1,2,3-cd) Pyrene	31 U	31	1.03
91-20-3	Naphthalene	150 U	150	11.6
85-01-8	Phenanthrene	31 U	31	0.882
129-00-0	Pyrene	31 U	31	1.32

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 13:25
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**46SB2A**	QC Batch:	90138 -110
Sample #:	**344928**	Anal. Batch:	208174
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.19

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	120 U		120	11.2
208-96-8	Acenaphthylene	250 U		250	13.8
120-12-7	Anthracene	25 U		25	0.833
56-55-3	Benzo (a) Anthracene	25 U	UJ,1	25	0.952
50-32-8	Benzo (a) Pyrene	25 U		25	1.19
205-99-2	Benzo (b) Fluoranthene	25 U		25	1.55
191-24-2	Benzo (g,h,i,) Perylene	120 U		120	14.9
207-08-9	Benzo (k) Fluoranthene	25 U		25	1.19
218-01-9	Chrysene	25 U		25	1.43
53-70-3	Dibenzo (a,h) Anthracene	25 U		25	1.67
206-44-0	Fluoranthene	25 U		25	2.02
86-73-7	Fluorene	25 U		25	1.55
193-39-5	Indeno (1,2,3-cd) Pyrene	25 U		25	0.833
91-20-3	Naphthalene	120 U		120	9.40
85-01-8	Phenanthrene	25 U		25	0.714
129-00-0	Pyrene	25 U		25	1.07

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 13:40
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**46SB2B**	QC Batch:	90138 -110
Sample #:	**344929**	Anal. Batch:	208174
Matrix:	Soil	Percent Solids:	81
Unit:	ug/kg dry	Dilution Factor:	1.23

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	120 U		120	11.6
208-96-8	Acenaphthylene	260 U		260	14.3
120-12-7	Anthracene	26 U		26	0.861
56-55-3	Benzo (a) Anthracene	26 U	VJ,1	26	0.984
50-32-8	Benzo (a) Pyrene	26 U		26	1.23
205-99-2	Benzo (b) Fluoranthene	26 U		26	1.60
191-24-2	Benzo (g,h,i,) Perylene	120 U		120	15.4
207-08-9	Benzo (k) Fluoranthene	26 U		26	1.23
218-01-9	Chrysene	26 U		26	1.48
53-70-3	Dibenzo (a,h) Anthracene	26 U		26	1.72
206-44-0	Fluoranthene	26 U		26	2.09
86-73-7	Fluorene	26 U		26	1.60
193-39-5	Indeno (1,2,3-cd) Pyrene	26 U		26	0.861
91-20-3	Naphthalene	120 U		120	9.72
85-01-8	Phenanthrene	26 U		26	0.738
129-00-0	Pyrene	26 U		26	1.11

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 13:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**46SB2C**	QC Batch:	90138 -110
Sample #:	**344930**	Anal. Batch:	208174
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	1.49

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	150 U		150	14.0
208-96-8	Acenaphthylene	310 U		310	17.3
120-12-7	Anthracene	31 U		31	1.04
56-55-3	Benzo (a) Anthracene	31 U	UJ,I	31	1.19
50-32-8	Benzo (a) Pyrene	31 U		31	1.49
205-99-2	Benzo (b) Fluoranthene	31 U		31	1.94
191-24-2	Benzo (g,h,i,) Perylene	120 U		120	18.6
207-08-9	Benzo (k) Fluoranthene	31 U		31	1.49
218-01-9	Chrysene	31 U		31	1.79
53-70-3	Dibenzo (a,h) Anthracene	31 U		31	2.09
206-44-0	Fluoranthene	31 U		31	2.53
86-73-7	Fluorene	31 U		31	1.94
193-39-5	Indeno (1,2,3-cd) Pyrene	31 U		31	1.04
91-20-3	Naphthalene	150 U		150	11.8
85-01-8	Phenanthrene	31 U		31	0.894
129-00-0	Pyrene	31 U		31	1.34

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**SBD2**	QC Batch:	90138 -110
Sample #:	**344931**	Anal. Batch:	208174
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	1.49

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	150 U	150	14.0
208-96-8	Acenaphthylene	310 U	310	17.3
120-12-7	Anthracene	31 U	31	1.04
56-55-3	Benzo (a) Anthracene	31 U	31	1.19
50-32-8	Benzo (a) Pyrene	31 U	31	1.49
205-99-2	Benzo (b) Fluoranthene	31 U	31	1.94
191-24-2	Benzo (g,h,i,) Perylene	150 U	150	18.6
207-08-9	Benzo (k) Fluoranthene	31 U	31	1.49
218-01-9	Chrysene	31 U	31	1.79
53-70-3	Dibenzo (a,h) Anthracene	31 U	31	2.09
206-44-0	Fluoranthene	31 U	31	2.53
86-73-7	Fluorene	31 U	31	1.94
193-39-5	Indeno (1,2,3-cd) Pyrene	31 U	31	1.04
91-20-3	Naphthalene	150 U	150	11.8
85-01-8	Phenanthrene	31 U	31	0.894
129-00-0	Pyrene	31 U	31	1.34

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**37SB1A**	QC Batch:	90138 -110
Sample #:	**344932**	Anal. Batch:	208174
Matrix:	Soil	Percent Solids:	61
Unit:	ug/kg dry	Dilution Factor:	1.64

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	160 U		160	15.4
208-96-8	Acenaphthylene	340 U		340	19.0
120-12-7	Anthracene	34 U		34	1.15
56-55-3	Benzo (a) Anthracene	34 U	UJ,I	34	1.31
50-32-8	Benzo (a) Pyrene	34 U		34	1.64
205-99-2	Benzo (b) Fluoranthene	34 U		34	2.13
191-24-2	Benzo (g,h,i,) Perylene	160 U		160	20.5
207-08-9	Benzo (k) Fluoranthene	34 U		34	1.64
218-01-9	Chrysene	34 U		34	1.97
53-70-3	Dibenzo (a,h) Anthracene	34 U		34	2.30
206-44-0	**Fluoranthene**	**73**		34	2.79
86-73-7	Fluorene	34 U		34	2.13
193-39-5	Indeno (1,2,3-cd) Pyrene	34 U		34	1.15
91-20-3	Naphthalene	160 U		160	13.0
85-01-8	**Phenanthrene**	**15 J**		34	0.984
129-00-0	**Pyrene**	**58**		34	1.48

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**37SB1B**	QC Batch:	90138 -110
Sample #:	**345024**	Anal. Batch:	208174
Matrix:	Soil	Percent Solids:	83
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	120 U		120	11.3
208-96-8	Acenaphthylene	250 U		250	13.9
120-12-7	Anthracene	25 U		25	0.840
56-55-3	Benzo (a) Anthracene	25 U	VJ,1	25	0.960
50-32-8	Benzo (a) Pyrene	25 U		25	1.20
205-99-2	Benzo (b) Fluoranthene	25 U		25	1.56
191-24-2	Benzo (g,h,i,) Perylene	25 U		25	15.0
207-08-9	Benzo (k) Fluoranthene	25 U		25	1.20
218-01-9	Chrysene	25 U		25	1.44
53-70-3	Dibenzo (a,h) Anthracene	25 U		25	1.68
206-44-0	Fluoranthene	25 U		25	2.04
86-73-7	Fluorene	25 U		25	1.56
193-39-5	Indeno (1,2,3-cd) Pyrene	25 U		25	0.840
91-20-3	Naphthalene	120 U		120	9.48
85-01-8	Phenanthrene	25 U		25	0.720
129-00-0	Pyrene	25 U		25	1.08

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Client:	**URS Corporation**	Sampled:	09/30/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**FSB1A**	QC Batch:	89967 -113
Sample #:	**344823**	Anal. Batch:	207867
Matrix:	Soil	Percent Solids:	87
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 14:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**FSB1B**	QC Batch:	89967 -113
Sample #:	**344824**	Anal. Batch:	207867
Matrix:	Soil	Percent Solids:	85
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**FSB1C**	QC Batch:	89967 -113
Sample #:	**344825**	Anal. Batch:	207867
Matrix:	Soil	Percent Solids:	82
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**FSB2A**	QC Batch:	89967 -113
Sample #:	**344826**	Anal. Batch:	207867
Matrix:	Soil	Percent Solids:	85
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**FSB2B**	QC Batch:	89967 -113
Sample #:	**344827**	Anal. Batch:	207867
Matrix:	Soil	Percent Solids:	93
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**SBD-1**	QC Batch:	89967 -113
Sample #:	**344828**	Anal. Batch:	207867
Matrix:	Soil	Percent Solids:	88
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**FSB2C**	QC Batch:	89967 -113
Sample #:	**344829**	Anal. Batch:	207867
Matrix:	Soil	Percent Solids:	85
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

005184

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 08:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**FSB3A**	QC Batch:	89967 -113
Sample #:	**344922**	Anal. Batch:	207867
Matrix:	Soil	Percent Solids:	86
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 08:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**FSB3B**	QC Batch:	89967 -113
Sample #:	**344923**	Anal. Batch:	207867
Matrix:	Soil	Percent Solids:	90
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 08:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**FSB3C**	QC Batch:	89967 -113
Sample #:	**344924**	Anal. Batch:	207867
Matrix:	Soil	Percent Solids:	71
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**46SB1A**	QC Batch:	89967 -113
Sample #:	**344925**	Anal. Batch:	207867
Matrix:	Soil	Percent Solids:	83
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**46SB1B**	QC Batch:	89967 -113
Sample #:	**344926**	Anal. Batch:	207867
Matrix:	Soil	Percent Solids:	76
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**46SB1C**	QC Batch:	89967 -113
Sample #:	**344927**	Anal. Batch:	207867
Matrix:	Soil	Percent Solids:	68
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 13:25
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**46SB2A**	QC Batch:	89967 -113
Sample #:	**344928**	Anal. Batch:	207867
Matrix:	Soil	Percent Solids:	84
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 13:40
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 08:55
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**46SB2B**	QC Batch:	89967 -113
Sample #:	**344929**	Anal. Batch:	207867
Matrix:	Soil	Percent Solids:	81
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 13:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**46SB2C**	QC Batch:	89967 -113
Sample #:	**344930**	Anal. Batch:	207867
Matrix:	Soil	Percent Solids:	67
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**SBD2**	QC Batch:	89967 -113
Sample #:	**344931**	Anal. Batch:	207867
Matrix:	Soil	Percent Solids:	67
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/19/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**37SB1A**	QC Batch:	89967 -113
Sample #:	**344932**	Anal. Batch:	207866
Matrix:	Soil	Percent Solids:	61
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	**2,4-Dinitrotoluene**	**0.27 J**		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	VJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	VJ,C	1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U		0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/19/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**37SB1B**	QC Batch:	89967 -113
Sample #:	**345024**	Anal. Batch:	207866
Matrix:	Soil	Percent Solids:	83
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	UJ,C	1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U		0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/09/03 by JRR
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 by MSN
	RAAP	Anal. Method:	USEPA-8081A
Sample ID:	**FSB2A**	QC Batch:	90181 -109
Sample #:	**344826**	Anal. Batch:	208238
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Chlorinated Pesticides OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
72-54-8	4,4'-DDD	24 U	24	0.286
72-55-9	4,4'-DDE	24 U	24	0.210
50-29-3	4,4'-DDT	24 U	24	0.216
309-00-2	Aldrin	24 U	24	0.365
319-84-6	Alpha-BHC	24 U	24	0.364
57-74-9	A-Chlordane	24 U	24	0.521
5103-74-2	G-Chlordane	24 U	24	0.844
319-85-7	Beta-BHC	24 U	24	1.36
319-86-8	Delta-BHC	24 U	24	0.982
60-57-1	Dieldrin	24 U	24	0.371
115-29-7	Endosulfan I	24 U	24	1.09
33213-65-9	Endosulfan II	24 U	24	0.257
1031-07-8	Endosulfan Sulfate	24 U	24	0.604
72-20-8	Endrin	24 U	24	0.358
7421-93-4	Endrin Aldehyde	24 U	24	1.33
53494-70-5	Endrin Ketone	24 U	24	0.330
58-89-9	Lindane	24 U	24	0.233
76-44-8	Heptachlor	24 U	24	0.846
1024-57-3	Heptachlor Epoxide	24 U	24	0.546
72-43-5	Methoxychlor	24 U	24	0.336
8001-35-2	Toxaphene	200 U	200	28.0

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by JRR
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 by MSN
	RAAP	Anal. Method:	USEPA-8081A
Sample ID:	**46SB1A**	QC Batch:	90181 -109
Sample #:	**344925**	Anal. Batch:	208238
Matrix:	Soil	Percent Solids:	83
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Chlorinated Pesticides OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
72-54-8	4,4'-DDD	24 U	24	0.286
72-55-9	4,4'-DDE	24 U	24	0.210
50-29-3	4,4'-DDT	24 U	24	0.216
309-00-2	Aldrin	24 U	24	0.365
319-84-6	Alpha-BHC	24 U	24	0.364
57-74-9	A-Chlordane	24 U	24	0.521
5103-74-2	G-Chlordane	24 U	24	0.844
319-85-7	Beta-BHC	24 U	24	1.36
319-86-8	Delta-BHC	24 U	24	0.982
60-57-1	Dieldrin	24 U	24	0.371
115-29-7	Endosulfan I	24 U	24	1.09
33213-65-9	Endosulfan II	24 U	24	0.257
1031-07-8	Endosulfan Sulfate	24 U	24	0.604
72-20-8	Endrin	24 U	24	0.358
7421-93-4	Endrin Aldehyde	24 U	24	1.33
53494-70-5	Endrin Ketone	24 U	24	0.330
58-89-9	Lindane	24 U	24	0.233
76-44-8	Heptachlor	24 U	24	0.846
1024-57-3	Heptachlor Epoxide	24 U	24	0.546
72-43-5	Methoxychlor	24 U	24	0.336
8001-35-2	Toxaphene	200 U	200	28.0

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by JRR
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 by MSN
	RAAP	Anal. Method:	USEPA-8081A
Sample ID:	**37SB1A**	QC Batch:	90181 -109
Sample #:	**344932**	Anal. Batch:	208238
Matrix:	Soil	Percent Solids:	61
Unit:	ug/kg dry	Dilution Factor:	1.6

CAS Number	Chlorinated Pesticides OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
72-54-8	4,4'-DDD	33 U		33	0.381
72-55-9	4,4'-DDE	33 U		33	0.280
50-29-3	4,4'-DDT	33 U		33	0.288
309-00-2	Aldrin	33 U		33	0.486
319-84-6	Alpha-BHC	33 U		33	0.485
57-74-9	A-Chlordane	33 U		33	0.694
5103-74-2	G-Chlordane	33 U		33	1.12
319-85-7	Beta-BHC	33 U		33	1.81
319-86-8	Delta-BHC	33 U		33	1.31
60-57-1	**Dieldrin**	**11 J**	J,g	33	0.494
115-29-7	Endosulfan I	33 U		33	1.46
33213-65-9	Endosulfan II	33 U		33	0.342
1031-07-8	Endosulfan Sulfate	33 U		33	0.805
72-20-8	Endrin	33 U		33	0.477
7421-93-4	Endrin Aldehyde	33 U		33	1.78
53494-70-5	Endrin Ketone	33 U		33	0.440
58-89-9	Lindane	33 U		33	0.310
76-44-8	Heptachlor	33 U		33	1.13
1024-57-3	Heptachlor Epoxide	33 U		33	0.728
72-43-5	Methoxychlor	33 U		33	0.448
8001-35-2	Toxaphene	280 U		280	37.3

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/09/03 by JRR
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JLRM
	RAAP	Anal. Method:	USEPA-8082
Sample ID:	**FSB2A**	QC Batch:	89881 -109
Sample #:	**344826**	Anal. Batch:	207710
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polychlorinated Biphenyls OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
12674-11-2	PCB-1016	78 U	78	19.2
11104-28-2	PCB-1221	39 U	39	2.40
11141-16-5	PCB-1232	39 U	39	6.00
53469-21-9	PCB-1242	39 U	39	3.60
12672-29-6	PCB-1248	39 U	39	6.00
11097-69-1	PCB-1254	39 U	39	3.60
11096-82-5	PCB-1260	39 U	39	8.40

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by JRR
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JLRM
	RAAP	Anal. Method:	USEPA-8082
Sample ID:	**46SB1A**	QC Batch:	89881 -109
Sample #:	**344925**	Anal. Batch:	207710
Matrix:	Soil	Percent Solids:	83
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polychlorinated Biphenyls OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
12674-11-2	PCB-1016	80 U	80	19.2
11104-28-2	PCB-1221	40 U	40	2.40
11141-16-5	PCB-1232	40 U	40	6.00
53469-21-9	PCB-1242	40 U	40	3.60
12672-29-6	PCB-1248	40 U	40	6.00
11097-69-1	PCB-1254	40 U	40	3.60
11096-82-5	PCB-1260	40 U	40	8.40

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by JRR
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JLRM
	RAAP	Anal. Method:	USEPA-8082
Sample ID:	**37SB1A**	QC Batch:	89881 -109
Sample #:	**344932**	Anal. Batch:	207710
Matrix:	Soil	Percent Solids:	61
Unit:	ug/kg dry	Dilution Factor:	1.6

CAS Number	Polychlorinated Biphenyls OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
12674-11-2	PCB-1016	110 U	110	25.6
11104-28-2	PCB-1221	54 U	54	3.20
11141-16-5	PCB-1232	54 U	54	8.00
53469-21-9	PCB-1242	54 U	54	4.80
12672-29-6	PCB-1248	54 U	54	8.00
11097-69-1	**PCB-1254**	**180**	54	4.80
11096-82-5	PCB-1260	54 U	54	11.2

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8151A
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by MSN
	RAAP	Anal. Method:	USEPA-8151A
Sample ID:	**FSB2A**	QC Batch:	90218 -110
Sample #:	**344826**	Anal. Batch:	208309
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Herbicides	Analytical Result	Reporting Limit	MDL
93-76-5	2,4,5-T	59 U	59	2.40
93-72-1	2,4,5-TP (Silvex)	59 U	59	4.80
94-75-7	2,4-D	240 U	240	19.2
94-82-6	2,4-DB	240 U	240	74.4
75-99-0	Dalapon	290 U	290	68.4
1918-00-9	Dicamba	240 U	240	2.40
120-36-5	Dichlorprop	240 U	240	20.4
~~88-85-7~~	~~*Dinoseb~~	~~240 U~~ R,1	~~240~~	~~25.2~~
94-74-6	MCPA	24000 U	24000	1680
93-65-2	MCPP	24000 U	24000	6070

~~AS 12/10/03~~

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/01/03 @ 09:15
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8151A
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/27/03 by JLRM
		Anal. Method:	USEPA-8151A
Sample ID:	**FSB2A**	QC Batch:	90218 -110
Sample #:	**344826DL**	Anal. Batch:	208365
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	*Herbicides	Analytical Result		Reporting Limit	MDL
93-76-5	2,4,5-T	59 U		59	2.40
93-72-1	2,4,5-TP (Silvex)	59 U		59	4.80
94-75-7	2,4-D	240 U		240	19.2
94-82-6	2,4-DB	240 U		240	74.4
75-99-0	Dalapon	290 U		290	68.4
1918-00-9	Dicamba	240 U		240	2.40
120-36-5	Dichlorprop	240 U		240	20.4
88-85-7	Dinoseb	240 U	UJ, h	240	25.2
94-74-6	MCPA	24000 U		24000	1680
93-65-2	MCPP	24000 U		24000	6070

* See attached Statement of Data Qualifications.

VSL only Dinoseb ✱ 12/10/03

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8151A
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by MSN
	RAAP	Anal. Method:	USEPA-8151A
Sample ID:	**46SB1A**	QC Batch:	90218 -110
Sample #:	**344925**	Anal. Batch:	208309
Matrix:	Soil	Percent Solids:	83
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Herbicides	Analytical Result	Reporting Limit	MDL
93-76-5	2,4,5-T	60 U	60	2.40
93-72-1	2,4,5-TP (Silvex)	60 U	60	4.80
94-75-7	2,4-D	240 U	240	19.2
94-82-6	2,4-DB	240 U	240	74.4
75-99-0	Dalapon	300 U	300	68.4
1918-00-9	Dicamba	240 U	240	2.40
120-36-5	Dichlorprop	240 U	240	20.4
~~88-85-7~~	~~*Dinoseb~~	~~240 U~~ R,1	~~240~~	~~25.2~~ AR, 12/10/03
94-74-6	MCPA	24000 U	24000	1680
93-65-2	MCPP	24000 U	24000	6070

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:10
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/02/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8151A
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/27/03 by JLRM
		Anal. Method:	USEPA-8151A
Sample ID:	**46SB1A**	QC Batch:	90218 -110
Sample #:	**344925DL**	Anal. Batch:	208365
Matrix:	Soil	Percent Solids:	83
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	*Herbicides	Analytical Result		Reporting Limit	MDL
93-76-5	2,4,5-T	60 U		60	2.40
93-72-1	2,4,5-TP (Silvex)	60 U		60	4.80
94-75-7	2,4-D	240 U		240	19.2
94-82-6	2,4-DB	240 U		240	74.4
75-99-0	Dalapon	300 U		300	68.4
1918-00-9	Dicamba	240 U		240	2.40
120-36-5	Dichlorprop	240 U		240	20.4
88-85-7	Dinoseb	240 U	UJ,h	240	25.2
94-74-6	MCPA	24000 U		24000	1680
93-65-2	MCPP	24000 U		24000	6070

* See attached Statement of Data Qualifications.

Use only Dinoseb, 12/10/03

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8151A
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by MSN
	RAAP	Anal. Method:	USEPA-8151A
Sample ID:	**37SB1A**	QC Batch:	90218 -110
Sample #:	**344932**	Anal. Batch:	208309
Matrix:	Soil	Percent Solids:	61
Unit:	ug/kg dry	Dilution Factor:	16

CAS Number	*Herbicides	Analytical Result	Reporting Limit	MDL
93-76-5	2,4,5-T	820 U	820	32.0
93-72-1	2,4,5-TP (Silvex)	820 U	820	64.0
94-75-7	2,4-D	3300 U	3300	256
94-82-6	2,4-DB	3300 U	3300	992
75-99-0	Dalapon	4100 U	4100	912
1918-00-9	Dicamba	3300 U	3300	32.0
120-36-5	Dichlorprop	3300 U	3300	272
~~88-85-7~~	~~*Dinoseb~~	~~3300 U~~ R,1	~~3300~~	~~336~~ AS 12/10/03
94-74-6	MCPA	330000 U	330000	22300
93-65-2	MCPP	330000 U	330000	80900

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 15:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/02/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8151A
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/29/03 by JLRM
		Anal. Method:	USEPA-8151A
Sample ID:	**37SB1A**	QC Batch:	90218 -110
Sample #:	**344932DL**	Anal. Batch:	208404
Matrix:	Soil	Percent Solids:	61
Unit:	ug/kg dry	Dilution Factor:	1

CAS Number	Herbicides	Analytical Result		Reporting Limit	MDL
93-76-5	2,4,5-T	82 U		82	2.00
93-72-1	2,4,5-TP (Silvex)	82 U		82	4.00
94-75-7	2,4-D	330 U		330	16.0
94-82-6	2,4-DB	330 U		330	62.0
75-99-0	Dalapon	410 U		410	57.0
1918-00-9	Dicamba	330 U		330	2.00
120-36-5	Dichlorprop	330 U		330	17.0
88-85-7	Dinoseb	330 U	VS,h	330	21.0
94-74-6	MCPA	33000 U		33000	1400
93-65-2	MCPP	33000 U		33000	5060

VSL only Dinoseb result, AS 12/10/03

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 09/30/03 @ 14:00
Sampler: B.F. & J.S.
Received: 10/01/03 @ 09:15

Submittal #: **36440-1**
Submittal: Delivery Order 0046
RAAP
Sample ID: **FSB1A**
Sample #: **344823**
Matrix: Soil

Percent Solids: 87

Parameter	Analytical Result	Reporting Limit	MDL	DF	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	16500	500	91.50		mg/kg dry	10/14/03	DWJ	USEPA-6010B
Antimony, Total	0.85 B,P	0.50	0.0518		mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	1.5	0.40	0.0232		mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	127	5.0	0.530	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Beryllium, Total	1.0 U	1.0	0.0391		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	1.9	1.0	0.182		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	23300 L,M	2500	830.0	50	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Chromium, Total	22 J,S	5.0	0.912		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	12 J,S	1.0	0.208		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	16	1.0	0.368		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Iron, Total	29500 J,S	1000	212.000	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Lead, Total	15	1.0	0.0218		mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	16700	2500	160.50	10	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Manganese, Total	529	10	2.640	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Mercury, Total	0.017 J	0.10	0.0077		mg/kg dry	10/06/03	MSS	USEPA-7471A
Nickel, Total	15 J,S	0.50	0.0356		mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	2160 J,S	100	25.00	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Selenium, Total	0.66 J	1.0	0.0502		mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.052 J	3.0	0.0044		mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	55 J B,X	100	8.92		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.21 J	0.50	0.0270		mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	47	1.0	0.207		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	56	4.0	0.517		mg/kg dry	10/13/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 09/30/03 @ 14:15
Sampler: B.F. & J.S.
Received: 10/01/03 @ 09:15

Submittal #: **36440-1**
Submittal: Delivery Order 0046
RAAP
Sample ID: **FSB1B**
Sample #: **344824**
Matrix: Soil

Percent Solids: 85

Parameter	Analytical Result		Reporting Limit	MDL	DF	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	17400		500	91.50		mg/kg dry	10/14/03	DWJ	USEPA-6010B
Antimony, Total	0.66	B,P	0.50	0.0518		mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	1.9		0.40	0.0232		mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	102		5.0	0.530	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Beryllium, Total	1.0 U		1.0	0.0391		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	1.9		1.0	0.182		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	1670	L,M	250	83.0	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Chromium, Total	26	J,S	5.0	0.912		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	12	J,S	1.0	0.208		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	16		1.0	0.368		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Iron, Total	34200	J,S	1000	212.000	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Lead, Total	14		1.0	0.0218		mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	4920		500	32.10	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Manganese, Total	553		10	2.640	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Mercury, Total	0.013 J		0.10	0.0077		mg/kg dry	10/06/03	MSS	USEPA-7471A
Nickel, Total	15	J,S	0.50	0.0356		mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	2250	J,S	100	25.00	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Selenium, Total	0.64 J		1.0	0.0502		mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.045 J		3.0	0.0044		mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	47 J	B,X	100	8.92		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.22 J		0.50	0.0270		mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	49		1.0	0.207		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	64		4.0	0.517		mg/kg dry	10/13/03	KLVM	USEPA-6010B

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Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 09/30/03 @ 14:30
Sampler: B.F. & J.S.
Received: 10/01/03 @ 09:15

Submittal #: **36440-1**
Submittal: Delivery Order 0046
RAAP
Sample ID: **FSB1C**
Sample #: **344825**
Matrix: Soil

Percent Solids: 82

Parameter	Analytical Result		Reporting Limit	MDL	DF	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	24400		1000	183.00	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Antimony, Total	0.73	B,P	0.50	0.0518		mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	5.2		0.40	0.0232		mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	67		1.0	0.106		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Beryllium, Total	0.20 J		1.0	0.0391		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	2.0		1.0	0.182		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	2050	L,M	250	83.0	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Chromium, Total	31	J,S	5.0	0.912		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	11	J,S	1.0	0.208		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	25		1.0	0.368		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Iron, Total	35500	J,S	1000	212.000	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Lead, Total	17		1.0	0.0218		mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	24000		2500	160.50	10	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Manganese, Total	463		10	2.640	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Mercury, Total	0.028 J		0.10	0.0077		mg/kg dry	10/06/03	MSS	USEPA-7471A
Nickel, Total	23	J,S	0.50	0.0356		mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	5460	J,S	200	50.00	10	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Selenium, Total	0.82 J		1.0	0.0502		mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.13 J		3.0	0.0044		mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	64 J	B,X	100	8.92		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.34 J		0.50	0.0270		mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	43		1.0	0.207		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	74		4.0	0.517		mg/kg dry	10/13/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 09/30/03 @ 15:00
Sampler: B.F. & J.S.
Received: 10/01/03 @ 09:15

Submittal #: **36440-1**
Submittal: Delivery Order 0046
RAAP
Sample ID: **FSB2A**
Sample #: **344826**
Matrix: Soil

Percent Solids: 85

Parameter	Analytical Result		Reporting Limit	MDL	DF	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	17100		500	91.50		mg/kg dry	10/14/03	DWJ	USEPA-6010B
Antimony, Total	0.55	B,P	0.50	0.0518		mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	1.7		0.40	0.0232		mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	102		5.0	0.530	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Beryllium, Total	0.087 J	B,X	1.0	0.0391		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	2.0		1.0	0.182		mg/kg dry	10/13/03	KLVM	USEPA-6010B
* Calcium, Total	2020	L,M	250	83.0	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Chromium, Total	25	J,S	5.0	0.912		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	14	J,S	1.0	0.208		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	15		1.0	0.368		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Iron, Total	34600	J,S	1000	212.000	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Lead, Total	12		1.0	0.0218		mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	4380		500	32.10	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Manganese, Total	607		10	2.640	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Mercury, Total	0.018 J		0.10	0.0077		mg/kg dry	10/06/03	MSS	USEPA-7471A
* Nickel, Total	13	J,S	0.50	0.0356		mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	2100	J,S	100	25.00	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Selenium, Total	0.66 J		1.0	0.0502		mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.041 J		3.0	0.0044		mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	24 J	B,X	100	8.92		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.19 J		0.50	0.0270		mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	50		1.0	0.207		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	55		4.0	0.517		mg/kg dry	10/13/03	KLVM	USEPA-6010B

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 09/30/03 @ 15:15
Sampler: B.F. & J.S.
Received: 10/01/03 @ 09:15

Submittal #: **36440-1**
Submittal: Delivery Order 0046
RAAP
Sample ID: **FSB2B**
Sample #: **344827**
Matrix: Soil

Percent Solids: 93

Parameter	Analytical Result		Reporting Limit	MDL	DF	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	11900	J,f	500	91.50		mg/kg dry	10/14/03	DWJ	USEPA-6010B
Antimony, Total	0.54	B,P	0.50	0.0518		mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	2.0		0.40	0.0232		mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	72		1.0	0.106		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Beryllium, Total	1.0 U		1.0	0.0391		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	0.99 J	B,P	1.0	0.182		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	27600	L,M	2500	830.0	50	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Chromium, Total	17	J,S	5.0	0.912		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	12	J,S	1.0	0.208		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	13		1.0	0.368		mg/kg dry	10/14/03	DWJ	USEPA-6010B
Iron, Total	24400	J,S	1000	212.000	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Lead, Total	11		1.0	0.0218		mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	15700	J,f	1250	80.25	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Manganese, Total	481		10	2.640	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Mercury, Total	0.012 J		0.10	0.0077		mg/kg dry	10/06/03	MSS	USEPA-7471A
Nickel, Total	13	J,S	0.50	0.0356		mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	1840	J,S	100	25.00	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Selenium, Total	0.53 J		1.0	0.0502		mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.069 J		3.0	0.0044		mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	52 J	B,X	100	8.92		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.16 J		0.50	0.0270		mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	32		1.0	0.207		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	38		4.0	0.517		mg/kg dry	10/13/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 09/30/03 @ 00:00
Sampler: B.F. & J.S.
Received: 10/01/03 @ 09:15

Submittal #: **36440-1**
Submittal: Delivery Order 0046
RAAP
Sample ID: **SBD-1**
Sample #: **344828**
Matrix: Soil

Percent Solids: 88

Parameter	Analytical Result		Reporting Limit	MDL	DF	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	17600	J,f	500	91.50		mg/kg dry	10/14/03	DWJ	USEPA-6010B
Antimony, Total	0.46 J	B,P	0.50	0.0528		mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	2.6		0.40	0.0232		mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	96		1.0	0.106		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Beryllium, Total	1.0 U		1.0	0.0391		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	2.2		1.0	0.182		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	9030	L,m	1250	415.0	25	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Chromium, Total	23	J,s	5.0	0.912		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	12	J,s	1.0	0.208		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	16		1.0	0.368		mg/kg dry	10/14/03	DWJ	USEPA-6010B
Iron, Total	36500	J,s	1000	212.000	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Lead, Total	15		1.0	0.0218		mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	7780	J,f	1250	80.25	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Manganese, Total	590		10	2.640	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Mercury, Total	0.019 J		0.10	0.0077		mg/kg dry	10/06/03	MSS	USEPA-7471A
Nickel, Total	15	J,s	0.50	0.0356		mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	2090	J,s	100	25.00	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Selenium, Total	0.63 J		1.0	0.0502		mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.060 J		3.0	0.0044		mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	38 J	B,x	100	8.92		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.23 J		0.50	0.0270		mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	44		1.0	0.207		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	54		4.0	0.517		mg/kg dry	10/13/03	KLVM	USEPA-6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 09/30/03 @ 15:45
Sampler: B.F. & J.S.
Received: 10/01/03 @ 09:15

Submittal #: **36440-1**
Submittal: Delivery Order 0046
RAAP
Sample ID: **FSB2C**
Sample #: **344829**
Matrix: Soil

Percent Solids: 85

Parameter	Analytical Result	Reporting Limit	MDL	DF	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	16500	500	91.50		mg/kg dry	10/14/03	DWJ	USEPA-6010B
Antimony, Total	0.38 J	0.50	0.0518		mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	1.9	0.40	0.0232		mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	76	1.0	0.106		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Beryllium, Total	1.0 U	1.0	0.0391		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	2.1	1.0	0.182		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	34600	2500	830.0	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Chromium, Total	22	5.0	0.912		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	9.3	1.0	0.208		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	15	1.0	0.368		mg/kg dry	10/14/03	DWJ	USEPA-6010B
Iron, Total	32900	1000	212.000	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Lead, Total	13	1.0	0.0218		mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	16500	1250	80.25	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Manganese, Total	469	10	2.640	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Mercury, Total	0.015 J	0.10	0.0077		mg/kg dry	10/06/03	MSS	USEPA-7471A
Nickel, Total	14	0.50	0.0356		mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	2430	100	25.00	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Selenium, Total	0.59 J	1.0	0.0502		mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.067 J	3.0	0.0044		mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	70 J	100	8.92		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.21 J	0.50	0.0270		mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	39	1.0	0.207		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	46	4.0	0.517		mg/kg dry	10/13/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/01/03 @ 08:00
Sampler: B.F. & J.S.
Received: 10/02/03 @ 08:55

Submittal #: **36440-1**
Submittal: Delivery Order 0046
RAAP
Sample ID: **FSB3A**
Sample #: **344922**
Matrix: Soil

Percent Solids: 86

Parameter	Analytical Result		Reporting Limit	MDL	DF	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	18200		500	91.50		mg/kg dry	10/14/03	DWJ	USEPA-6010B
Antimony, Total	0.34 J	B,P	0.50	0.0518		mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	1.7		0.40	0.0232		mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	107		5.0	0.530		mg/kg dry	10/14/03	DWJ	USEPA-6010B
Beryllium, Total	0.098 J	B,X	1.0	0.0391		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	2.1		1.0	0.182		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	3890	L,M	500	166.0	10	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Chromium, Total	26	J,S	5.0	0.912		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	13	J,S	1.0	0.208		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	18		1.0	0.368		mg/kg dry	10/14/03	DWJ	USEPA-6010B
Iron, Total	37200	J,S	1000	212.000	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Lead, Total	14		1.0	0.0218		mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	6000		500	32.10	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Manganese, Total	558		10	2.640	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Mercury, Total	0.013 J		0.10	0.0077		mg/kg dry	10/06/03	MSS	USEPA-7471A
Nickel, Total	17	J,S	0.50	0.0356		mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	2470	J,S	100	25.00	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Selenium, Total	0.69 J		1.0	0.0502		mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.056 J		3.0	0.0044		mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	42 J	B,X	100	8.92		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.27 J		0.50	0.0270		mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	54		1.0	0.207		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	65		4.0	0.517		mg/kg dry	10/13/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/01/03 @ 08:15
Sampler: B.F. & J.S.
Received: 10/02/03 @ 08:55

Submittal #: **36440-1**
Submittal: Delivery Order 0046
RAAP
Sample ID: **FSB3B**
Sample #: **344923**
Matrix: Soil

Percent Solids: 90

Parameter	Analytical Result	Reporting Limit	MDL	DF	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	18600	500	91.50		mg/kg dry	10/14/03	DWJ	USEPA-6010B
Antimony, Total	0.36 J B,P	0.50	0.0518		mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	2.0	0.40	0.0232		mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	96	1.0	0.106		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Beryllium, Total	1.0 U	1.0	0.0391		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	1.8	1.0	0.182		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	1710 L,M	250	83.0	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Chromium, Total	142 J,S	25	4.560	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Cobalt, Total	12 J,S	1.0	0.208		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	22	1.0	0.368		mg/kg dry	10/14/03	DWJ	USEPA-6010B
Iron, Total	38900 J,S	1000	212.000	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Lead, Total	12	1.0	0.0218		mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	5190	500	32.10	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Manganese, Total	625	10	2.640	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Mercury, Total	0.017 J	0.10	0.0077		mg/kg dry	10/06/03	MSS	USEPA-7471A
Nickel, Total	15 J,S	0.50	0.0356		mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	2160 J,S	100	25.00	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Selenium, Total	0.64 J	1.0	0.0502		mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.063 J	3.0	0.0044		mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	40 J B,X	100	8.92		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.22 J	0.50	0.0270		mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	54	1.0	0.207		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	52	4.0	0.517		mg/kg dry	10/13/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/01/03 @ 08:30
Sampler: B.F. & J.S.
Received: 10/02/03 @ 08:55

Submittal #: **36440-1**
Submittal: Delivery Order 0046
RAAP
Sample ID: **FSB3C**
Sample #: **344924**
Matrix: Soil

Percent Solids: 71

Parameter	Analytical Result		Reporting Limit	MDL	DF	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	25700		1000	183.00	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Antimony, Total	0.37 J	B,P	0.50	0.0518		mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	6.0		0.40	0.0232		mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	87		1.0	0.106		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Beryllium, Total	0.17 J		1.0	0.0391		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	1.7		1.0	0.182		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	1530	L,M	250	83.0	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Chromium, Total	26	J,S	5.0	0.912		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	10	J,S	1.0	0.208		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	22		1.0	0.368		mg/kg dry	10/14/03	DWJ	USEPA-6010B
Iron, Total	34800	J,S	1000	212.000	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Lead, Total	11		1.0	0.0218		mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	22000		2500	160.50	10	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Manganese, Total	1170		25	6.600	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Mercury, Total	0.033 J		0.10	0.0077		mg/kg dry	10/06/03	MSS	USEPA-7471A
Nickel, Total	23	J,S	0.50	0.0356		mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	6880	J,S	200	50.00	10	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Selenium, Total	0.68 J		1.0	0.0502		mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.15 J		3.0	0.0044		mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	50 J	B,X	100	8.92		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.38 J		0.50	0.0270		mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	44		1.0	0.207		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	41		4.0	0.517		mg/kg dry	10/13/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/01/03 @ 12:10
Sampler: B.F. & J.S.
Received: 10/02/03 @ 08:55

Submittal #: **36440-1**
Submittal: Delivery Order 0046
RAAP
Sample ID: **46SB1A**
Sample #: **344925**
Matrix: Soil

Percent Solids: 83

Parameter	Analytical Result		Reporting Limit	MDL	DF	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	22500		1000	183.00	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Antimony, Total	0.32 J	B,P	0.50	0.0518		mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	1.9		0.40	0.0232		mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	114		5.0	0.530		mg/kg dry	10/14/03	DWJ	USEPA-6010B
Beryllium, Total	0.77 J		1.0	0.0391		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	2.2		1.0	0.182		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	1350	L,M	250	83.0	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Chromium, Total	26	J,S	5.0	0.912		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	11	J,S	1.0	0.208		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	16		1.0	0.368		mg/kg dry	10/14/03	DWJ	USEPA-6010B
Iron, Total	33800	J,S	1000	212.000	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Lead, Total	13		1.0	0.0218		mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	4690		500	32.10	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Manganese, Total	506		10	2.640	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Mercury, Total	0.035 J		0.10	0.0077		mg/kg dry	10/06/03	MSS	USEPA-7471A
Nickel, Total	17	J,S	0.50	0.0356		mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	2170	J,S	100	25.00	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Selenium, Total	0.67 J		1.0	0.0502		mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.059 J		3.0	0.0044		mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	40 J	B,X	100	8.92		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.24 J		0.50	0.0270		mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	56		1.0	0.207		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	65		4.0	0.517		mg/kg dry	10/13/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/01/03 @ 12:20
Sampler: B.F. & J.S.
Received: 10/02/03 @ 08:55

Submittal #: **36440-1**
Submittal: Delivery Order 0046
RAAP
Sample ID: **46SB1B**
Sample #: **344926**
Matrix: Soil

Percent Solids: 76

Parameter	Analytical Result	Reporting Limit	MDL	DF	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	27000	1000	183.00	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Antimony, Total	0.36 J B,P	0.50	0.0518		mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	2.9	0.40	0.0232		mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	101	5.0	0.530	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Beryllium, Total	0.87 J	1.0	0.0391		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	1.9	1.0	0.182		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	2900 L,M	250	83.0	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Chromium, Total	30 J,S	5.0	0.912		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	9.0 J,S	1.0	0.208		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	20	1.0	0.368		mg/kg dry	10/14/03	DWJ	USEPA-6010B
Iron, Total	34400 J,S	1000	212.000	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Lead, Total	12	1.0	0.0218		mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	15100	1250	80.25	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Manganese, Total	457	10	2.640	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Mercury, Total	0.031 J	0.10	0.0077		mg/kg dry	10/06/03	MSS	USEPA-7471A
Nickel, Total	21 J,S	0.50	0.0356		mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	4000 J,S	200	50.00	10	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Selenium, Total	0.81 J	1.0	0.0502		mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.10 J	3.0	0.0044		mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	52 J B,X	100	8.92		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.25 J	0.50	0.0270		mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	54	1.0	0.207		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	58	4.0	0.517		mg/kg dry	10/13/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/01/03 @ 12:50
Sampler: B.F. & J.S.
Received: 10/02/03 @ 08:55

Submittal #: **36440-1**
Submittal: Delivery Order 0046
RAAP
Sample ID: **46SB1C**
Sample #: **344927**
Matrix: Soil

Percent Solids: 68

Parameter	Analytical Result	Reporting Limit	MDL	DF	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	42900	1000	183.00	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Antimony, Total	0.38 J B,P	0.50	0.0518		mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	4.5	0.40	0.0232		mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	137	5.0	0.530	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Beryllium, Total	1.2	1.0	0.0391		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	0.89 J B,P	1.0	0.182		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	9970 L,M	1250	415.0	25	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Chromium, Total	28 J,S	5.0	0.912		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	7.6 J,S	1.0	0.208		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	20	1.0	0.368		mg/kg dry	10/14/03	DWJ	USEPA-6010B
Iron, Total	37800 J,S	1000	212.000	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Lead, Total	13	1.0	0.0218		mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	30200	2500	160.50	10	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Manganese, Total	411	10	2.640	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Mercury, Total	0.053 J	0.10	0.0077		mg/kg dry	10/06/03	MSS	USEPA-7471A
Nickel, Total	26 J,S	0.50	0.0356		mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	6520 J,S	200	50.00	D	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Selenium, Total	1.2	1.0	0.0502		mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.14 J	3.0	0.0044		mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	84 J B,X	100	8.92		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.36 J	0.50	0.0270		mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	60	1.0	0.207		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	68	4.0	0.517		mg/kg dry	10/13/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/01/03 @ 13:25
Sampler: B.F. & J.S.
Received: 10/02/03 @ 08:55

Submittal #: **36440-1**
Submittal: Delivery Order 0046
RAAP
Sample ID: **46SB2A**
Sample #: **344928**
Matrix: Soil

Percent Solids: 84

Parameter	Analytical Result		Reporting Limit	MDL	DF	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	23700		1000	183.00	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Antimony, Total	0.33 J	B,P	0.50	0.0518		mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	2.3		0.40	0.0232		mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	105		5.0	0.530	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Beryllium, Total	0.68 J		1.0	0.0391		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	2.2		1.0	0.182		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	1530	L,M	250	83.0	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Chromium, Total	25	J,S	5.0	0.912		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	13	J,S	1.0	0.208		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	15		1.0	0.368		mg/kg dry	10/14/03	DWJ	USEPA-6010B
Iron, Total	35900	J,S	1000	212.000	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Lead, Total	14		1.0	0.0218		mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	5290		500	32.10	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Manganese, Total	573		10	2.640	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Mercury, Total	0.031 J		0.10	0.0077		mg/kg dry	10/06/03	MSS	USEPA-7471A
Nickel, Total	16	J,S	0.50	0.0356		mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	2180	J,S	100	25.00	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Selenium, Total	0.63 J		1.0	0.0502		mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.057 J		3.0	0.0044		mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	50 J	B,X	100	8.92		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.27 J		0.50	0.0270		mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	56		1.0	0.207		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	72		4.0	0.517		mg/kg dry	10/13/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/01/03 @ 13:40
Sampler: B.F. & J.S.
Received: 10/01/03 @ 08:55

Submittal #: **36440-1**
Submittal: Delivery Order 0046
RAAP
Sample ID: **46SB2B**
Sample #: **344929**
Matrix: Soil

Percent Solids: 81

Parameter	Analytical Result		Reporting Limit	MDL	DF	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	33600		1000	183.00	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Antimony, Total	0.43 J	B,P	0.50	0.0518		mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	3.3		0.40	0.0232		mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	114		5.0	0.530	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Beryllium, Total	0.74 J		1.0	0.0391		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	2.4		1.0	0.182		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	1050	L,M	250	83.0	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Chromium, Total	25	J,S	5.0	0.912		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	10	J,S	1.0	0.208		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	18		1.0	0.368		mg/kg dry	10/14/03	DWJ	USEPA-6010B
Iron, Total	35200	J,S	1000	212.000	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Lead, Total	14		1.0	0.0218		mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	13800		1250	80.25	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Manganese, Total	466		10	2.640	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Mercury, Total	0.059 J		0.10	0.0077		mg/kg dry	10/06/03	MSS	USEPA-7471A
Nickel, Total	22	J,S	0.50	0.0356		mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	3060	J,S	100	25.00	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Selenium, Total	0.89 J		1.0	0.0502		mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.10 J		3.0	0.0044		mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	54 J	B,X	100	8.92		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.29 J		0.50	0.0270		mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	57		1.0	0.207		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	57		4.0	0.517		mg/kg dry	10/13/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/01/03 @ 13:50
Sampler: B.F. & J.S.
Received: 10/02/03 @ 08:55

Submittal #: **36440-1**
Submittal: Delivery Order 0046
RAAP
Sample ID: **46SB2C**
Sample #: **344930**
Matrix: Soil

Percent Solids: 67

Parameter	Analytical Result		Reporting Limit	MDL	DF	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	55400		2500	457.50	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Antimony, Total	0.42 J	B,P	0.50	0.0518		mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	5.6		0.40	0.0232		mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	145		5.0	0.530	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Beryllium, Total	1.5		1.0	0.0391		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	1.1	B,P	1.0	0.182		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	1220	L,M	250	83.0	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Chromium, Total	38	J,S	5.0	0.912		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	7.1	J,S	1.0	0.208		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	21		1.0	0.368		mg/kg dry	10/14/03	DWJ	USEPA-6010B
Iron, Total	37800	J,S	1000	212.000	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Lead, Total	15		1.0	0.0218		mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	50100		5000	321.00	20	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Manganese, Total	365		10	2.640	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Mercury, Total	0.066 J		0.10	0.0077		mg/kg dry	10/06/03	MSS	USEPA-7471A
Nickel, Total	30	J,S	0.50	0.0356		mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	13200	J,S	500	125.00	25	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Selenium, Total	1.3		1.0	0.0502		mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.18 J		3.0	0.0044		mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	87 J	B,X	100	8.92		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.43 J		0.50	0.0270		mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	72		1.0	0.207		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	62		4.0	0.517		mg/kg dry	10/13/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/01/03 @ 00:00
Sampler: B.F. & J.S.
Received: 10/02/03 @ 08:55

Submittal #: **36440-1**
Submittal: Delivery Order 0046
RAAP
Sample ID: **SBD2**
Sample #: **344931**
Matrix: Soil

Percent Solids: 67

Parameter	Analytical Result	Reporting Limit	MDL	DF	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	58100	2500	457.50	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Antimony, Total	0.42 J B,P	0.50	0.0518		mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	5.6	0.40	0.0232		mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	153	5.0	0.530	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Beryllium, Total	1.4	1.0	0.0391		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	1.5	1.0	0.182		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	1160 L,M	250	83.0	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Chromium, Total	38 J,S	5.0	0.912		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	7.4 J,S	1.0	0.208		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	19	1.0	0.368		mg/kg dry	10/14/03	DWJ	USEPA-6010B
Iron, Total	42600 J,S	1000	212.000	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Lead, Total	16	1.0	0.0218		mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	53300	5000	321.00	20	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Manganese, Total	335	10	2.640	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Mercury, Total	0.081 J	0.10	0.0077		mg/kg dry	10/06/03	MSS	USEPA-7471A
Nickel, Total	34 J,S	0.50	0.0356		mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	11800 J,S	500	125.00	25	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Selenium, Total	1.4	1.0	0.0502		mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.18 J	3.0	0.0044		mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	88 J B,X	100	8.92		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.49 J	0.50	0.0270		mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	72	1.0	0.207		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	61	4.0	0.517		mg/kg dry	10/13/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/01/03 @ 15:30
Sampler: B.F. & J.S.
Received: 10/02/03 @ 08:55

Submittal #: **36440-1**
Submittal: Delivery Order 0046
RAAP
Sample ID: **37SB1A**
Sample #: **344932**
Matrix: Soil

Percent Solids: 61

Parameter	Analytical Result		Reporting Limit	MDL	DF	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	13100		500	91.50		mg/kg dry	10/14/03	DWJ	USEPA-6010B
Antimony, Total	0.52	B,P	0.50	0.0518		mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	3.8		0.40	0.0232		mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	51		1.0	0.106		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Beryllium, Total	0.64 J		1.0	0.0391		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	1.9		1.0	0.182		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	35700	L,M	2500	830.0	50	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Chromium, Total	72	J,S	5.0	0.912		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	2.8	J,S	1.0	0.208		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	78		1.0	0.368		mg/kg dry	10/14/03	DWJ	USEPA-6010B
Iron, Total	14300	J,S	500	106.000		mg/kg dry	10/14/03	DWJ	USEPA-6010B
Lead, Total	80		10	0.2180	10	mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	3270		250	16.05		mg/kg dry	10/14/03	DWJ	USEPA-6010B
Manganese, Total	147		5.0	1.320		mg/kg dry	10/14/03	DWJ	USEPA-6010B
Mercury, Total	0.41		0.10	0.0077		mg/kg dry	10/06/03	MSS	USEPA-7471A
Nickel, Total	30	J,S	0.50	0.0356		mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	860	J,S	20	5.00		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Selenium, Total	0.47 J		1.0	0.0502		mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.14 J		3.0	0.0044		mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	70 J	B,X	100	8.92		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.069 J		0.50	0.0270		mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	16		1.0	0.207		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	67		4.0	0.517		mg/kg dry	10/13/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/01/03 @ 16:00
Sampler: B.F. & J.S.
Received: 10/02/03 @ 08:55

Submittal #: **36440-1**
Submittal: Delivery Order 0046
RAAP
Sample ID: **37SB1B**
Sample #: **345024**
Matrix: Soil

Percent Solids: 83

Parameter	Analytical Result	Reporting Limit	MDL	DF	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	14100	500	91.50		mg/kg dry	10/15/03	DWJ	USEPA-6010B
Antimony, Total	0.19 J	0.50	0.0518		mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	1.0	0.40	0.0232		mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	132	5.0	0.530	5	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Beryllium, Total	0.71 J	1.0	0.0391		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	0.79 J	1.0	0.182		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	1990	250	16.6		mg/kg dry	10/17/03	DWJ	USEPA-6010B
Chromium, Total	18	5.0	0.912		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	8.4	1.0	0.208		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	8.0	1.0	0.368		mg/kg dry	10/17/03	DWJ	USEPA-6010B
Iron, Total	20200	500	106.000		mg/kg dry	10/15/03	DWJ	USEPA-6010B
Lead, Total	8.4	1.0	0.0218		mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	3630	250	16.05		mg/kg dry	10/15/03	DWJ	USEPA-6010B
Manganese, Total	479	10	2.640	2	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Mercury, Total	0.10 U	0.10	0.0077		mg/kg dry	10/09/03	MSS	USEPA-7471A
Nickel, Total	12	0.50	0.0356		mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	2000	100	25.00	5	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Selenium, Total	0.60 J	1.0	0.0502		mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.063 J	3.0	0.0044		mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	67 J	100	8.92		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.16 J	0.50	0.0270		mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	27	1.0	0.207		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	55	4.0	0.517		mg/kg dry	10/13/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
Submittal #:	**36440-1**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**FSB1A**		
Sample #:	**344823**		
Matrix:	Soil	Percent Solids:	87

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	87	0.1	0.1	%	10/08/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 14:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
Submittal #:	**36440-1**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**FSB1B**		
Sample #:	**344824**		
Matrix:	Soil	Percent Solids:	85

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	85	0.1	0.1	%	10/08/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.1780	mg/kg dry	10/09/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
Submittal #:	**36440-1**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**FSB1C**		
Sample #:	**344825**		
Matrix:	Soil	Percent Solids:	82

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	82	0.1	0.1	%	10/08/03	TAM	SW-846 3550B
Cyanide, Total	0.05 J	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
Submittal #:	**36440-1**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**FSB2A**		
Sample #:	**344826**		
Matrix:	Soil	Percent Solids:	85

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	85	0.1	0.1	%	10/08/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
Submittal #:	**36440-1**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**FSB2B**		
Sample #:	**344827**		
Matrix:	Soil	Percent Solids:	93

	Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
	Percent Solids	93	0.1	0.1	%	10/08/03	TAM	SW-846 3550B
*	Cyanide, Total	0.53 U	0.53	0.3560	mg/kg dry	10/09/03	JLB	USEPA-9012A

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
Submittal #:	**36440-1**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**SBD-1**		
Sample #:	**344828**		
Matrix:	Soil	Percent Solids:	88

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	88	0.1	0.1	%	10/08/03	TAM	SW-846 3550B
* Cyanide, Total	0.56 U	0.56	0.3560	mg/kg dry	10/09/03	JLB	USEPA-9012A

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
Submittal #:	**36440-1**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**FSB2C**		
Sample #:	**344829**		
Matrix:	Soil	Percent Solids:	85

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	85	0.1	0.1	%	10/08/03	TAM	SW-846 3550B
* Cyanide, Total	0.56 U	0.56	0.3560	mg/kg dry	10/09/03	JLB	USEPA-9012A

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 08:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
Submittal #:	**36440-1**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**FSB3A**		
Sample #:	**344922**		
Matrix:	Soil	Percent Solids:	86

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	86	0.1	0.1	%	10/08/03	TAM	SW-846 3550B
Cyanide, Total	0.06 J	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 08:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/02/03 @ 08:55

Submittal #: **36440-1**
Submittal: Delivery Order 0046
RAAP
Sample ID: **FSB3B**
Sample #: **344923**
Matrix: Soil
Percent Solids: 90

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	90	0.1	0.1	%	10/08/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 08:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
Submittal #:	**36440-1**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**FSB3C**		
Sample #:	**344924**		
Matrix:	Soil	Percent Solids:	71

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	71	0.1	0.1	%	10/08/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
Submittal #:	**36440-1**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**46SB1A**		
Sample #:	**344925**		
Matrix:	Soil	Percent Solids:	83

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	83	0.1	0.1	%	10/08/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
Submittal #:	**36440-1**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**46SB1B**		
Sample #:	**344926**		
Matrix:	Soil	Percent Solids:	76

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	76	0.1	0.1	%	10/08/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

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TriMatrix
Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
Submittal #:	**36440-1**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**46SB1C**		
Sample #:	**344927**		
Matrix:	Soil	Percent Solids:	68

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	68	0.1	0.1	%	10/08/03	TAM	SW-846 3550B
Cyanide, Total	0.15 J	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

004279

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 13:25
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/02/03 @ 08:55

Submittal #: **36440-1**
Submittal: Delivery Order 0046
RAAP
Sample ID: **46SB2A**
Sample #: **344928**
Matrix: Soil
Percent Solids: 84

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	84	0.1	0.1	%	10/08/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 13:40
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 08:55
Submittal #:	**36440-1**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**46SB2B**		
Sample #:	**344929**		
Matrix:	Soil	Percent Solids:	81

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	81	0.1	0.1	%	10/08/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 13:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
Submittal #:	**36440-1**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**46SB2C**		
Sample #:	**344930**		
Matrix:	Soil	Percent Solids:	67

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	67	0.1	0.1	%	10/08/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

004232

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
Submittal #:	**36440-1**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**SBD2**		
Sample #:	**344931**		
Matrix:	Soil	Percent Solids:	67

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	67	0.1	0.1	%	10/08/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
Submittal #:	**36440-1**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**37SB1A**		
Sample #:	**344932**		
Matrix:	Soil	Percent Solids:	61

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	61	0.1	0.1	%	10/08/03	TAM	SW-846 3550B
Cyanide, Total	0.80	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55

Submittal #: **36440-1**
Submittal: Delivery Order 0046
RAAP
Sample ID: **37SB1B**
Sample #: **345024**
Matrix: Soil Percent Solids: 83

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	B3	0.1	0.1	%	10/08/03	TAM	SW-846 3550B
Cyanide, Total	0.11 J	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

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DATA VALIDATION WORKSHEET

Volatile Organic Analysis by GC/MS

Reviewer: AS
Date: December-03
DV Level: II III IV
Review Document:
X NFG - Region III Modifications
X Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-1
Test Name: 8260B
Method No.: VOC

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Do sample preservation, collection and storage condition meet method requirement?	x		
	If the temperature of the cooler was elevated (> 10 °C) or bubble size in aqueous sample was too big (tiny bubble is OK.), then flag all positive results with a "L" and all non-detects "UL".			
1.5	Do any soil samples contain more than 50% water?		x	
	If any sample analyzed as a soil, other than TCLP, contains % moisture greater than 50%, noted in the DV report.			

Notes:
1. a cooler at 1.7C
2. 37SB1B was cancelled by client.
3. 37SB1C was supposed to be renamed 37SB1B and analyzed, but the encores were not preserved within hold time. This sample was resampled and submitted in SDG 36440-6.

2.0 Holding Times		Yes	No	NA
2.1	Were sample preserved as specified in the method or project QAPP?	see above		
2.2	Have any technical holding times, determined from date of sampling to date of analysis, been exceeded? If yes, L(+)/UL(-). For aqueous unpreserved - 7 days for aromatic compounds All others - 14 days.		x	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, L(+)/R(-) .		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per GCMS, 20 samples, batch, matrix, and level)?	x		
3.2	Do any method blanks have positive results? Action: If yes, positive sample results should be reported and qualified "B", if the concentration of the compound in the sample is less than or equal to 5 times (or 10 times for the common volatile lab contaminants - methylene chloride, acetone, and 2-butanone) the amount in the associated blank.	x		
3.3	Do any field equipment blanks/trip blanks have positive results? If Yes, use same rules above.			x
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, noted in the DV report.			x

Notes: acetone

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If no, use professional judgement to determine the effect on the data and note in the reviewer narrative.	x		
4.3	Has a continuing calibration standard been analyzed for every 12 hours of sample analysis per instrument?	x		
4.4	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 15% and %D < ± 20%		x	
	For initial Calibration: for %RSD > ±15%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 20% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >20%, J(+).			
4.5	Do any SPCC compounds have an RRF < control limit? Control limits: >0.10 for chloromethane, 1,1-dichloroethane, & bromoform or >0.30 for chlorobenzene & 1,1,2,2-tetrachloroethane. If yes, L(+)/R(-).		x	

Notes: The second source for methyl acetate was analyzed after sample analyses, but passed at 89% - no action was taken.

5.0 GC/MS Instrument Performance Check		Yes	No	NA
5.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?	x		
5.2	Are BFB enchanced bar graph spectrum and mass/charge (m/z) listing provided for each 12-hour shift?	x		
5.3	Have all samples been analyzed within twelve hours of the BFB tune?	x		
	If twelve hours have elapsed according to the system clock, and the laboratory had analyzed standards, blanks, field samples or QC samples after twelve (12) hours, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
5.4	Have ion abundance criteria for BFB been met for each instrument used?	x		
	If the BFB criteria were not met prior to the analyses of the standards, blanks, field samples and QC samples, all standards, blanks, field samples and QC samples are rejected "R".			

Notes:

6.0 Surrogate Recovery							Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?						x		
6.2	Are surrogate recoveries within acceptance criteria (not to exceed 50-150%) for all samples and method blanks?						x		
6.3	If No in Section 6.2, are these sample(s) or method blank(s) reanalyzed?								x
	If any system monitoring compound(s) in the volatile fraction is out of specification, there should be a reanalysis to confirm that the non-compliance is because of sample matrix effects rather than laboratory deficiencies.								
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? DV report should indicate that extraction efficiency/ method accuracy cannot be verified.								x
		1 or more <10%		1 high/low	2 or 3 high/low	2 or 3 all low	2 or 3 all high		
	Positives	L		J	J	L	K		
	Non-detects	R		UJ	UJ	UL	NONE		
	Note: The B qualifier remains over surrogate flagging.								

Notes:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 50-150%?	x		
7.4	Are there any RPD outside the QC limits not to exceed 50%?	x		
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

8.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)		Yes	No	NA
8.1	Is the LCS/LCSD recovery form present?	x		
8.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
8.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 50-150%?	x		
	If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
8.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 50%?			x
	If Yes, J(+) only.			

Notes:

9.0 Internal Standard		Yes	No	NA
9.1	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration? If not, J(+)/UJ(-).	x		
	If extremely low area counts are reported, or performance exhibits a major abrupt drop-off, then a severe loss of sensitivity is indicated. Non-detect target compounds should then be qualified as unusable (R).			
9.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	x		
	The chromatographic profile for that sample must be examined to determine if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction. Positive results should not needed to be qualified as "R", if the mass spectral criteria are met.			

Notes:

10.0 Field Duplicate		Yes	No	NA
10.1	Was a field duplicate prepared and analyzed at the correct frequency (one per 20 samples, matrix, and level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
10.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

11.0 Tentatively Identified Compounds (TICs) and Detection Limit Verification		Yes	No	NA
11.1	Are any TICs detected in the field samples? If Yes, all TIC results should be flagged "NJ" (tentatively identified and approximate concentration).	x		
11.2	Do detection limits meet those required by the project QAPP and were they properly adjusted to reflect all sample dilutions and dry weight factors?	x		
11.3	Were sample concentrations above the highest standard run at a dilution? If not, for ion saturation flag "L", unsaturated results "J".			x

Notes:

12.0 Data Completeness		Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit 90%)	x		
	Number of samples: 19			
	Number of target compounds in each analysis:50			
	Number of results rejected and not reported:1			
	% Completeness = (12.1.1 x 12.1.2 - 12.1.3) x 100/(12.1.1 x 12.1.2)			
	% Completeness = 99.9%			

Notes:

DATA VALIDATION WORKSHEET

Semivolatile Organic Analysis

Reviewer: AS
Date: December-03
DV Level: II III IV
Review Document:
X NFG - Region III Modifications
X Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-1
Test Name: SVOC
Method No.: 8270C

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	
1.4	Do sample preservation, collection and storage condition meet method requirement?		x	
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 20 ^{O}C), then flag all positive results with a "L" and all non-detects "UL".			
1.5	Do any soil samples contain more than 50% water?		x	
	If any sample analyzed as a soil, other than TCLP, contains % moisture greater than 50%, noted in the DV report.			

Notes: a cooler @ 1.7C

2.0 Holding Times		Yes	No	NA
2.1	Were sample preserved as specified in the method or project QAPP?	x		
2.2	Have any technical holding times, determined from date of sampling to date of analysis, been exceeded? If yes, L(+)/UL(-). For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, L(+)/R(-) .		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x		
3.2	Do any preparation/instrument/reagent blanks have positive results? Action: If yes, positive sample results should be reported and qualified "B", if the concentrationof the compound in the sample is less than or equal to 5 times (or 10 times for the common phthalate contaminants) the amount in the associated blank.		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.	x		
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, noted in the Dv report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If no, use professional judgement to determine the effect on the data and note in the reviewer narrative.	x		
4.3	Has a continuing calibration standard been analyzed for every 12 hours of sample analysis per instrument?	x		
4.4	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD ≤ 15%, ICV %D < 30%, and CCV %D ≤ 20%.		x	
	For initial Calibration: for %RSD > ±15%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 20% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >20%, J(+).			
4.5	Do any SPCC compounds have an RRF < 0.05? (n-nitroso-di-n-propylamine,hexachlorocyclopentadiene,2,4-dinitrophenol, & 4-nitrophenol) If yes, J(+)/R(-).		x	

Notes:

5.0 GC/MS Instrument Performance Check		Yes	No	NA
5.1	Are GC/MS Tuning and Mass Calibration forms present for decafluorotriphenylphosphine (DFTPP)?	x		
5.2	Are DFTPP enchanced bar graph spectrum and mass/charge (m/z) listing provided for each 12-hour shift?	x		
	If DFTPP was analyzed simultaneously with any calibration standard or blank, the instrument performance check (IPC) is rejected "R" as well as all associated data.			
5.3	Have all samples been analyzed within twelve hours of the DFTPP tune?	x		
	If twelve hours have elapsed according to the system clock, and the laboratory had analyzed standards, blanks, field samples or QC samples after twelve (12) hours, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
5.4	Have ion abundance criteria for DFTPP been met for each instrument used?	x		
	If the DFTPP criteria were not met prior to the analyses of the standards, blanks, field samples and QC samples, all standards, blanks, field samples and QC samples are rejected "R".			

Notes:

6.0 Surrogate Recovery		Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
6.2	Are surrogate recoveries within acceptance criteria not to exceed 10-150% for all samples and method blanks?		x	
6.3	If No in Section 6.2, are these sample(s) or method blank(s) reanalyzed?		x	
	If any two base/neutral or acid fraction are out of specification, or if any one base/neutral or acid extractable surrogate has a recovery of less than 10%, then there should be a reanalysis to confirm that the non-compliance is because of sample matrix effects rather than laboratory deficiencies.			
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? (recoveries may be diluted out.)		x	
	1 or more <10% / 2 or 3 high/low / 2 or 3 all low / 2 or 3 all high Positives: L / J / L / K Non-detects: R / UJ / UL / NONE			
	Note: The B qualifier remains over surrogate flagging.			

Notes:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 10-150%?	x		
7.4	Are there any RPDs outside the QC limits not to exceed 60%?	x		
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualificationof the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

8.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)		Yes	No	NA
8.1	Is the LCS/LCSD recovery form present?	x		
8.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
8.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 10-150%?	x		
	If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
8.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 50%?			x
	If Yes, J(+) only.			

Notes:

9.0 Internal Standard		Yes	No	NA
9.1	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration? If not, J(+)/UJ(-).		x	
	If extremely low area counts are reported, or performance exhibits a major abrupt drop-off, then a severe loss of sensitivity is indicated. Non-detect target compounds should then be qualified as unusable (R).			
9.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	x		
	The chromatographic profile for that sample must be examined to determine if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction. Positive results should not needed to be qualified as "R", if the mass spectral criteria are met.			

Notes: 37SB1A was analyzed at dilution due to the last internal recovery low and associated analytes should be used from this dilution for data assessment.

10.0 Field Duplicate		Yes	No	NA
10.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
10.2	Are all analyte duplicate results within control limits? Generally, no action is taken on the basis of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

11.0 Tentatively Identified Compounds (TICs) and Detection Limit Verification		Yes	No	NA
11.1	Are any TICs detected in the field samples? If Yes, all TIC results should be flagged "NJ" (tentativelyidenified, and approximate concentration).	x		
11.2	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture?	x	37SB1A DF16	
11.3	Were sample concentrations above the highest standard run at a dilution? If not, for ion saturation flag "L", unsaturated results "J".			x

Notes:

12.0 Data Completeness		Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit 90%)	x		
	Number of samples: 19			
	Number of target compounds in each analysis: 66			
	Number of results rejected and not reported: 0			
	% Completeness = (12.1.1 x 12.1.2 - 12.1.3) x 100/(12.1.1 x 12.1.2) 100			
	% Completeness = #DIV/0!			

Notes:

DATA VALIDATION WORKSHEET

Polyaromatic Hydrocarbons

Reviewer: AS
Date: December-03
DV Level: II III IV

Review Document:

X Region III Modified for National Functional Guidelines
____ NFG for organic Data review (February 1994)
X Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-1
Test Name: PAH
Method No.: 8310-HPLC

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. % solids		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes: cooler @ 1.7C

2.0 Holding Times		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?		see above	
	Action: If the temperature of the cooler was elevated (> 10 ^{O}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyses, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes: collected from 9/30/03-10/01/03 and extracted on 10/10/03

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%	x		
	For initial Calibration: for %RSD > ±20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?	x		
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?			x
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.			x
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 40-150%?	x		
	Are there any RPDs outside the QC limits not to exceed 60%?		x	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

7.0 Laboratory Control Sample (LCS)

		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 40-150%?	x		
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?			x
	Action: If Yes, J(+) only.			

Notes:

8.0 Field Duplicate

		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.	x		
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.	x		
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	x		

Notes:

10.0 Data Completeness			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		x		
	Number of samples:	19			
	Number of target compounds in each analysis:	16			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

DATA VALIDATION WORKSHEET

Explosives

Reviewer: AS
Date: December-03
DV Level: II III IV

Review Document:

X Region III Modified for National Functional Guidelines
___ NFG for organic Data review (February 1994)
X Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-1
Test Name: Explosives
Method No.: 8330-HPLC

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. % solids		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes: a cooler @ 1.7C

2.0 Holding Times		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?		see above	
	Action: If the temperature of the cooler was elevated (> 10 ^{O}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyese, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes: sampled between 9/30/03-10/1/03, extracted on 10/13/03, and analyzed between 10/18/03-10/19/03

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%		x	
	For initial Calibration: for %RSD > ±20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?	x		
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?			x
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.			x
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 40-150%?		x	
6.4	Are there any RPDs outside the QC limits not to exceed 60%?		x	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

7.0 Laboratory Control Sample (LCS)		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 40-150%?		x	
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?			x
	Action: If Yes, J(+) only.			

Notes:

8.0 Field Duplicate		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	positive	x		
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.	x		
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	x		

Notes:

10.0 Data Completeness			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		x		
	Number of samples:	19			
	Number of target compounds in each analysis:	14			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

DATA VALIDATION WORKSHEET

Pesticides/PCBs

Reviewer: AS
Date: December-03
DV Level: II III IV

Review Document:

X SW-846 - 8081/8082
X NFG - Region III Modifications
___ CLP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-1
Test Name: PEST/PCB
Method No.: 8081A/8082

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	
1.4	Do any soil samples contain more than 50% water?		x	
	If any sample analyzed as a soil, other than TCLP, contains % moisture greater than 50%, noted in the DV report.			

Notes: a cooler at 1.7C

2.0 Preservation/ Holding Times		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?		see above	
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 20 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampleing to date of analysis, been exceeded? If yes, J(+)/UJ(-). For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, J(+)/R(-) .		x	

Notes: sampled between 9/30/03-10/1/03, prepared on 10/09/03, analyzed 10/10/03

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix)?	x		
3.2	Do any preparation/instrument/reagent blanks have positive results? Action: If yes, positive sample results should be reported and qualified "B", if the concentration of the compound in the sample is less than or equal to five times the amount in the associated blank.		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note it in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards included in the calibration curve? 1016 and 1260 need at least three peaks at five concentrations. The multi-component target compounds (the other Aroclors, Toxaphene, & Chlordane) must each be analyzed separately at a single concentration level during the initial calibration sequence.	x		
4.2	Has a continuing calibration standard been analyzed for every 12 hours or twenty samples?	x		
4.3	Are all calibration standard (IC and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r>0.99, %RSD < ± 20% and %D < ± 15%		x	
	For initial Calibration: for %RSD > ± 20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Do all standard retention times in the continuing calibration fall within the RT windows established during the initial calibration sequence? If No, the associated sample result should be carefully evaluated.	x		

Notes:

5.0 GC/ECD Instrument Performance Check for Pesticides		Yes	No	NA
5.1	Is the 4,4'-DDT breakdown </= to 15%? If No, for positive DDT results, DDT-L(+), DDD/DDE - NJ(+). For non-detect DDT results, DDD/DDE - R(+).	x		
5.2	Is the endrin breakdown </= to 15%? If No, for positive endrin results, endrin-L(+), endrin aldehyde/ketone - NJ(+). For non-detect DDT results, endrin aldehyde/ketone - R(+).	x		

Notes:

6.0 Surrogate Recovery		Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
6.2	Do all surrogate retention times fall within the RT windows established during the initial calibration sequence? If No, the associated sample result should be carefully evaluated.	x		
6.3	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?	x		
6.4	If No in Section 6.3, are these sample(s) or method blank(s) reanalyzed?			x
6.5	If No in Section 6.4, is any sample dilution factor greater than 10? (recoveries may be diluted out.)			x

	# of outliers	Recovery	Sample result from column with non-conformance	Sample result from column without non-conformance
	1 out	high/low	No action	No action
	2 out	2 high same column	K	No action
		2 low same column	L, UL	No action
		mixed same column	J, UJ	No action
		2 high diff columns	J	Not applicable
		2 low diff columns	J, UJ	Not applicable
		mixed diff columns	Professional judgement	Not applicable
	3 out	All high	K	Not applicable
		All low	L, UL	Not applicable
		2 high, 1 low	K (2 high)	J (1 low 2nd column)
		2 low, 1 high	L, UJ (2 low)	J (1 high 2nd column)
		other mixed	J, UJ	Not applicable
	4 out	All high	K	Not applicable
		All low	L, UL	Not applicable
		Mixed	J, UJ	Not applicable
	If any recovery is >0% and <10% then L(+)/R(-).			
	If any recovery is 0% then R(+/-).			

Notes:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 30-150%?	pest	pcb	
7.4	Are there any RPDs outside the QC limits not to exceed 60%?	pest	pcb	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

8.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)		Yes	No	NA
8.1	Is the LCS/LCSD recovery form present?	x		
8.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
8.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 30-150%?		x	
	If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
8.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?			x
	If Yes, J(+) only.			

Notes:

9.0 Field Duplicate		Yes	No	NA
9.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
9.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes: QSB1A submitted in SDG 36440-2, BDL for pest and 0.053/0.051 for Aroclor 1254.

10.0 Compound Identification and Detection Limit Verification		Yes	No	NA
10.1	Is the percent difference calculated for the positive sample results on both columns < 40%? If No, J(+).	x		
10.2	Do detection limits meet those required by the project QAPP and were properly adjusted for dilution factors and moisture?	x		

Notes:

11.0 Pesticide Cleanup Checks		Yes	No	NA
11.1	Is Form IX PEST-1 present and complete for each lot of Florisil Cartridges used? (Florisil Cleanup is required for all Pest/PCB extracts to reduce matrix interference caused by polar compounds.)			x
	Every lot number of Florisil cartridges used for sample cleanup must be checked by spiking with 2,4,5-trichlorophenol and the midpoint concentration of Individual Standard Mixture A.			
11.2	Are all samples listed on the Pesticide Florisil cartridge Check Form?			
11.3	Are percent recoveries of pesticide and surrogate compounds within control limit, 80-120%(if the recovery of 2,4,5-trichlorophenol < 5%), for the florisil cartridge check? If No, the raw data should be examined for the presence of polar interferences and professional judgement should be used in qualifying the data.			

Notes:

12.0 Data Completeness				Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit 90%)	Pest	PCB	x		
	Number of samples:	3	3			
	Number of target compounds in each analysis:	21	7			
	Number of results rejected and not reported:	0	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)					
	% Completeness =	100%	100%			

Notes:

DATA VALIDATION WORKSHEET

Herbicides

Reviewer: AS
Date: December-03
DV Level: II III IV

Review Document:

__X__ Region III Modified for National Functional Guidelines
____ NFG for organic Data review (February 1994)
__X__ Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-1
Test Name: Herbicides
Method No.: 8151A

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. % solids		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes: a cooler @ 1.7C

2.0 Holding Times		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?		see above	
	Action: If the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyese, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).	x		
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes: re-extraction for Dinoseb occured outside the 14 day extraction holding time, but less than 28 days
FSB2A, collected on 9/30/03, re-extracted on 10/17/03
46SB1A, collected on 10/01/03, re-extracted on 10/17/03
37SB1A, collected on 10/01/03, re-extracted on 10/17/03

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%	x		
	For initial Calibration: for %RSD > ±20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 25-150% for all samples and method blanks?	x	Dinoseb	
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?		x	
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.		x	
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes: Most of the surrogates for the extraction to report dinoseb have high recoveries.

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 25-150%?		x	
6.4	Are there any RPDs outside the QC limits not to exceed 60%?		x	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes: multiple

7.0 Laboratory Control Sample (LCS)		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 25-150%?	x		
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?			x
	Action: If Yes, J(+) only.			

Notes: original extraction Dinoseb LCS recovery low, re-extraction passed.

8.0 Field Duplicate		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes: QSB1A and SDB-3 submitted in SDG 36440-2 were both non-detect.

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.	x		
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.	x		
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?		x	

Notes: 37SB1A was analyzed at diltion and reported with elevated detection limits due to matrix interference of one or more interfering peaks during analysis.

10.0 Data Completeness			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		x		
	Number of samples:	3			
	Number of target compounds in each analysis:	10			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

DATA VALIDATION WORKSHEET
INORGANIC - ICP, CVAA, AND CYANIDE
REGION III - NATIONAL FUNCTIONAL GUIDELINES

Project Name: Radford SSP
SDG No.: 36440-1
Reviewer: AS
Project No.: 15291974.30000
Date: December-03

1.0 Chain of Custody/Sample Condition/Raw Data		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples which were analyzed?	x			x			x			x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x			x			x			x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x			x			x			x	
1.4	Does sample preservation, collection and storage meet method requirement? (For metal: water samples: with Nitric Acid to pH < 2, and soil/sediment samples: 4 $^{O}C \pm 2\ ^{O}C$)		x			x			x			x	
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes. % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	x			x			x			x		

Note: a cooler @ 1.7C

2.0 Holding Time		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, CN: 14 days, other metals: 6 months) Action:L(+)/UL(-). If the holding time is grossly exceeded (twice the holding time criteria), L(+)/R(-).		x			x			x			x	

Note:

3.0 Instrument Calibration		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? (ICP& ICPMS: blank + one standard & a RL standard OR 3 standards and a blank with one standard at the RL; CVAA: blank + five standards with one standard at the RL). If not, qualify with "R".	7 + BLK			4 + BLK			5 + BLK			x		
3.2	Are the correlation coefficients > 0.99? Action: J(+)/UJ(-).	x			x			x			x		
3.3	Once per calibration, did a high and low distilled standard recovery within 85-115%? If no, follow 3.6.										x		
3.4	Was an initial calibration check standard (ICV) analyzed immediately after instrument system had been calibrated? Action: If no, all associated data are rejected "R".	x			x			x			x		
3.5	Was continuing calibration standard (CCS) analyzed at a minimum frequency of 10% (every 10 samples) during an analytical run and at the end of the analytical run? If not, document and flag based on professional judgement.	x			x			x			x		
3.6	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? FOR ICP 90%-110%, FOR Hg 80-120%, FOR CN 85-115%.	x			x			x			x		
	ICV and CCV: Action: L(+)/R(-) L(+)/UL(-) K(+) Mercury < 65% 65% - 79% > 120% Cyanide < 65% 65% - 84% > 115% Other Metals < 75% 75% - 89% > 110%												
3.7	For ICP & ICPMS, did the CRDL standard recover between 80-120%?	Sb					x	x					
	<50% 50%-79% >120% 2xCRDL>[sample]>IDL L(+)/R(-) L(+)/UL(-) K							passed within 70-130%					

Note: batch 207811 has a new high point added to Al, Ba, Ca, Fe, Mg, Mn, & K, an elevated RL by 5

4.0 Blanks		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were method blank (MB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x			x			x			x		
4.2	Were calibration blanks (ICB and CCBs) analyzed immediately after each and every ICV and CCVs? Action: If no ICB was run, all associated data are rejected. If the frequency of the CCBs does not follow requirement, all associated data are qualified "J".	x			x			x			x		
4.3	Are there reported MB or ICB/CCBs values > RL?	x			x				x			x	
	Sample Results > RL												
	< 5X Blank Contamination B												
4.4	Are there negative blank results with the absolute value > RL?		x			x			x			x	
	Sample Results Non-detects > RL												
	< 5X absolute Blank Contamination UL L												
4.5	Are there reported field blank > ± RL?	x			x				x			x	
	Sample Results > RL												
	< 5X Blank Contamination B												

Note: _____

5.0 ICP Interference Check Sample (ICS)		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1	Was ICS analyzed at beginning of each ICP run?	x			x								
5.2	Are the ICS AB recoveries within 80% - 120%?	x			x								
5.3	Are the results for unspiked analytes (in ICS A) < ± RL?	x			x								
5.4	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?			x			x						
	If not...												
	Action: Not Spiked Analytes: < -IDL L(+)/UL(-); > IDL K(+). Spiked analytes (ICS AB analytes): < 50% L(+)/R(-); 50% - 79% L(+)/UL(-); >120% K(+)												

Note: _____

6.0 Laboratory Control Sample (LCS)		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	x			x			x			x		
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)		x			x			x			x	
	Action: Solid: < LCL L(+)/UL(-); > UCL K(+). Aqueous: < 50% L(+)/R(-); 50% - 79% L(+)/UL(-); > 120% K(+)												

Note: _____

7.0 Laboratory Duplicates (MSD)		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), using professional judgement, analytes not associated with duplicate results.	x			x			x			x		
	For aqueous 6010B and Hg - RPD< 25%, aqueous CN - RPD < 20%, aqueous 6020 - RPD < 20%, and for soil - use laboratory generated limits for MS/MSD.												
7.2	Are all analyte duplicate results within control limits? If no, qualify all associated field samples J(+)/UJ(-) for the analyte with results that fall outside criteria.	x			x			x			x		

Note: _____

8.0 Spike Sample Analysis -Pre-Digestion/Post-Digestion		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
8.1	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, batch, matrix and level)? If not, J(+) with professional judgement.	x			x			x			x		
8.2	For all analytes with sample concentration > 4 x spike concentration, are spike recoveries within the control limit of 75-125%?	x				x		x			x		
	%R > 125% / 30%< %R < 74% / < 30%												
	Positive: K / L / L												
	Non-detect: None / UL / R												
8.3	Where pre-digestion matrix spike analytes were outside the acceptable recovery limits(except Ag), was a post-digestion spike performed? Note any failures in DV report, but no data qualifying action is required.	x			x			x					x

Note: FSB2A 6010B MS/MSD calcium 60%/62% (70%)

PDS for iron low at 71%, MS/MSD did not meet four times rule.

9.0 Instrument Detection Limits (IDL)		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1	Are all IDLs/RLs equal to or less than the reporting limits specified?	x			x			x			x		

Note:

10.0 ICP/AA Serial Dilutions (Not for Mercury Analysis)		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	x			x								
10.2	Was a five-fold dilution performed?	x			x								
10.3	Did the serial dilution results agree within 10% for ICP analyte concentration > 5 X the RL for 6010 or > 20 X the RL for 6020 in the original sample? If no, J(+).		x			x							

Note: 6010B: FSB2A - Cobalt at 28.6%, chromium at 20.0%, iron at 10.4%, and potassium at 11.0%.

6020: - Nickel at 15.4%

11.0 Field Duplicate Samples		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?	x			x			x			x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.												
11.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report	x				x		x			x		

Note: _____

12.0 Result Verification/ Internal Standards/ Tune		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?	x			x			x			x		
12.2	Were all dilution reflected in the positive results and detection limits?	x			x			x			x		
12.3	Were the Internal Standard recoveries within 30-120%	x			x								
12.4	Were the tunes run at a minimum of four times with RSD < 5% for analytes in solution?	x											
12.5	Were the tune mass calibrations < 0.1 amu from the true value?	x											
12.6	Was the resolution check peak width < 0.9 amu at 10% peak height?	x											

Note: CN for FSB2B, SBD-1, and FSB2C were reported from dilutions due to matrix interference

Several metals by 6010B and lead by 6020 were analyzed straight and then at dilution due to the presence of high target concentrations

13.0 Completeness Calculation		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
13.1	Is % completeness within the control limits? (Control limit 90%)	x			x			x			x		
13.1.1	Number of samples:												
13.1.2	Number of target compounds in each analysis:												
13.1.3	Number of results rejected and not reported:												
	% Completeness = (13.1.1 x 13.1.2 - 13.1.3) x 100/(13.1.1 x 13.1.2)												
	% Completeness =	100%			100%			100%			100%		

Note: _____

Cart 2
Vol Soil Fridge
Nº 1073

Radford Army Ammunition Plant
Chain Of Custody Record

Project Number	Project Name
07604-317	RFAAP

Project Contact (Name and Phone Number)
Darren Rennie (804) 965-9000

Samplers:
Brett Fisher / Josh Spangler

LAB: TriMatrix

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, [redacted])	Dioxin/Furan(8290)	TAL Metals (Including Mercury) /CN	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	WERB	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
FSB1A	9/30/05 1400	5		X	S	F	/	5	X	X	X			X		X						X	3 jars 3 encore
FSB1B	9/30/05 1415	5		X	S	F	/	5	X	X	X			X		X						X	3 jars 3 encore
FSB1C	9/30/05 1430	5		X	S	F	/	5	X	X	X			X		X						X	3 jars 3 encore
FSB2A	9/30/05 1500	5		X	S	F	/	6	X	X	X	X	X	X		X						X	4 jars 3 encore
FSB2AMS	9/30/05 1500	5		X	S	F	/	6	X	X	X	X	X	X		X						X	4 jars 3 encore
FSB2AMSD	9/30/05 1500	5		X	S	F	/	6	X	X	X	X	X	X		X						X	4 jars 3 encore
FSB2B	9/30/05 1515	5		X	S	F	/	5	X	X	X			X		X						X	#3 jars 3 encore
SBD[redacted]-1	9/30/05	5		X	S	F	/	5	X	X	X			X		X						X	3 jars 3 encore
FSB2C	9/30/05 1545	5		X	S	F	/	5	X	X	X			X		X							3 jars 3 encore

Cancelled per client

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
Brett Fisher	9/30/05 1800				JAF 10/01/03 9:15
Relinquished by:	Date/time	Received by: (for lab)	Date/Time	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

S-4

36440-1

TMO576

000056

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1075

Project Number	Project Name
39604-317	RFAAP

Project Contact (Name and Phone Number): Darren Renne (804) 965-9000

Samplers: Brett Fisher / John Spangler

LAB: Tri-matrix

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, [redacted])	Dioxin/Furan(8290)	TAL Metals (Including Mercury) /CN	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	[redacted] NERB	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)	TG
FSB3A	10/1/03 800	S		X	5	F	/	5	X	X	X			X		X								2C
FSB3B	10/1/03 815	S		X	5	F	/	5	X	X	X			X		X								2C
FSB3C	10/1/03 830	S		X	5	F	/	5	X	X	X			X		X								2C
46SB1A	10/1/03 1210	S		X	5	F	/	7	X	X	X	X	X	X		X						X		2[illegible]
46SB1B	10/1/03 1220	S		X	5	F	/	5	X	X	X			X		X								2C
46SB1C	10/1/03 1250	S		X	5	F	/	5	X	X	X			X		X								
46SB2A	10/1/03 1325	S		X	5	F	/	5	X	X	X			X		X								
46SB2B	10/1/03 1340	S		X	5	F	/	5	X	X	X			X		X								
46SB2C	10/1/03 1350	S		X	5	F	/	5	X	X	X			X		X								
SBD2	10/1/03 —	S		X	5	F	/	5	X	X	X			X		X								

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
[signature]	10/1/03 1800				[signature] 10/02/03 8:55
Relinquished by:	Date/time	Received by: (for lab)	Date/Time		

NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement

7-5

36440-1

TM0127 Cart 4

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1084

000057

Project Number	Project Name
09604 317	RFAAP

Project Contact (Name and Phone Number): Darren Ranne (804) 965-9000

Samplers: Brett Fisher / John Spangler

LAB: Tri-matrix

AIRBILL No:

Courier:

ANALYSES

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, [redacted])	Dioxin/Furan(8290)	TAL Metals (Including Mercury) / CN	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	[redacted] NERB	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
37SB1A	10/1/03 1530	S		X	S	F	/	7	X	X	X	X	X	X		X						X	37SB1A is mainly
37SB1B	10/1/03 1545	S		X	S	F	/	5	X	X	X			X		X		HOLD					consisted of Sludge.
37SB1C	10/1/03 1600	S		X	S	F	/	5	X	X	X			X		X		HOLD					Treat as Highly contaminated
																							-per Client 10/2/03

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
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E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
[signature]	10/1/03 1800				
Relinquished by:	Date/time	Received by: (for lab) [signature]	Date/Time 10/2/03 8:55	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

36440-1

7-5

DATA VALIDATION REPORT - Level III Review

SDG No.: 36440-2 **Fraction:** VOCs, SVOCs, PAHs, Explosives, Pesticides, PCBs, Herbicides, Metals, & Cyanide

Lab: TriMatrix **Project Name:** Radford SSP

Reviewer: AS **Date:** December 9, 2003

This report presents the findings of a review of the referenced data. The report consists of this summary, copies of data reports with data qualifying flags applied (as required), the completed data validation checklist, supporting documentation, and an explanation of the data qualifying flags employed. The review performed is based on the USEPA Region III Modifications to the National Functional Guidelines for Organic and Inorganic Data Review as pertains to the specifics of the analytical methods employed and provisions of the approved project-specific Quality Assurance Project Plan (QAPP).

Major Anomalies:

For the SVOC analyses, the 1:24 dilution analysis of sample 37SB2A and the neat analyses of samples SBD3, QSB1A, and QSB3A displayed internal standard area counts less than the lower control limit (i.e., 50%) for perylene-d_{10} at 12.5%, 3.3%, 16.4%, and 11.9%, respectively. The associated field sample results were non-detect and were flagged "R,i". The samples were re-analyzed at dilutions with more acceptable internal standard area counts. The associated results from the dilutions should be used for data interpretation.

The matrix spike pair for sample 37SB2A displayed percent recoveries severely less than the lower control limit for 2-nitroaniline (10%/8%), 3,3'-dichlorobenzidine (0%/0%), 3-nitroaniline (4%/3%), 4-chloroaniline (2%/2%), and 4-nitroaniline (5%/5%). This sample represents a sludge matrix from a calcium sulfate drying bed. No other samples from this project were indicated by the field team to be of a sludge matrix. The parent sample results were non-detect and were flagged "R,m".

Minor Anomalies:

For the VOC analyses, the method blank for batch 90038-110 contained acetone at 0.00980 mg/Kg. The method blank for batch 90038-111 contained acetone at 0.00710 mg/Kg. The method blank for batch 89888-115 contained acetone at 13.0 ug/L and methylene chloride at 0.410 ug/L. Positive results less than ten times the blank concentration were flagged "B,z" in the associated samples.

The equipment blank EQB1 displayed positive detections for acetone at 2.9 ug/L and methylene chloride at 0.60 ug/L. The trip blank displayed positive detections for methylene chloride at 1.0 ug/L and toluene at 0.27 ug/L. The field blank detections for methylene chloride and acetone were previously qualified due to method blank detections. Since the trip blank is only associated with the aqueous field samples, no further data qualifying action was required.

The continuing calibration analyzed on 10/10/03 at 1112 displayed percent differences greater than the control limit (i.e., 20%) with a negative bias for methylene chloride at 24.0%, trans-1,2-dichloroethene at 20.1%, and methyl acetate at 29.4%. The continuing calibration analyzed on 10/11/03 at 1331 displayed percent differences greater than the control limit with a negative bias for acetone at 39.4%, carbon disulfide at 23.9%, methylene chloride at 24.8%, methyl acetate at 25.4%, 4-methyl-2-pentanone at 26.3%, and 2-hexanone at 20.7%. The

continuing calibration analyzed on 10/15/03 at 0919 displayed a percent difference greater than the control limit with a negative bias for carbon disulfide at 27.5%. Non-detect associated field sample results were flagged "UJ,c" while positive associated field sample results were flagged "J,c", unless previously qualified for a method blank detection for acetone.

The matrix spike pair for sample 37SB2A displayed percent recoveries outside the laboratory generated control limits for 1,2-dibromo-3-chloropropane (60%), 1,2-dichlorobenzene (54%/48%), 1,2,3-trichlorobenzene (31%/20%), 1,2,4-trichlorobenzene (33%/23%), 1,3-dichlorobenzene (57%/48%), 1,4-dichlorobenzene (54%/45%), acetone (52%), carbon disulfide (49%/46%), chloroethane (125%), ethylbenzene (58%), methyl-tert-butyl ether (141%), styrene (46%/34%), toluene (56%), and total xylenes (49%). This matrix spike pair also displayed relative percent differences greater than the laboratory generated control limits for 1,2,3-trichlorobenzene at 41%, methyl ethyl ketone at 21%, and 1,2,4-trichlorobenzene at 36%. The parent sample was non-detect for the anomalous compounds that displayed a negative bias. These results were flagged "UJ,m", unless previously qualified for an internal standard anomaly. The parent sample result for acetone was positive and previously qualified for a method blank detection. The other anomalous compounds displayed a positive bias or imprecision while the parent sample results were non-detect. No further data qualifying action was taken.

The matrix spike pair for sample 37SB3B displayed percent recoveries less than the laboratory generated lower control limits for carbon disulfide (34%/42%) and acetone (30%). This matrix spike pair also displayed relative percent differences greater than the laboratory generated control limits for methyl ethyl ketone at 42% and 2-hexanone at 54%. The parent sample was non-detect for carbon disulfide and was flagged "UJ,m". The parent sample acetone result was positive and previously qualified for a method blank detection. The other anomalous compounds displayed an imprecision while the parent sample results were non-detect. No further data qualifying action was taken.

Sample 37SB2A displayed an internal standard area count less than the lower control limit (i.e., 50%) for 1,4-dichlorobenzene-d_4 at 41%. The associated field sample results were non-detect and were flagged "UJ,i".

For the SVOC analyses, the method blank for extraction batch 89818-108 displayed positive detections for bis(2-ethylhexyl)phthalate at 1.10 ug/L and diethylphthalate at 0.150 ug/L. The method blank for extraction batch 90209-109 displayed a positive detection for diethylphthalate at 0.0160 mg/Kg. Positive associated field sample results less than ten times the blank concentrations were flagged "B,z".

The equipment blank EQB1 contained bis(2-ethylhexyl)phthalate at 1.0 ug/L, butyl benzyl phthalate at 0.96 ug/L, diethylphthalate at 0.10 ug/L, and several tentatively identified compounds (TICs). The equipment blank detections for bis(2-ethylhexyl) phthalate and diethylphthalate were previously flagged due to method blank detections and no further data qualifying action was taken. Positive results less than ten times the blank concentration for butyl benzyl phthalate and less than five times the blank concentration of the TICs were flagged "B,x" in the associated samples.

The continuing calibration analyzed on 10/15/03 at 1103 displayed percent differences greater than the control limit (i.e., 20%) with a negative bias for benzaldehyde at 29.7% and 4-chloroaniline at 24.2% and with a positive bias for bis(2-chloroethyl)ether at 20.8%, 2,4,5-

trichlorophenol at 22.8%, 2,4-dinitrophenol at 26.3%, and 4,6-dinitro-2-methylphenol at 20.1%. All associated field sample results were non-detect for benzaldehyde and 4-chloroaniline and were flagged "UJ,c". All associated field sample results were non-detect for the other anomalous compounds while the continuing calibration displayed a positive bias, thus, no data qualifying action was required.

The continuing calibration analyzed on 10/15/03 at 2147 displayed percent differences greater than the control limit with a negative bias for benzaldehyde at 37.5%, 4-chloroaniline at 39.9%, caprolactam at 24.1%, and 4-nitroaniline at 20.9%. All associated field sample results were non-detect and were flagged "UJ,c".

The continuing calibration analyzed on 10/16/03 at 2111 displayed percent differences greater than the control limit with a negative bias for atrazine at 38.6%, benzaldehyde at 34.4%, 4-chloroaniline at 21.9%, bis(2-ethylhexyl)phthalate at 27.9%, 3,3'-dichlorobenzidine at 20.6%, and di-n-octylphthalate at 24.9%. All associated non-detect field sample results were flagged "UJ,c" while positive field sample results were flagged "J,c", unless previously flagged for a matrix spike anomaly. This continuing calibration displayed percent differences greater than the control limit with a positive bias for 2,4-dinitrophenol at 25.6% and pentachlorophenol at 28.3%. All associated field sample results were non-detect, thus, no data qualifying action was required.

The continuing calibration analyzed on 10/17/03 at 1307 displayed percent differences greater than the control limit with a negative bias for benzaldehyde at 21.9% and with a positive bias for hexachlorocyclopentadiene at 21.4%, 3,3'-dichlorobenzidine at 20.5%, and di-n-octylphthalate at 21.1%. The associated field sample result was non-detect for benzaldehyde and was flagged "UJ,c". The associated field sample results were non-detect for the other anomalous compounds while the continuing calibration displayed a positive bias, thus, no data qualifying action was required.

The laboratory control spike pair for batch 89818-108 displayed recoveries less than the laboratory generated lower control limit (i.e., 50%) but greater than the QAPP lower control limit (i.e., 10%) for caprolactam (40%/37%). The laboratory control spike for batch 90209-109 displayed a recovery less than the laboratory generated lower control limit (i.e., 16%) but greater than the QAPP lower control limit (i.e., 10%) for 4-chloroaniline at 14%. The associated field sample results were non-detect and were previously flagged for a negative bias in the continuing calibration. No further data qualifying action was taken.

The laboratory control spike duplicate for batch 89818-108 displayed recoveries greater than the laboratory generated upper control limits for benzo(g,h,i) perylene at 127% and pentachlorophenol at 122%. The laboratory control spike for batch 89845-109 displayed recoveries greater than the laboratory generated upper control limits for 3,3'-dichlorobenzidine at 116%, benzo(k)fluoranthene at 118%, and carbazole at 125%. The laboratory control spike for batch 90209-109 displayed recoveries greater than the laboratory generated upper control limits for 2,4,5-trichlorophenol at 122%, 2,6-dinitrotoluene at 119%, benzo(b)fluoranthene at 121%, carbazole at 127%, diethylphthalate at 123%, dimethylphthalate at 117%, and fluorene at 117%. The laboratory control spike for batch 90209-116 displayed recoveries greater than the laboratory generated upper control limits for 2,4,5-trichlorophenol at 132%, 2-nitroaniline at 125%, 4-bromophenyl phenyl ether at 126%, 4-chloroaniline at 71%, 4-chlorophenyl phenyl ether at 121%, acenaphthylene at 118%, anthracene at 125%, benzo(a)pyrene at 131%, benzo(b)fluoranthene at 133%, benzo(k)fluoranthene at 119%, carbazole at 134%, diethylphthalate at 123%, dimethylphthalate at 122%, fluorene at 124%, and

hexachlorocyclopentadiene at 119%. Sample 37SB2A displayed a positive detection for diethylphthalate that was flagged "J,l". All other associated field sample results were non-detect or previously flagged for a method blank detection while the laboratory control spike displayed a positive bias. No data qualifying action was taken.

The matrix spike pair for sample 37SB2A displayed several percent recoveries and relative percent differences outside the laboratory generated control limits. For matrix spike recoveries that displayed a negative bias, positive parent sample results were flagged "J,m" while non-detects were flagged "UJ,m", unless previously flagged for a surrogate recovery. For matrix spike recoveries that displayed a positive bias or anomalous relative percent differences, positive parent sample results were flagged "J,m".

The matrix spike pair for sample 37SB3B displayed several percent recoveries and relative percent differences outside the laboratory generated control limits. For matrix spike recoveries that displayed a negative bias, positive parent sample results were flagged "J,m" while non-detects were flagged "UJ,m", unless previously flagged for a continuing calibration anomaly. For matrix spike recoveries that displayed a positive bias or anomalous relative percent differences, positive parent sample results were flagged "J,m".

The dilution analysis of sample SBD3 displayed an internal standard area count less than the lower control limit (i.e., 50%) for perylene-d_{10} at 37%. The associated field sample results were non-detect and were flagged "UJ,i".

The 1:24 dilution analysis of sample 37SB2A displayed two acid fraction surrogate recoveries outside the laboratory generated control limits for phenol-d_6 at 36% and 2,4,6-tribromophenol at 125%. The associated acid fraction constituents were non-detect and were flagged "UJ,s". The neat analysis of sample SBD3 displayed two acid fraction surrogate recoveries less than the laboratory generated lower control limits for 2-fluorophenol at 19% and phenol-d_6 at 19%. The associated acid fraction constituents were non-detect and were flagged "UL,s". The acid fraction surrogate 2-fluorophenol displayed percent recoveries greater than the laboratory generated upper control limit (i.e., 115%) for sample 37SB3A at 118%, 37SB3B at 117%, 37SB3C at 121%, and QSB1B at 120%. The neat analysis of sample QSB3A displayed a base/neutral fraction surrogate recovery less than the laboratory generated lower control limit (i.e., 38%) for phenol-d_6 at 24%. Since only one surrogate recovery was outside the control limits, no data qualifying action was required. The dilution analyses of samples QSB1A and QSB3A displayed several surrogate recoveries less than the laboratory generated lower control limits. Since the laboratory has indicated that these surrogates were diluted out, no data qualifying action was taken.

Sample 37SB2A initial extraction was brought to five times the normal final volume due to solidification into a gel upon concentration. This extract was further diluted by a factor of two prior to analysis. All internal standards failed and the surrogates had been lost. This analysis was subsequently discarded. This sample including the matrix spike pair was re-extracted at a smaller initial volume and was brought to five times the normal final volume including surrogate and spike addition where appropriate at increased concentrations to compensate for the final dilution factor.

For the PAH analyses, the laboratory control spike for batch 90138-110 displayed recoveries less than the laboratory generated lower control limits but greater than the project QAPP lower control limit (i.e., 40%) for benzo(a)anthracene at 73%, fluoranthene at 68%, and pyrene at 74%. The laboratory control spike for batch 90708-113 displayed a recovery less than the

laboratory generated lower control limit (i.e., 87%) but greater than the project QAPP lower control limit (i.e., 40%) for fluoranthene at 77%. Positive associated field sample results were flagged "J,l" while non-detects were flagged "UJ,l".

The surrogate, 2-fluorobiphenyl, recovery was greater than the laboratory upper control limit (i.e., 125%) for the EQB1 at 126%. All results for EQB1 were non-detect, thus, no data qualifying action was required. The surrogate recoveries were less than the laboratory lower control limit (i.e., 49%) for 37SB2A at 48%, 37SB3C at 36%, QSB1B at 44%, QSB3A at 47%, QSB3B at 42%, and QSB3C at 46%. Positive associated field sample results were flagged "L,s" while non-detects were flagged "UL,s", unless previously qualified for matrix spike or laboratory control spike anomalies.

The matrix spike duplicate for sample 37SB2A displayed recoveries less than the laboratory generated lower control limits for dibenzo(a,h)anthracene at 63%, fluoranthene at 50%, and pyrene at 25%. The non-detect parent sample result for dibenzo(a,h)anthracene was flagged "UJ,m". The matrix spike displayed recoveries greater than the laboratory generated upper control limits for benzo(a,h)anthracene at 120% and benzo(g,h,i) perylene at 197%. The matrix spike duplicate displayed a recovery greater than the laboratory generated upper control limit for benzo(g,h,i) perylene at 211%. The parent sample results were non-detect for these compounds that displayed a positive bias, thus, no data qualifying action was taken. This matrix spike pair also displayed relative percent differences greater than the laboratory generated control limits for benzo(a) anthracene at 20%, benzo(b)fluoranthene at 26%, benzo(k)fluoranthene at 25%, dibenzo(a,h)anthracene at 25%, fluoranthene at 31%, and fluorene at 21%. Positive parent sample results were flagged "J,d".

For the explosive analyses, the continuing calibration analyzed on 10/19/03 at 0414 displayed a percent difference greater than the control limit (i.e., 15%) with a negative bias for 3-nitrotoluene at 17.3%. The continuing calibration analyzed on 10/19/03 at 0852 displayed percent differences greater than the control limit with a negative bias for 3-nitrotoluene at 17.0% and HMX at 24.0%. The continuing calibration analyzed on 10/21/03 at 1533 displayed percent differences greater than the control limit with a negative bias for 2-nitrotoluene at 18.9% and 3-nitrotoluene at 30.3%. The continuing calibration analyzed on 10/21/03 at 2100 displayed a percent difference greater than the control limit with a negative bias for 3-nitrotoluene at 16.0%. The continuing calibration analyzed on 10/22/03 at 0227 displayed a percent difference greater than the control limit with a negative bias for 3-nitrotoluene at 19.9%. All associated sample results were non-detect and were flagged "UJ,c".

The matrix spike pair for sample 37SB2A displayed spike recoveries outside the laboratory generated control limits for 2,4-dinitrotoluene (30%) and 4-amino-2,6-dinitrotoluene (182%/211%). This matrix spike pair also displayed a relative percent difference greater than the laboratory generated control limit (i.e., 40%) for 2-amino-4,6-dinitrotoluene at 48%. The parent sample result for 2,4-dinitrotoluene was positive and was flagged "J,m". The matrix spike pair for sample 37SB3B displayed relative percent differences greater than the laboratory generated control limit (i.e., 40%) for 2,4-dinitrotoluene at 50% and 2-amino-4,6-dinitrotoluene at 41%. The parent sample results were non-detect for these compounds that displayed a positive bias or imprecision, thus, no data qualifying action was taken.

For the pesticide analyses, the opening continuing calibration analyzed on 10/10/03 displayed percent differences greater than the control limit (i.e., 15%) with a positive bias on column one for delta BHC at 18.6%, 4,4'-DDD at 19.73%, endosulfan II at 15.76%, methoxychlor at 19.24%, and endosulfan sulfate at 15.16%. The closing continuing calibration displayed a

percent difference greater than the control limit with a positive bias on column one for delta BHC at 15.11%. The associated field sample results were non-detect or did not confirm on the passing alternate analytical column. No data qualifying action was taken based on these anomalies.

The initial calibration displayed a relative standard deviation greater than the control limit (i.e., 20%) on column one for 4,4'-DDD at 24.13%. The closing continuing calibration analyzed on 10/18/03 displayed percent differences greater than the control limit (i.e., 15%) with a positive bias on column one for delta BHC at 16.89%, 4,4'-DDD at 33.20%, 4,4'-DDT at 18.77%, methoxychlor at 28.37%, and endosulfan sulfate at 15.85%. This closing continuing calibration displayed percent differences greater than the control limit with a positive bias on column two for 4,4'-DDD at 17.38% and methoxychlor at 20.16%. The associated field sample results were non-detect on one or both columns while the continuing calibration displayed a positive bias. No data qualifying action was taken based on these anomalies.

The laboratory control spike pair for batch 90180-108 displayed recoveries greater than the laboratory generated upper control limits for a-chlordane (111%), endosulfan sulfate (145%), endrin aldehyde (139%), and methoxychlor (148%/133%). The associated field sample, EQB1, was non-detect for these compounds while the laboratory control spikes displayed a positive bias. No data qualifying action was taken based on these anomalies.

The matrix spike duplicate for sample FSB2A submitted with sample delivery group 36440-1 displayed several recoveries less than the laboratory generated lower control limits. This matrix spike duplicate was analyzed twice and the second analysis results were reported. This matrix spike pair also displayed several relative percent differences greater than the laboratory generated control limits. Since the matrix spike displayed acceptable recoveries and all recoveries were within the QAPP specified limits, no data qualifying action was taken based on these anomalies.

For the herbicide analyses, the laboratory control spike pair for batch 90447-109 displayed recoveries greater than the laboratory generated upper control limits for dicamba (130%), dichlorprop (109%), MCPA (98%), and MCPP (122%/106%). The associated field sample, EQB1, was non-detect for these constituents while the laboratory control spike displayed a positive bias. No data qualifying action was taken. The laboratory control spike for batch 90218-110 displayed a recovery less than the laboratory generated lower control limit at for dinoseb at 0% and a recovery greater than the laboratory generated upper control limit (91%) for MCPP at 117%. The associated field sample results were non-detect for MCPP while the laboratory control spike displayed a positive bias, therefore, no data qualifying action was required. A re-extraction occurred on 10/17/03 that was fifteen days after the sampling date because the initial extraction did not recover dinoseb. All dinoseb results from the original extraction were rejected and manually removed from the result forms by the reviewer. All dinoseb results from the re-extraction were non-detect and were flagged "UJ,h".

The original extraction for the associated matrix spike pair for sample FSB2A submitted with sample delivery group 36640-1 displayed recoveries less than the laboratory generated lower control limits for dinoseb (2%/7%) and dicamba (46%). This matrix spike pair also displayed a relative percent difference greater than the laboratory generated control limit (i.e., 40%) for dicamba at 90%. The re-extraction for this matrix spike pair displayed recoveries less than the laboratory generated lower control limit (i.e., 50%) for dinoseb (29%/42%). All dinoseb results from the original extraction were manually removed by the reviewer. Since the matrix

spike duplicate displayed an acceptable recovery for dicamba and all recoveries were within the QAPP specified limits, no data qualifying action was taken based on these anomalies.

For the metal analyses by 6020, the method blank for batch 89770-108 contained antimony at 0.17 mg/Kg. The associated positive field sample results less than five times the blank concentration were flagged "B,p". The method blank for batch 89970-113 contained chromium at 0.58 ug/L. The associated field sample result for chromium was non-detect and no data qualifying action was required.

The equipment blank EQB1 contained lead at 0.3 ug/L. The associated field sample results were positive and greater than five times the equipment blank concentration. No data qualifying action was required.

The field duplicate pair (QSB1A and SBD3) displayed a relative percent difference greater than the control limit (i.e., 35%) for lead at 72.3%. The positive results for lead were flagged "J,f" in these two samples.

For the metal analyses by 6010B, the method blank for batch 89817-107 contained barium at 0.128 mg/Kg, cadmium at 0.329 mg/Kg, iron at 2.87 mg/Kg, potassium at 12.5 mg/Kg, and sodium at 18.7 mg/Kg. The method blank for batch 89817-110 contained barium at 0.151 mg/Kg, cadmium at 0.290 mg/Kg, iron at 1.30 mg/Kg, magnesium at 5.69 mg/Kg, potassium at 28.1 mg/Kg, sodium at 24.7 mg/Kg, and vanadium at 0.420 mg/Kg. The method blank for batch 89966-113 contained iron at 7.12 ug/L, potassium at 88 ug/L, and sodium at 421 ug/L. Positive results less than five times the blank concentration for cadmium and sodium were flagged "B,p" in the associated samples. All other field sample results were greater than five times the associated method blank concentration and no data qualifying action was required.

The equipment blank, EQB1, contained beryllium at 0.3 ug/L and sodium at 220 ug/L. The equipment blank result for sodium was previously qualified due to a method blank detection. Associated positive field sample results were greater than five times the equipment blank concentration for beryllium. No data qualifying action was required.

The matrix spike pair performed on sample 37SB3B displayed recoveries greater than the laboratory generated upper control limit (i.e., 111%) for magnesium (131%/115%). All associated field sample results were positive and were flagged "K,m".

The serial dilution performed on sample 37SB2A displayed a percent difference greater than the control limit (i.e., 10%) for chromium at 14.9%. This sample represents a sludge matrix that was digested in a batch by itself. This result was flagged "J,s".

The field duplicate pair (QSB1A and SBD3) displayed a relative percent difference greater than the control limit (i.e., 35%) for calcium at 112.9%. The positive results for calcium were flagged "J,f" in these two samples.

For mercury analyses, the matrix spike for sample 37SB2A displayed a recovery less than the laboratory generated lower control limit (i.e., 73%) at 63%. This parent sample represents a sludge matrix. The matrix spike pair for sample 37SB2B displayed acceptable recoveries. The mercury result for sample 37SB2A was positive and was flagged "J,m".

Correctable Anomalies: The client requested that the field sample 37SB1B sampled on 10/2/03 be discarded. An encore sampler labeled 37SB1B was packed with 37SB1C. And, sample 37SB1C was missing the third encore sampler. Two low level analyses were performed on these sample aliquots and the results were comparable.

Comments: Sample 37SB2A was initially analyzed for SVOCs at a dilution of 24 due to non-target matrix interference during the concentration step of the extraction and the reporting limits were elevated. Due to the abundance of target compounds, most of the samples were analyzed at dilutions for the metals analyses. Therefore, the reporting limits for these constituents were elevated.

Field coolers were received at the laboratory with internal temperatures less than the lower control limit (i.e., 2°C) at 0.7°C, 1.9 °C, and 0.9 °C. Since the sample aliquots were not frozen and the containers were intact, no data qualifying action was taken.

It should be noted that TIC results were flagged "NJ,t" in the associated samples. TIC results that were identified as unknown were manually lined out by the reviewer. The GIS-Key format is limited to 12 characters for a TIC CAS number. One or two SVOC TIC detections exceeded this limitation for 37SB1C, 37SB2B, 37SB2C, 37SB3B, QSB1A, QSB1B, QSB1C, QSB3B, QSB3C, QSB2A, QSB2B, and QSB2C. The laboratory reported the CAS number without the dashes. The reviewer manually entered the dashes for evaluation purposes on the hardcopy result forms included in this report.

No anomalies were encountered if a given fraction was not mentioned. Except for data flagged "R", all data are usable, as qualified, for their intended purpose based on the data reviewed.

Signed: Andrea Sansom

Andrea Sansom

Radford SSP

Submittal No.	Lab Sample ID	Field Sample ID	Matrix (Code)	Sample Date
36440-2	345028	37SB1C	SO	10/02/03
36440-2	345029	37SB2A	SO	10/02/03
36440-2	345030	37SB2B	SO	10/02/03
36440-2	345031	37SB2C	SO	10/02/03
36440-2	345032	37SB3A	SO	10/02/03
36440-2	345033	37SB3B	SO	10/02/03
36440-2	345034	37SB3C	SO	10/02/03
36440-2	345035	QSB1A	SO	10/02/03
36440-2	345036	SBD3	SO	10/02/03
36440-2	345037	QSB1B	SO	10/02/03
36440-2	345038	QSB1C	SO	10/02/03
36440-2	345039	QSB3A	SO	10/02/03
36440-2	345040	QSB3B	SO	10/02/03
36440-2	345041	QSB3C	SO	10/02/03
36440-2	345042	QSB2A	SO	10/02/03
36440-2	345043	QSB2B	SO	10/02/03
36440-2	345044	QSB2C	SO	10/02/03
36440-2	345045	EQB1	WQ	10/02/03
36440-2	345046	Trip Blank	WQ	10/02/03

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 08:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**37SB1C**	QC Batch:	90038 -110
Sample #:	**345028**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.18

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	5.9 U		5.9	0.503
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.9 U		5.9	0.896
79-34-5	1,1,2,2-Tetrachloroethane	5.9 U		5.9	0.771
79-00-5	1,1,2-Trichloroethane	5.9 U		5.9	0.700
75-34-3	1,1-Dichloroethane	5.9 U		5.9	0.854
75-35-4	1,1-Dichloroethylene	5.9 U		5.9	0.865
106-93-4	1,2-Dibromoethane	5.9 U		5.9	0.808
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.45
95-50-1	1,2-Dichlorobenzene	5.9 U		5.9	0.571
107-06-2	1,2-Dichloroethane	5.9 U		5.9	0.509
156-59-2	cis-1,2-Dichloroethene	5.9 U		5.9	0.838
156-60-5	trans-1,2-Dichloroethene	5.9 U	UJ,c	5.9	0.830
78-87-5	1,2-Dichloropropane	5.9 U		5.9	0.691
87-61-6	1,2,3-Trichlorobenzene	5.9 U		5.9	0.642
120-82-1	1,2,4-Trichlorobenzene	5.9 U		5.9	0.484
541-73-1	1,3-Dichlorobenzene	5.9 U		5.9	0.316
106-46-7	1,4-Dichlorobenzene	5.9 U		5.9	0.838
78-93-3	Methyl Ethyl Ketone	24 U		24	5.90
591-78-6	2-Hexanone	12 U		12	2.67
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.72
67-64-1	**Acetone**	**24**	B,z	24	5.90
71-43-2	Benzene	5.9 U		5.9	0.622
74-97-5	Bromochloromethane	5.9 U		5.9	0.898
75-27-4	Dichlorobromomethane	5.9 U		5.9	0.591
75-25-2	Bromoform	5.9 U		5.9	0.682
74-83-9	Bromomethane	5.9 U		5.9	1.77
75-15-0	Carbon Disulfide	5.9 U		5.9	1.71
56-23-5	Carbon Tetrachloride	5.9 U		5.9	0.550
108-90-7	Chlorobenzene	5.9 U		5.9	0.780
75-00-3	Chloroethane	5.9 U		5.9	1.59
67-66-3	Chloroform	5.9 U		5.9	0.526

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 08:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**37SB1C**	QC Batch:	90038 -110
Sample #:	**345028**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.18

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	5.9 U		5.9	0.984
110-82-7	Cyclohexane	12 U		12	0.373
10061-01-5	cis-1,3-Dichloropropene	5.9 U		5.9	0.579
10061-02-6	trans-1,3-Dichloropropene	5.9 U		5.9	0.615
75-71-8	Dichlorodifluoromethane	5.9 U		5.9	0.788
124-48-1	Chlorodibromomethane	5.9 U		5.9	0.610
100-41-4	Ethylbenzene	5.9 U		5.9	0.499
98-82-8	Isopropylbenzene	5.9 U		5.9	0.644
79-20-9	Methyl Acetate	24 U	UJC	24	4.09
108-87-2	Methylcyclohexane	12 U		12	0.997
1634-04-4	Methyl(tert)butyl Ether	5.9 U		5.9	0.756
75-09-2	**Methylene Chloride**	**5.0 J**	J,C	24	3.32
100-42-5	Styrene	5.9 U		5.9	0.522
127-18-4	Tetrachloroethene	5.9 U		5.9	0.723
108-88-3	Toluene	5.9 U		5.9	0.548
79-01-6	Trichloroethene	5.9 U		5.9	0.799
75-69-4	Trichlorofluoromethane	5.9 U		5.9	0.877
75-01-4	Vinyl Chloride	5.9 U		5.9	0.437
1330-20-7	**Xylene (Total)**	**0.78 J**		5.9	0.497

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 08:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**37SB1C**	QC Batch:	90038 -110
Sample #:	**345028**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	85
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 09:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**37SB2A**	QC Batch:	90038 -110
Sample #:	**345029**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	63
Unit:	ug/kg dry	Dilution Factor:	1.59

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	7.9 U		7.9	0.677
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	7.9 U		7.9	1.21
79-34-5	*1,1,2,2-Tetrachloroethane	7.9 UJ	UJ,i	7.9	1.04
79-00-5	1,1,2-Trichloroethane	7.9 U		7.9	0.943
75-34-3	*1,1-Dichloroethane	7.9 UJ		7.9	1.15
75-35-4	1,1-Dichloroethylene	7.9 U		7.9	1.17
106-93-4	1,2-Dibromoethane	7.9 U		7.9	1.09
96-12-8	*1,2-Dibromo-3-chloropropane	16 UJ	UJ,i	16	3.31
95-50-1	*1,2-Dichlorobenzene	7.9 UJ	UJ,i	7.9	0.770
107-06-2	1,2-Dichloroethane	7.9 U		7.9	0.685
156-59-2	cis-1,2-Dichloroethene	7.9 U		7.9	1.13
156-60-5	*trans-1,2-Dichloroethene	7.9 UJ	UJ,c	7.9	1.12
78-87-5	1,2-Dichloropropane	7.9 U		7.9	0.932
87-61-6	*1,2,3-Trichlorobenzene	7.9 UJ	UJ,i	7.9	0.865
120-82-1	*1,2,4-Trichlorobenzene	7.9 UJ	UJ,i	7.9	0.652
541-73-1	*1,3-Dichlorobenzene	7.9 UJ	UJ,i	7.9	0.426
106-46-7	*1,4-Dichlorobenzene	7.9 UJ	UJ,i	7.9	1.13
78-93-3	Methyl Ethyl Ketone	32 U		32	7.95
591-78-6	2-Hexanone	16 U		16	3.59
108-10-1	4-Methyl-2-Pentanone	16 U		16	2.32
67-64-1	***Acetone**	**37** J	B,Z	32	7.95
71-43-2	Benzene	7.9 U		7.9	0.838
74-97-5	Bromochloromethane	7.9 U		7.9	1.21
75-27-4	Dichlorobromomethane	7.9 U		7.9	0.797
75-25-2	Bromoform	7.9 U		7.9	0.919
74-83-9	Bromomethane	7.9 U		7.9	2.39
75-15-0	*Carbon Disulfide	7.9 UJ	UJ,M	7.9	2.31
56-23-5	Carbon Tetrachloride	7.9 U		7.9	0.741
108-90-7	Chlorobenzene	7.9 U		7.9	1.05
75-00-3	*Chloroethane	7.9 UJ		7.9	2.15
67-66-3	Chloroform	7.9 U		7.9	0.709

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 09:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**37SB2A**	QC Batch:	90038 -110
Sample #:	**345029**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	63
Unit:	ug/kg dry	Dilution Factor:	1.59

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	7.9 U		7.9	1.33
110-82-7	Cyclohexane	16 U		16	0.502
10061-01-5	cis-1,3-Dichloropropene	7.9 U		7.9	0.781
10061-02-6	trans-1,3-Dichloropropene	7.9 U		7.9	0.828
75-71-8	Dichlorodifluoromethane	7.9 U		7.9	1.06
124-48-1	Chlorodibromomethane	7.9 U		7.9	0.822
100-41-4	*Ethylbenzene	7.9 UJ	UJ,M	7.9	0.673
98-82-8	*Isopropylbenzene	7.9 UJ	UJ,I	7.9	0.868
79-20-9	Methyl Acetate	32 U	UJ,C	32	5.52
108-87-2	Methylcyclohexane	16 U		16	1.34
1634-04-4	*Methyl(tert)butyl Ether	7.9 UJ		7.9	1.02
75-09-2	12/15/03 ~~*~~**Methylene Chloride**	**10 J~~J~~**	12/15/03 J,C	32	4.47
100-42-5	*Styrene	7.9 UJ	UJ,M	7.9	0.703
127-18-4	Tetrachloroethene	7.9 U		7.9	0.975
108-88-3	*Toluene	7.9 UJ	UJ,M	7.9	0.738
79-01-6	Trichloroethene	7.9 U		7.9	1.08
75-69-4	Trichlorofluoromethane	7.9 U		7.9	1.18
75-01-4	Vinyl Chloride	7.9 U		7.9	0.588
1330-20-7	*Xylene (Total)	7.9 UJ	UJ,M	7.9	0.669

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 09:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**37SB2A**	QC Batch:	90038 -110
Sample #:	**345029**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	63
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 09:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/10/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**37SB2B**	QC Batch:	90038 -110
Sample #:	**345030**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.18

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	5.9 U		5.9	0.503
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.9 U		5.9	0.896
79-34-5	1,1,2,2-Tetrachloroethane	5.9 U		5.9	0.771
79-00-5	1,1,2-Trichloroethane	5.9 U		5.9	0.700
75-34-3	1,1-Dichloroethane	5.9 U		5.9	0.854
75-35-4	1,1-Dichloroethylene	5.9 U		5.9	0.865
106-93-4	1,2-Dibromoethane	5.9 U		5.9	0.808
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.45
95-50-1	1,2-Dichlorobenzene	5.9 U		5.9	0.571
107-06-2	1,2-Dichloroethane	5.9 U		5.9	0.509
156-59-2	**cis-1,2-Dichloroethene**	**1.3 J**		5.9	0.838
156-60-5	trans-1,2-Dichloroethene	5.9 U	UJ,c	5.9	0.830
78-87-5	1,2-Dichloropropane	5.9 U		5.9	0.691
87-61-6	1,2,3-Trichlorobenzene	5.9 U		5.9	0.642
120-82-1	1,2,4-Trichlorobenzene	5.9 U		5.9	0.484
541-73-1	1,3-Dichlorobenzene	5.9 U		5.9	0.316
106-46-7	1,4-Dichlorobenzene	5.9 U		5.9	0.838
78-93-3	**Methyl Ethyl Ketone**	**18 J**		24	5.90
591-78-6	2-Hexanone	12 U		12	2.67
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.72
67-64-1	**Acetone**	**25**	B,z	24	5.90
71-43-2	Benzene	5.9 U		5.9	0.622
74-97-5	Bromochloromethane	5.9 U		5.9	0.898
75-27-4	Dichlorobromomethane	5.9 U		5.9	0.591
75-25-2	Bromoform	5.9 U		5.9	0.682
74-83-9	Bromomethane	5.9 U		5.9	1.77
75-15-0	Carbon Disulfide	5.9 U		5.9	1.71
56-23-5	Carbon Tetrachloride	5.9 U		5.9	0.550
108-90-7	Chlorobenzene	5.9 U		5.9	0.780
75-00-3	Chloroethane	5.9 U		5.9	1.59
67-66-3	Chloroform	5.9 U		5.9	0.526

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**37SB2B**	QC Batch:	90038 -110
Sample #:	**345030**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.18

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	5.9 U		5.9	0.984
110-82-7	Cyclohexane	12 U		12	0.373
10061-01-5	cis-1,3-Dichloropropene	5.9 U		5.9	0.579
10061-02-6	trans-1,3-Dichloropropene	5.9 U		5.9	0.615
75-71-8	Dichlorodifluoromethane	5.9 U		5.9	0.788
124-48-1	Chlorodibromomethane	5.9 U		5.9	0.610
100-41-4	Ethylbenzene	5.9 U		5.9	0.499
98-82-8	Isopropylbenzene	5.9 U		5.9	0.644
79-20-9	Methyl Acetate	24 U	VJ,c	24	4.09
108-87-2	Methylcyclohexane	12 U		12	0.997
1634-04-4	Methyl(tert)butyl Ether	5.9 U		5.9	0.756
75-09-2	**Methylene Chloride**	**5.3 J**	J,c	24	3.32
100-42-5	Styrene	5.9 U		5.9	0.522
127-18-4	Tetrachloroethene	5.9 U		5.9	0.723
108-88-3	**Toluene**	**1.0 J**		5.9	0.548
79-01-6	**Trichloroethene**	**6.8**		5.9	0.799
75-69-4	Trichlorofluoromethane	5.9 U		5.9	0.877
75-01-4	Vinyl Chloride	5.9 U		5.9	0.437
1330-20-7	Xylene (Total)	5.9 U		5.9	0.497

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**37SB2B**	QC Batch:	90038 -110
Sample #:	**345030**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	85
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**37SB2C**	QC Batch:	90038 -110
Sample #:	**345031**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	86
Unit:	ug/kg dry	Dilution Factor:	1.16

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	5.8 U		5.8	0.494
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.8 U		5.8	0.880
79-34-5	1,1,2,2-Tetrachloroethane	5.8 U		5.8	0.757
79-00-5	1,1,2-Trichloroethane	5.8 U		5.8	0.688
75-34-3	1,1-Dichloroethane	5.8 U		5.8	0.840
75-35-4	1,1-Dichloroethylene	5.8 U		5.8	0.850
106-93-4	1,2-Dibromoethane	5.8 U		5.8	0.795
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.41
95-50-1	1,2-Dichlorobenzene	5.8 U		5.8	0.561
107-06-2	1,2-Dichloroethane	5.8 U		5.8	0.500
156-59-2	cis-1,2-Dichloroethene	5.8 U		5.8	0.824
156-60-5	trans-1,2-Dichloroethene	5.8 U	UJ,c	5.8	0.815
78-87-5	1,2-Dichloropropane	5.8 U		5.8	0.680
87-61-6	1,2,3-Trichlorobenzene	5.8 U		5.8	0.631
120-82-1	1,2,4-Trichlorobenzene	5.8 U		5.8	0.476
541-73-1	1,3-Dichlorobenzene	5.8 U		5.8	0.311
106-46-7	1,4-Dichlorobenzene	5.8 U		5.8	0.824
78-93-3	Methyl Ethyl Ketone	24 U		24	5.80
591-78-6	2-Hexanone	12 U		12	2.62
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.69
67-64-1	**Acetone**	**19 J**	B,z	24	5.80
71-43-2	Benzene	5.8 U		5.8	0.611
74-97-5	Bromochloromethane	5.8 U		5.8	0.883
75-27-4	Dichlorobromomethane	5.8 U		5.8	0.581
75-25-2	Bromoform	5.8 U		5.8	0.670
74-83-9	Bromomethane	5.8 U		5.8	1.74
75-15-0	Carbon Disulfide	5.8 U		5.8	1.68
56-23-5	Carbon Tetrachloride	5.8 U		5.8	0.541
108-90-7	Chlorobenzene	5.8 U		5.8	0.767
75-00-3	Chloroethane	5.8 U		5.8	1.57
67-66-3	Chloroform	5.8 U		5.8	0.517

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**37SB2C**	QC Batch:	90038 -110
Sample #:	**345031**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	86
Unit:	ug/kg dry	Dilution Factor:	1.16

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	5.8 U		5.8	0.967
110-82-7	Cyclohexane	12 U		12	0.367
10061-01-5	cis-1,3-Dichloropropene	5.8 U		5.8	0.570
10061-02-6	trans-1,3-Dichloropropene	5.8 U		5.8	0.604
75-71-8	Dichlorodifluoromethane	5.8 U		5.8	0.775
124-48-1	Chlorodibromomethane	5.8 U		5.8	0.600
100-41-4	Ethylbenzene	5.8 U		5.8	0.491
98-82-8	Isopropylbenzene	5.8 U		5.8	0.633
79-20-9	Methyl Acetate	24 U	UJ,c	24	4.03
108-87-2	Methylcyclohexane	12 U		12	0.980
1634-04-4	Methyl(tert)butyl Ether	5.8 U		5.8	0.744
75-09-2	**Methylene Chloride**	**5.2 J**	J,c	24	3.26
100-42-5	Styrene	5.8 U		5.8	0.513
127-18-4	Tetrachloroethene	5.8 U		5.8	0.711
108-88-3	Toluene	5.8 U		5.8	0.538
79-01-6	**Trichloroethene**	**63**		5.8	0.785
75-69-4	Trichlorofluoromethane	5.8 U		5.8	0.862
75-01-4	Vinyl Chloride	5.8 U		5.8	0.429
1330-20-7	Xylene (Total)	5.8 U		5.8	0.488

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**37SB2C**	QC Batch:	90038 -110
Sample #:	**345031**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	86
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
2-Methyl-1-Propene	115-11-7	8.4	E	NJ,t

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**37SB3A**	QC Batch:	90038 -110
Sample #:	**345032**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	88
Unit:	ug/kg dry	Dilution Factor:	1.14

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	5.7 U		5.7	0.486
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.7 U		5.7	0.865
79-34-5	1,1,2,2-Tetrachloroethane	5.7 U		5.7	0.744
79-00-5	1,1,2-Trichloroethane	5.7 U		5.7	0.676
75-34-3	1,1-Dichloroethane	5.7 U		5.7	0.825
75-35-4	1,1-Dichloroethylene	5.7 U		5.7	0.836
106-93-4	1,2-Dibromoethane	5.7 U		5.7	0.781
96-12-8	1,2-Dibromo-3-chloropropane	11 U		11	2.37
95-50-1	1,2-Dichlorobenzene	5.7 U		5.7	0.552
107-06-2	1,2-Dichloroethane	5.7 U		5.7	0.491
156-59-2	cis-1,2-Dichloroethene	5.7 U		5.7	0.809
156-60-5	trans-1,2-Dichloroethene	5.7 U	UJ,C	5.7	0.801
78-87-5	1,2-Dichloropropane	5.7 U		5.7	0.668
87-61-6	1,2,3-Trichlorobenzene	5.7 U		5.7	0.620
120-82-1	1,2,4-Trichlorobenzene	5.7 U		5.7	0.467
541-73-1	1,3-Dichlorobenzene	5.7 U		5.7	0.306
106-46-7	1,4-Dichlorobenzene	5.7 U		5.7	0.809
78-93-3	**Methyl Ethyl Ketone**	**24**		22	5.70
591-78-6	2-Hexanone	11 U		11	2.58
108-10-1	4-Methyl-2-Pentanone	11 U		11	1.66
67-64-1	**Acetone**	**66**	B,Z	22	5.70
71-43-2	Benzene	5.7 U		5.7	0.601
74-97-5	Bromochloromethane	5.7 U		5.7	0.868
75-27-4	Dichlorobromomethane	5.7 U		5.7	0.571
75-25-2	Bromoform	5.7 U		5.7	0.659
74-83-9	Bromomethane	5.7 U		5.7	1.71
75-15-0	Carbon Disulfide	5.7 U		5.7	1.65
56-23-5	Carbon Tetrachloride	5.7 U		5.7	0.531
108-90-7	Chlorobenzene	5.7 U		5.7	0.754
75-00-3	Chloroethane	5.7 U		5.7	1.54
67-66-3	Chloroform	5.7 U		5.7	0.508

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**37SB3A**	QC Batch:	90038 -110
Sample #:	**345032**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	88
Unit:	ug/kg dry	Dilution Factor:	1.14

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	5.7 U		5.7	0.951
110-82-7	Cyclohexane	11 U		11	0.360
10061-01-5	cis-1,3-Dichloropropene	5.7 U		5.7	0.560
10061-02-6	trans-1,3-Dichloropropene	5.7 U		5.7	0.594
75-71-8	Dichlorodifluoromethane	5.7 U		5.7	0.762
124-48-1	Chlorodibromomethane	5.7 U		5.7	0.589
100-41-4	Ethylbenzene	5.7 U		5.7	0.482
98-82-8	Isopropylbenzene	5.7 U		5.7	0.622
79-20-9	Methyl Acetate	22 U	UJ,c	22	3.96
108-87-2	Methylcyclohexane	11 U		11	0.963
1634-04-4	Methyl(tert)butyl Ether	5.7 U		5.7	0.731
75-09-2	**Methylene Chloride**	**4.5 J**	J,c	22	3.20
100-42-5	Styrene	5.7 U		5.7	0.504
127-18-4	Tetrachloroethene	5.7 U		5.7	0.699
108-88-3	Toluene	5.7 U		5.7	0.529
79-01-6	Trichloroethene	5.7 U		5.7	0.772
75-69-4	Trichlorofluoromethane	5.7 U		5.7	0.847
75-01-4	Vinyl Chloride	5.7 U		5.7	0.422
1330-20-7	Xylene (Total)	5.7 U		5.7	0.480

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**37SB3A**	QC Batch:	90038 -110
Sample #:	**345032**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	88
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**37SB3B**	QC Batch:	90038 -110
Sample #:	**345033**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.19

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.0 U		6.0	0.507
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.0 U		6.0	0.903
79-34-5	1,1,2,2-Tetrachloroethane	6.0 U		6.0	0.777
79-00-5	1,1,2-Trichloroethane	6.0 U		6.0	0.706
75-34-3	1,1-Dichloroethane	6.0 U		6.0	0.862
75-35-4	1,1-Dichloroethylene	6.0 U		6.0	0.872
106-93-4	1,2-Dibromoethane	6.0 U		6.0	0.815
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.48
95-50-1	1,2-Dichlorobenzene	6.0 U		6.0	0.576
107-06-2	1,2-Dichloroethane	6.0 U		6.0	0.513
156-59-2	cis-1,2-Dichloroethene	6.0 U		6.0	0.845
156-60-5	trans-1,2-Dichloroethene	6.0 U	UJ,C	6.0	0.837
78-87-5	1,2-Dichloropropane	6.0 U		6.0	0.697
87-61-6	1,2,3-Trichlorobenzene	6.0 U		6.0	0.647
120-82-1	1,2,4-Trichlorobenzene	6.0 U		6.0	0.488
541-73-1	1,3-Dichlorobenzene	6.0 U		6.0	0.319
106-46-7	1,4-Dichlorobenzene	6.0 U		6.0	0.845
78-93-3	Methyl Ethyl Ketone	24 U		24	5.95
591-78-6	2-Hexanone	12 U		12	2.69
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.74
67-64-1	***Acetone**	**31 J**	B,Z	24	5.95
71-43-2	Benzene	6.0 U		6.0	0.627
74-97-5	Bromochloromethane	6.0 U		6.0	0.906
75-27-4	Dichlorobromomethane	6.0 U		6.0	0.596
75-25-2	Bromoform	6.0 U		6.0	0.688
74-83-9	Bromomethane	6.0 U		6.0	1.79
75-15-0	*Carbon Disulfide	6.0 UJ	UJ,M	6.0	1.73
56-23-5	Carbon Tetrachloride	6.0 U		6.0	0.555
108-90-7	Chlorobenzene	6.0 U		6.0	0.787
75-00-3	Chloroethane	6.0 U		6.0	1.61
67-66-3	Chloroform	6.0 U		6.0	0.531

* See attached Statement of Data Qualifications.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**37SB3B**	QC Batch:	90038 -110
Sample #:	**345033**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.19

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.0 U		6.0	0.992
110-82-7	Cyclohexane	12 U		12	0.376
10061-01-5	cis-1,3-Dichloropropene	6.0 U		6.0	0.584
10061-02-6	trans-1,3-Dichloropropene	6.0 U		6.0	0.620
75-71-8	Dichlorodifluoromethane	6.0 U		6.0	0.795
124-48-1	Chlorodibromomethane	6.0 U		6.0	0.615
100-41-4	Ethylbenzene	6.0 U		6.0	0.503
98-82-8	Isopropylbenzene	6.0 U		6.0	0.650
79-20-9	Methyl Acetate	24 U	UJ,C	24	4.13
108-87-2	**Methylcyclohexane**	**3.0 J**		12	1.01
1634-04-4	Methyl(tert)butyl Ether	6.0 U		6.0	0.763
75-09-2	**Methylene Chloride**	**5.0 J**	J,C	24	3.34
100-42-5	Styrene	6.0 U		6.0	0.526
127-18-4	Tetrachloroethene	6.0 U		6.0	0.729
108-88-3	Toluene	6.0 U		6.0	0.552
79-01-6	Trichloroethene	6.0 U		6.0	0.806
75-69-4	Trichlorofluoromethane	6.0 U		6.0	0.884
75-01-4	Vinyl Chloride	6.0 U		6.0	0.440
1330-20-7	**Xylene (Total)**	**2.0 J**		6.0	0.501

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**37SB3B**	QC Batch:	90038 -110
Sample #:	**345033**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	84
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2,4-Trimethylbenzene	95-63-6	3.6	Q	NJ,+
1,3,5-Trimethylbenzene	108-67-8	1.8	Q	NJ,+
1,3-Dimethyl-,trans-cyclohexane	2207-03-6	5.7	E	NJ,+
Ethyl-cyclohexane	1678-91-7	6.4	E	NJ,+
Heptane, 2-methyl-	592-27-8	6.5	E	NJ,+
Nonane	111-84-2	5.1	E	NJ,+
Octane	111-65-9	8.3	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**37SB3C**	QC Batch:	90038 -110
Sample #:	**345034**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	93
Unit:	ug/kg dry	Dilution Factor:	1.08

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	5.4 U		5.4	0.460
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.4 U		5.4	0.820
79-34-5	1,1,2,2-Tetrachloroethane	5.4 U		5.4	0.705
79-00-5	1,1,2-Trichloroethane	5.4 U		5.4	0.640
75-34-3	1,1-Dichloroethane	5.4 U		5.4	0.782
75-35-4	1,1-Dichloroethylene	5.4 U		5.4	0.792
106-93-4	1,2-Dibromoethane	5.4 U		5.4	0.740
96-12-8	1,2-Dibromo-3-chloropropane	11 U		11	2.25
95-50-1	1,2-Dichlorobenzene	5.4 U		5.4	0.523
107-06-2	1,2-Dichloroethane	5.4 U		5.4	0.465
156-59-2	cis-1,2-Dichloroethene	5.4 U		5.4	0.767
156-60-5	trans-1,2-Dichloroethene	5.4 U	UJ,c	5.4	0.759
78-87-5	1,2-Dichloropropane	5.4 U		5.4	0.633
87-61-6	1,2,3-Trichlorobenzene	5.4 U		5.4	0.588
120-82-1	1,2,4-Trichlorobenzene	5.4 U		5.4	0.443
541-73-1	1,3-Dichlorobenzene	5.4 U		5.4	0.289
106-46-7	1,4-Dichlorobenzene	5.4 U		5.4	0.767
78-93-3	Methyl Ethyl Ketone	22 U		22	5.40
591-78-6	2-Hexanone	11 U		11	2.44
108-10-1	4-Methyl-2-Pentanone	11 U		11	1.58
67-64-1	**Acetone**	**16 J**	B,Z	22	5.40
71-43-2	Benzene	5.4 U		5.4	0.569
74-97-5	Bromochloromethane	5.4 U		5.4	0.822
75-27-4	Dichlorobromomethane	5.4 U		5.4	0.541
75-25-2	Bromoform	5.4 U		5.4	0.624
74-83-9	Bromomethane	5.4 U		5.4	1.62
75-15-0	Carbon Disulfide	5.4 U		5.4	1.57
56-23-5	Carbon Tetrachloride	5.4 U		5.4	0.503
108-90-7	Chlorobenzene	5.4 U		5.4	0.714
75-00-3	Chloroethane	5.4 U		5.4	1.46
67-66-3	Chloroform	5.4 U		5.4	0.482

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**37SB3C**	QC Batch:	90038 -110
Sample #:	**345034**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	93
Unit:	ug/kg dry	Dilution Factor:	1.08

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	5.4 U		5.4	0.901
110-82-7	Cyclohexane	11 U		11	0.341
10061-01-5	cis-1,3-Dichloropropene	5.4 U		5.4	0.530
10061-02-6	trans-1,3-Dichloropropene	5.4 U		5.4	0.563
75-71-8	Dichlorodifluoromethane	5.4 U		5.4	0.721
124-48-1	Chlorodibromomethane	5.4 U		5.4	0.558
100-41-4	Ethylbenzene	5.4 U		5.4	0.457
98-82-8	Isopropylbenzene	5.4 U		5.4	0.590
79-20-9	Methyl Acetate	22 U	UJ,c	22	3.75
108-87-2	Methylcyclohexane	11 U		11	0.913
1634-04-4	Methyl(tert)butyl Ether	5.4 U		5.4	0.692
75-09-2	**Methylene Chloride**	**4.7 J**	J,c	22	3.03
100-42-5	Styrene	5.4 U		5.4	0.477
127-18-4	Tetrachloroethene	5.4 U		5.4	0.662
108-88-3	Toluene	5.4 U		5.4	0.501
79-01-6	Trichloroethene	5.4 U		5.4	0.731
75-69-4	Trichlorofluoromethane	5.4 U		5.4	0.802
75-01-4	Vinyl Chloride	5.4 U		5.4	0.400
1330-20-7	Xylene (Total)	5.4 U		5.4	0.455

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**37SB3C**	QC Batch:	90038 -110
Sample #:	**345034**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	93
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	CAS Number	Result (ug/kg dr	Qualifier
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**QSB1A**	QC Batch:	90038 -110
Sample #:	**345035**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	81
Unit:	ug/kg dry	Dilution Factor:	1.23

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.2 U		6.2	0.524
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.2 U		6.2	0.934
79-34-5	1,1,2,2-Tetrachloroethane	6.2 U		6.2	0.803
79-00-5	1,1,2-Trichloroethane	6.2 U		6.2	0.729
75-34-3	1,1-Dichloroethane	6.2 U		6.2	0.891
75-35-4	1,1-Dichloroethylene	6.2 U		6.2	0.902
106-93-4	1,2-Dibromoethane	6.2 U		6.2	0.843
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.56
95-50-1	1,2-Dichlorobenzene	6.2 U		6.2	0.595
107-06-2	1,2-Dichloroethane	6.2 U		6.2	0.530
156-59-2	cis-1,2-Dichloroethene	6.2 U		6.2	0.873
156-60-5	trans-1,2-Dichloroethene	6.2 U	VJ,c	6.2	0.865
78-87-5	1,2-Dichloropropane	6.2 U		6.2	0.721
87-61-6	1,2,3-Trichlorobenzene	6.2 U		6.2	0.669
120-82-1	1,2,4-Trichlorobenzene	6.2 U		6.2	0.504
541-73-1	1,3-Dichlorobenzene	6.2 U		6.2	0.330
106-46-7	1,4-Dichlorobenzene	6.2 U		6.2	0.873
78-93-3	**Methyl Ethyl Ketone**	**25**		24	6.15
591-78-6	2-Hexanone	12 U		12	2.78
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.80
67-64-1	**Acetone**	**110**		24	6.15
71-43-2	Benzene	6.2 U		6.2	0.648
74-97-5	Bromochloromethane	6.2 U		6.2	0.936
75-27-4	Dichlorobromomethane	6.2 U		6.2	0.616
75-25-2	Bromoform	6.2 U		6.2	0.711
74-83-9	Bromomethane	6.2 U		6.2	1.85
75-15-0	Carbon Disulfide	6.2 U		6.2	1.78
56-23-5	Carbon Tetrachloride	6.2 U		6.2	0.573
108-90-7	Chlorobenzene	6.2 U		6.2	0.813
75-00-3	Chloroethane	6.2 U		6.2	1.66
67-66-3	Chloroform	6.2 U		6.2	0.549

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**QSB1A**	QC Batch:	90038 -110
Sample #:	**345035**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	81
Unit:	ug/kg dry	Dilution Factor:	1.23

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.2 U		6.2	1.03
110-82-7	**Cyclohexane**	**0.90 J**		12	0.389
10061-01-5	cis-1,3-Dichloropropene	6.2 U		6.2	0.604
10061-02-6	trans-1,3-Dichloropropene	6.2 U		6.2	0.641
75-71-8	Dichlorodifluoromethane	6.2 U		6.2	0.822
124-48-1	Chlorodibromomethane	6.2 U		6.2	0.636
100-41-4	**Ethylbenzene**	**0.75 J**		6.2	0.520
98-82-8	Isopropylbenzene	6.2 U		6.2	0.672
79-20-9	Methyl Acetate	24 U	UJ,c	24	4.27
108-87-2	**Methylcyclohexane**	**4.2 J**		12	1.04
1634-04-4	Methyl(tert)butyl Ether	6.2 U		6.2	0.788
75-09-2	**Methylene Chloride**	**4.2 J**	J,c	24	3.46
100-42-5	Styrene	6.2 U		6.2	0.544
127-18-4	Tetrachloroethene	6.2 U		6.2	0.754
108-88-3	Toluene	6.2 U		6.2	0.571
79-01-6	Trichloroethene	6.2 U		6.2	0.833
75-69-4	Trichlorofluoromethane	6.2 U		6.2	0.914
75-01-4	Vinyl Chloride	6.2 U		6.2	0.455
1330-20-7	**Xylene (Total)**	**4.1 J**		6.2	0.518

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**QSB1A**	QC Batch:	90038 -110
Sample #:	**345035**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	81
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2,4-Trimethylbenzene	95-63-6	2.7	Q	NJ,+
2-Methyl-hexane	591-76-4	8.4	E	NJ,+
3-Methyl-hexane	589-34-4	7.0	E	NJ,+
Hexanal	66-25-1	11	E	NJ,+
Hexane	110-54-3	14	E	NJ,+
Pentane, 2-methyl-	107-83-5	11	E	NJ,+
Pentane, 3-ethyl-2,2-dimethyl-	16747-32-3	5.7	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD3**	QC Batch:	90038 -110
Sample #:	**345036**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.35

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.8 U		6.8	0.575
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.8 U		6.8	1.02
79-34-5	1,1,2,2-Tetrachloroethane	6.8 U		6.8	0.882
79-00-5	1,1,2-Trichloroethane	6.8 U		6.8	0.801
75-34-3	1,1-Dichloroethane	6.8 U		6.8	0.977
75-35-4	1,1-Dichloroethylene	6.8 U		6.8	0.990
106-93-4	1,2-Dibromoethane	6.8 U		6.8	0.925
96-12-8	1,2-Dibromo-3-chloropropane	14 U		14	2.81
95-50-1	1,2-Dichlorobenzene	6.8 U		6.8	0.653
107-06-2	1,2-Dichloroethane	6.8 U		6.8	0.582
156-59-2	cis-1,2-Dichloroethene	6.8 U		6.8	0.959
156-60-5	trans-1,2-Dichloroethene	6.8 U	UJ,c	6.8	0.949
78-87-5	1,2-Dichloropropane	6.8 U		6.8	0.791
87-61-6	1,2,3-Trichlorobenzene	6.8 U		6.8	0.734
120-82-1	1,2,4-Trichlorobenzene	6.8 U		6.8	0.554
541-73-1	1,3-Dichlorobenzene	6.8 U		6.8	0.362
106-46-7	1,4-Dichlorobenzene	6.8 U		6.8	0.959
78-93-3	**Methyl Ethyl Ketone**	**23 J**		28	6.75
591-78-6	2-Hexanone	14 U		14	3.05
108-10-1	4-Methyl-2-Pentanone	14 U		14	1.97
67-64-1	**Acetone**	**57**	B,z	28	6.75
71-43-2	Benzene	6.8 U		6.8	0.711
74-97-5	Bromochloromethane	6.8 U		6.8	1.03
75-27-4	Dichlorobromomethane	6.8 U		6.8	0.676
75-25-2	Bromoform	6.8 U		6.8	0.780
74-83-9	Bromomethane	6.8 U		6.8	2.03
75-15-0	Carbon Disulfide	6.8 U		6.8	1.96
56-23-5	Carbon Tetrachloride	6.8 U		6.8	0.629
108-90-7	Chlorobenzene	6.8 U		6.8	0.892
75-00-3	Chloroethane	6.8 U		6.8	1.82
67-66-3	Chloroform	6.8 U		6.8	0.602

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD3**	QC Batch:	90038 -110
Sample #:	**345036**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.35

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.8 U		6.8	1.13
110-82-7	Cyclohexane	14 U		14	0.427
10061-01-5	cis-1,3-Dichloropropene	6.8 U		6.8	0.663
10061-02-6	trans-1,3-Dichloropropene	6.8 U		6.8	0.703
75-71-8	Dichlorodifluoromethane	6.8 U		6.8	0.902
124-48-1	Chlorodibromomethane	6.8 U		6.8	0.698
100-41-4	Ethylbenzene	6.8 U		6.8	0.571
98-82-8	Isopropylbenzene	6.8 U		6.8	0.737
79-20-9	Methyl Acetate	28 U	VJ,c	28	4.68
108-87-2	Methylcyclohexane	14 U		14	1.14
1634-04-4	Methyl(tert)butyl Ether	6.8 U		6.8	0.865
75-09-2	**Methylene Chloride**	**5.7 J**	J,c	28	3.79
100-42-5	Styrene	6.8 U		6.8	0.597
127-18-4	Tetrachloroethene	6.8 U		6.8	0.828
108-88-3	Toluene	6.8 U		6.8	0.626
79-01-6	Trichloroethene	6.8 U		6.8	0.914
75-69-4	Trichlorofluoromethane	6.8 U		6.8	1.00
75-01-4	Vinyl Chloride	6.8 U		6.8	0.500
1330-20-7	Xylene (Total)	6.8 U		6.8	0.568

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD3**	QC Batch:	90038 -110
Sample #:	**345036**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	74
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**QSB1B**	QC Batch:	90038 -110
Sample #:	**345037**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.19

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.0 U		6.0	0.507
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.0 U		6.0	0.903
79-34-5	1,1,2,2-Tetrachloroethane	6.0 U		6.0	0.777
79-00-5	1,1,2-Trichloroethane	6.0 U		6.0	0.706
75-34-3	1,1-Dichloroethane	6.0 U		6.0	0.862
75-35-4	1,1-Dichloroethylene	6.0 U		6.0	0.872
106-93-4	1,2-Dibromoethane	6.0 U		6.0	0.815
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.48
95-50-1	1,2-Dichlorobenzene	6.0 U		6.0	0.576
107-06-2	1,2-Dichloroethane	6.0 U		6.0	0.513
156-59-2	cis-1,2-Dichloroethene	6.0 U		6.0	0.845
156-60-5	trans-1,2-Dichloroethene	6.0 U	UJ,C	6.0	0.837
78-87-5	1,2-Dichloropropane	6.0 U		6.0	0.697
87-61-6	1,2,3-Trichlorobenzene	6.0 U		6.0	0.647
120-82-1	1,2,4-Trichlorobenzene	6.0 U		6.0	0.488
541-73-1	1,3-Dichlorobenzene	6.0 U		6.0	0.319
106-46-7	1,4-Dichlorobenzene	6.0 U		6.0	0.845
78-93-3	Methyl Ethyl Ketone	24 U		24	5.95
591-78-6	2-Hexanone	12 U		12	2.69
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.74
67-64-1	**Acetone**	**36**	B,Z	24	5.95
71-43-2	Benzene	6.0 U		6.0	0.627
74-97-5	Bromochloromethane	6.0 U		6.0	0.906
75-27-4	Dichlorobromomethane	6.0 U		6.0	0.596
75-25-2	Bromoform	6.0 U		6.0	0.688
74-83-9	Bromomethane	6.0 U		6.0	1.79
75-15-0	Carbon Disulfide	6.0 U		6.0	1.73
56-23-5	Carbon Tetrachloride	6.0 U		6.0	0.555
108-90-7	Chlorobenzene	6.0 U		6.0	0.787
75-00-3	Chloroethane	6.0 U		6.0	1.61
67-66-3	Chloroform	6.0 U		6.0	0.531

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**QSB1B**	QC Batch:	90038 -110
Sample #:	**345037**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.19

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.0 U		6.0	0.992
110-82-7	Cyclohexane	12 U		12	0.376
10061-01-5	cis-1,3-Dichloropropene	6.0 U		6.0	0.584
10061-02-6	trans-1,3-Dichloropropene	6.0 U		6.0	0.620
75-71-8	Dichlorodifluoromethane	6.0 U		6.0	0.795
124-48-1	Chlorodibromomethane	6.0 U		6.0	0.615
100-41-4	Ethylbenzene	6.0 U		6.0	0.503
98-82-8	Isopropylbenzene	6.0 U		6.0	0.650
79-20-9	Methyl Acetate	24 U	VJ,C	24	4.13
108-87-2	Methylcyclohexane	12 U		12	1.01
1634-04-4	Methyl(tert)butyl Ether	6.0 U		6.0	0.763
75-09-2	**Methylene Chloride**	**4.8 J**	J,C	24	3.34
100-42-5	Styrene	6.0 U		6.0	0.526
127-18-4	Tetrachloroethene	6.0 U		6.0	0.729
108-88-3	Toluene	6.0 U		6.0	0.552
79-01-6	Trichloroethene	6.0 U		6.0	0.806
75-69-4	Trichlorofluoromethane	6.0 U		6.0	0.884
75-01-4	Vinyl Chloride	6.0 U		6.0	0.440
1330-20-7	Xylene (Total)	6.0 U		6.0	0.501

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**QSB1B**	QC Batch:	90038 -110
Sample #:	**345037**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	84
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/10/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**QSB1C**	QC Batch:	90038 -110
Sample #:	**345038**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	93
Unit:	ug/kg dry	Dilution Factor:	1.08

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	5.4 U		5.4	0.460
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.4 U		5.4	0.820
79-34-5	1,1,2,2-Tetrachloroethane	5.4 U		5.4	0.705
79-00-5	1,1,2-Trichloroethane	5.4 U		5.4	0.640
75-34-3	1,1-Dichloroethane	5.4 U		5.4	0.782
75-35-4	1,1-Dichloroethylene	5.4 U		5.4	0.792
106-93-4	1,2-Dibromoethane	5.4 U		5.4	0.740
96-12-8	1,2-Dibromo-3-chloropropane	11 U		11	2.25
95-50-1	1,2-Dichlorobenzene	5.4 U		5.4	0.523
107-06-2	1,2-Dichloroethane	5.4 U		5.4	0.465
156-59-2	cis-1,2-Dichloroethene	5.4 U		5.4	0.767
156-60-5	trans-1,2-Dichloroethene	5.4 U	UJ,C	5.4	0.759
78-87-5	1,2-Dichloropropane	5.4 U		5.4	0.633
87-61-6	1,2,3-Trichlorobenzene	5.4 U		5.4	0.588
120-82-1	1,2,4-Trichlorobenzene	5.4 U		5.4	0.443
541-73-1	1,3-Dichlorobenzene	5.4 U		5.4	0.289
106-46-7	1,4-Dichlorobenzene	5.4 U		5.4	0.767
78-93-3	**Methyl Ethyl Ketone**	**17 J**		22	5.40
591-78-6	2-Hexanone	11 U		11	2.44
108-10-1	4-Methyl-2-Pentanone	11 U		11	1.58
67-64-1	**Acetone**	**36**	B,Z	22	5.40
71-43-2	Benzene	5.4 U		5.4	0.569
74-97-5	Bromochloromethane	5.4 U		5.4	0.822
75-27-4	Dichlorobromomethane	5.4 U		5.4	0.541
75-25-2	Bromoform	5.4 U		5.4	0.624
74-83-9	Bromomethane	5.4 U		5.4	1.62
75-15-0	Carbon Disulfide	5.4 U		5.4	1.57
56-23-5	Carbon Tetrachloride	5.4 U		5.4	0.503
108-90-7	Chlorobenzene	5.4 U		5.4	0.714
75-00-3	Chloroethane	5.4 U		5.4	1.46
67-66-3	Chloroform	5.4 U		5.4	0.482

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**QSB1C**	QC Batch:	90038 -110
Sample #:	**345038**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	93
Unit:	ug/kg dry	Dilution Factor:	1.08

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	5.4 U		5.4	0.901
110-82-7	Cyclohexane	11 U		11	0.341
10061-01-5	cis-1,3-Dichloropropene	5.4 U		5.4	0.530
10061-02-6	trans-1,3-Dichloropropene	5.4 U		5.4	0.563
75-71-8	Dichlorodifluoromethane	5.4 U		5.4	0.721
124-48-1	Chlorodibromomethane	5.4 U		5.4	0.558
100-41-4	Ethylbenzene	5.4 U		5.4	0.457
98-82-8	Isopropylbenzene	5.4 U		5.4	0.590
79-20-9	Methyl Acetate	22 U	UJ,c	22	3.75
108-87-2	Methylcyclohexane	11 U		11	0.913
1634-04-4	Methyl(tert)butyl Ether	5.4 U		5.4	0.692
75-09-2	**Methylene Chloride**	**4.1 J**	J,c	22	3.03
100-42-5	Styrene	5.4 U		5.4	0.477
127-18-4	Tetrachloroethene	5.4 U		5.4	0.662
108-88-3	Toluene	5.4 U		5.4	0.501
79-01-6	Trichloroethene	5.4 U		5.4	0.731
75-69-4	Trichlorofluoromethane	5.4 U		5.4	0.802
75-01-4	Vinyl Chloride	5.4 U		5.4	0.400
1330-20-7	Xylene (Total)	5.4 U		5.4	0.455

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**QSB1C**	QC Batch:	90038 -110
Sample #:	**345038**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	93
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 14:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/10/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**QSB3A**	QC Batch:	90038 -110
Sample #:	**345039**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.28

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.4 U		6.4	0.545
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.4 U		6.4	0.972
79-34-5	1,1,2,2-Tetrachloroethane	6.4 U		6.4	0.836
79-00-5	1,1,2-Trichloroethane	6.4 U		6.4	0.759
75-34-3	1,1-Dichloroethane	6.4 U		6.4	0.927
75-35-4	1,1-Dichloroethylene	6.4 U		6.4	0.938
106-93-4	1,2-Dibromoethane	6.4 U		6.4	0.877
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	2.66
95-50-1	1,2-Dichlorobenzene	6.4 U		6.4	0.620
107-06-2	1,2-Dichloroethane	6.4 U		6.4	0.552
156-59-2	cis-1,2-Dichloroethene	6.4 U		6.4	0.909
156-60-5	trans-1,2-Dichloroethene	6.4 U	UJ,e	6.4	0.900
78-87-5	1,2-Dichloropropane	6.4 U		6.4	0.750
87-61-6	1,2,3-Trichlorobenzene	6.4 U		6.4	0.696
120-82-1	1,2,4-Trichlorobenzene	6.4 U		6.4	0.525
541-73-1	1,3-Dichlorobenzene	6.4 U		6.4	0.343
106-46-7	1,4-Dichlorobenzene	6.4 U		6.4	0.909
78-93-3	**Methyl Ethyl Ketone**	**23 J**		26	6.40
591-78-6	2-Hexanone	13 U		13	2.89
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.87
67-64-1	**Acetone**	**56**	B,z	26	6.40
71-43-2	Benzene	6.4 U		6.4	0.675
74-97-5	Bromochloromethane	6.4 U		6.4	0.974
75-27-4	Dichlorobromomethane	6.4 U		6.4	0.641
75-25-2	Bromoform	6.4 U		6.4	0.740
74-83-9	Bromomethane	6.4 U		6.4	1.92
75-15-0	Carbon Disulfide	6.4 U		6.4	1.86
56-23-5	Carbon Tetrachloride	6.4 U		6.4	0.596
108-90-7	Chlorobenzene	6.4 U		6.4	0.846
75-00-3	Chloroethane	6.4 U		6.4	1.73
67-66-3	Chloroform	6.4 U		6.4	0.571

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**QSB3A**	QC Batch:	90038 -110
Sample #:	**345039**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.28

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.4 U		6.4	1.07
110-82-7	Cyclohexane	13 U		13	0.404
10061-01-5	cis-1,3-Dichloropropene	6.4 U		6.4	0.628
10061-02-6	trans-1,3-Dichloropropene	6.4 U		6.4	0.667
75-71-8	Dichlorodifluoromethane	6.4 U		6.4	0.855
124-48-1	Chlorodibromomethane	6.4 U		6.4	0.662
100-41-4	Ethylbenzene	6.4 U		6.4	0.541
98-82-8	Isopropylbenzene	6.4 U		6.4	0.699
79-20-9	Methyl Acetate	26 U	UJ/c	26	4.44
108-87-2	Methylcyclohexane	13 U		13	1.08
1634-04-4	Methyl(tert)butyl Ether	6.4 U		6.4	0.820
75-09-2	**Methylene Chloride**	**6.8 J**	J/c	26	3.60
100-42-5	Styrene	6.4 U		6.4	0.566
127-18-4	Tetrachloroethene	6.4 U		6.4	0.785
108-88-3	Toluene	6.4 U		6.4	0.594
79-01-6	Trichloroethene	6.4 U		6.4	0.867
75-69-4	Trichlorofluoromethane	6.4 U		6.4	0.951
75-01-4	Vinyl Chloride	6.4 U		6.4	0.474
1330-20-7	Xylene (Total)	6.4 U		6.4	0.539

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 14:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/10/03 JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**QSB3A**	QC Batch:	90038 -110
Sample #:	**345039**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	78
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 14:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/10/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**QSB3B**	QC Batch:	90038 -110
Sample #:	**345040**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	87
Unit:	ug/kg dry	Dilution Factor:	1.15

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	5.7 U		5.7	0.490
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.7 U		5.7	0.873
79-34-5	1,1,2,2-Tetrachloroethane	5.7 U		5.7	0.751
79-00-5	1,1,2-Trichloroethane	5.7 U		5.7	0.682
75-34-3	1,1-Dichloroethane	5.7 U		5.7	0.833
75-35-4	1,1-Dichloroethylene	5.7 U		5.7	0.843
106-93-4	1,2-Dibromoethane	5.7 U		5.7	0.788
96-12-8	1,2-Dibromo-3-chloropropane	11 U		11	2.39
95-50-1	1,2-Dichlorobenzene	5.7 U		5.7	0.557
107-06-2	1,2-Dichloroethane	5.7 U		5.7	0.496
156-59-2	cis-1,2-Dichloroethene	5.7 U		5.7	0.817
156-60-5	trans-1,2-Dichloroethene	5.7 U	VJ,C	5.7	0.808
78-87-5	1,2-Dichloropropane	5.7 U		5.7	0.674
87-61-6	1,2,3-Trichlorobenzene	5.7 U		5.7	0.626
120-82-1	1,2,4-Trichlorobenzene	5.7 U		5.7	0.472
541-73-1	1,3-Dichlorobenzene	5.7 U		5.7	0.308
106-46-7	1,4-Dichlorobenzene	5.7 U		5.7	0.817
78-93-3	Methyl Ethyl Ketone	22 U		22	5.75
591-78-6	2-Hexanone	11 U		11	2.60
108-10-1	4-Methyl-2-Pentanone	11 U		11	1.68
67-64-1	**Acetone**	**24**	B,Z	22	5.75
71-43-2	Benzene	5.7 U		5.7	0.606
74-97-5	Bromochloromethane	5.7 U		5.7	0.875
75-27-4	Dichlorobromomethane	5.7 U		5.7	0.576
75-25-2	Bromoform	5.7 U		5.7	0.665
74-83-9	Bromomethane	5.7 U		5.7	1.73
75-15-0	Carbon Disulfide	5.7 U		5.7	1.67
56-23-5	Carbon Tetrachloride	5.7 U		5.7	0.536
108-90-7	Chlorobenzene	5.7 U		5.7	0.760
75-00-3	Chloroethane	5.7 U		5.7	1.55
67-66-3	Chloroform	5.7 U		5.7	0.513

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 14:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**QSB3B**	QC Batch:	90038 -110
Sample #:	**345040**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	87
Unit:	ug/kg dry	Dilution Factor:	1.15

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	5.7 U		5.7	0.959
110-82-7	Cyclohexane	11 U		11	0.363
10061-01-5	cis-1,3-Dichloropropene	5.7 U		5.7	0.565
10061-02-6	trans-1,3-Dichloropropene	5.7 U		5.7	0.599
75-71-8	Dichlorodifluoromethane	5.7 U		5.7	0.768
124-48-1	Chlorodibromomethane	5.7 U		5.7	0.595
100-41-4	Ethylbenzene	5.7 U		5.7	0.486
98-82-8	Isopropylbenzene	5.7 U		5.7	0.628
79-20-9	Methyl Acetate	22 U	VJ,c	22	3.99
108-87-2	Methylcyclohexane	11 U		11	0.972
1634-04-4	Methyl(tert)butyl Ether	5.7 U		5.7	0.737
75-09-2	**Methylene Chloride**	**4.8 J**	J,c	22	3.23
100-42-5	Styrene	5.7 U		5.7	0.508
127-18-4	Tetrachloroethene	5.7 U		5.7	0.705
108-88-3	Toluene	5.7 U		5.7	0.534
79-01-6	Trichloroethene	5.7 U		5.7	0.779
75-69-4	Trichlorofluoromethane	5.7 U		5.7	0.854
75-01-4	Vinyl Chloride	5.7 U		5.7	0.426
1330-20-7	Xylene (Total)	5.7 U		5.7	0.484

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 14:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**QSB3B**	QC Batch:	90038 -110
Sample #:	**345040**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	87
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/11/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**QSB3C**	QC Batch:	90038 -111
Sample #:	**345041**	Anal. Batch:	208001
Matrix:	Soil	Percent Solids:	92
Unit:	ug/kg dry	Dilution Factor:	1.09

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	5.4 U		5.4	0.464
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.4 U		5.4	0.827
79-34-5	1,1,2,2-Tetrachloroethane	5.4 U		5.4	0.712
79-00-5	1,1,2-Trichloroethane	5.4 U		5.4	0.646
75-34-3	1,1-Dichloroethane	5.4 U		5.4	0.789
75-35-4	1,1-Dichloroethylene	5.4 U		5.4	0.799
106-93-4	1,2-Dibromoethane	5.4 U		5.4	0.747
96-12-8	1,2-Dibromo-3-chloropropane	11 U		11	2.27
95-50-1	1,2-Dichlorobenzene	5.4 U		5.4	0.528
107-06-2	1,2-Dichloroethane	5.4 U		5.4	0.470
156-59-2	cis-1,2-Dichloroethene	5.4 U		5.4	0.774
156-60-5	trans-1,2-Dichloroethene	5.4 U		5.4	0.766
78-87-5	1,2-Dichloropropane	5.4 U		5.4	0.639
87-61-6	1,2,3-Trichlorobenzene	5.4 U		5.4	0.593
120-82-1	1,2,4-Trichlorobenzene	5.4 U		5.4	0.447
541-73-1	1,3-Dichlorobenzene	5.4 U		5.4	0.292
106-46-7	1,4-Dichlorobenzene	5.4 U		5.4	0.774
78-93-3	Methyl Ethyl Ketone	22 U		22	5.45
591-78-6	2-Hexanone	11 U	UJ,c	11	2.46
108-10-1	4-Methyl-2-Pentanone	11 U	UJ,c	11	1.59
67-64-1	**Acetone**	**18 J**	B,z	22	5.45
71-43-2	Benzene	5.4 U		5.4	0.574
74-97-5	Bromochloromethane	5.4 U		5.4	0.829
75-27-4	Dichlorobromomethane	5.4 U		5.4	0.546
75-25-2	Bromoform	5.4 U		5.4	0.630
74-83-9	Bromomethane	5.4 U		5.4	1.64
75-15-0	Carbon Disulfide	5.4 U	UJ,c	5.4	1.58
56-23-5	Carbon Tetrachloride	5.4 U		5.4	0.508
108-90-7	Chlorobenzene	5.4 U		5.4	0.720
75-00-3	Chloroethane	5.4 U		5.4	1.47
67-66-3	Chloroform	5.4 U		5.4	0.486

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/11/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**QSB3C**	QC Batch:	90038 -111
Sample #:	**345041**	Anal. Batch:	208001
Matrix:	Soil	Percent Solids:	92
Unit:	ug/kg dry	Dilution Factor:	1.09

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	5.4 U		5.4	0.909
110-82-7	Cyclohexane	11 U		11	0.344
10061-01-5	cis-1,3-Dichloropropene	5.4 U		5.4	0.535
10061-02-6	trans-1,3-Dichloropropene	5.4 U		5.4	0.568
75-71-8	Dichlorodifluoromethane	5.4 U		5.4	0.728
124-48-1	Chlorodibromomethane	5.4 U		5.4	0.564
100-41-4	Ethylbenzene	5.4 U		5.4	0.461
98-82-8	Isopropylbenzene	5.4 U		5.4	0.595
79-20-9	Methyl Acetate	22 U	UJ,c	22	3.78
108-87-2	Methylcyclohexane	11 U		11	0.921
1634-04-4	Methyl(tert)butyl Ether	5.4 U		5.4	0.699
75-09-2	**Methylene Chloride**	**5.6 J**	J,c	22	3.06
100-42-5	Styrene	5.4 U		5.4	0.482
127-18-4	Tetrachloroethene	5.4 U		5.4	0.668
108-88-3	Toluene	5.4 U		5.4	0.506
79-01-6	Trichloroethene	5.4 U		5.4	0.738
75-69-4	Trichlorofluoromethane	5.4 U		5.4	0.810
75-01-4	Vinyl Chloride	5.4 U		5.4	0.403
1330-20-7	Xylene (Total)	5.4 U		5.4	0.459

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/11/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**QSB3C**	QC Batch:	90038 -111
Sample #:	**345041**	Anal. Batch:	208001
Matrix:	Soil	Percent Solids:	92
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/11/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**QSB2A**	QC Batch:	90038 -111
Sample #:	**345042**	Anal. Batch:	208001
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.18

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	5.9 U		5.9	0.503
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.9 U		5.9	0.896
79-34-5	1,1,2,2-Tetrachloroethane	5.9 U		5.9	0.771
79-00-5	1,1,2-Trichloroethane	5.9 U		5.9	0.700
75-34-3	1,1-Dichloroethane	5.9 U		5.9	0.854
75-35-4	1,1-Dichloroethylene	5.9 U		5.9	0.865
106-93-4	1,2-Dibromoethane	5.9 U		5.9	0.808
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.45
95-50-1	1,2-Dichlorobenzene	5.9 U		5.9	0.571
107-06-2	1,2-Dichloroethane	5.9 U		5.9	0.509
156-59-2	cis-1,2-Dichloroethene	5.9 U		5.9	0.838
156-60-5	trans-1,2-Dichloroethene	5.9 U		5.9	0.830
78-87-5	1,2-Dichloropropane	5.9 U		5.9	0.691
87-61-6	1,2,3-Trichlorobenzene	5.9 U		5.9	0.642
120-82-1	1,2,4-Trichlorobenzene	5.9 U		5.9	0.484
541-73-1	1,3-Dichlorobenzene	5.9 U		5.9	0.316
106-46-7	1,4-Dichlorobenzene	5.9 U		5.9	0.838
78-93-3	Methyl Ethyl Ketone	24 U		24	5.90
591-78-6	2-Hexanone	12 U	UJ,C	12	2.67
108-10-1	4-Methyl-2-Pentanone	12 U	UJ,C	12	1.72
67-64-1	**Acetone**	**42**	B,Z	24	5.90
71-43-2	Benzene	5.9 U		5.9	0.622
74-97-5	Bromochloromethane	5.9 U		5.9	0.898
75-27-4	Dichlorobromomethane	5.9 U		5.9	0.591
75-25-2	Bromoform	5.9 U		5.9	0.682
74-83-9	Bromomethane	5.9 U		5.9	1.77
75-15-0	Carbon Disulfide	5.9 U	UJ,C	5.9	1.71
56-23-5	Carbon Tetrachloride	5.9 U		5.9	0.550
108-90-7	Chlorobenzene	5.9 U		5.9	0.780
75-00-3	Chloroethane	5.9 U		5.9	1.59
67-66-3	Chloroform	5.9 U		5.9	0.526

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/11/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**QSB2A**	QC Batch:	90038 -111
Sample #:	**345042**	Anal. Batch:	208001
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.18

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	5.9 U		5.9	0.984
110-82-7	Cyclohexane	12 U		12	0.373
10061-01-5	cis-1,3-Dichloropropene	5.9 U		5.9	0.579
10061-02-6	trans-1,3-Dichloropropene	5.9 U		5.9	0.615
75-71-8	Dichlorodifluoromethane	5.9 U		5.9	0.788
124-48-1	Chlorodibromomethane	5.9 U		5.9	0.610
100-41-4	Ethylbenzene	5.9 U		5.9	0.499
98-82-8	Isopropylbenzene	5.9 U		5.9	0.644
79-20-9	Methyl Acetate	24 U	UJ,c	24	4.09
108-87-2	Methylcyclohexane	12 U		12	0.997
1634-04-4	Methyl(tert)butyl Ether	5.9 U		5.9	0.756
75-09-2	**Methylene Chloride**	**4.5 J**	J,c	24	3.32
100-42-5	Styrene	5.9 U		5.9	0.522
127-18-4	Tetrachloroethene	5.9 U		5.9	0.723
108-88-3	Toluene	5.9 U		5.9	0.548
79-01-6	Trichloroethene	5.9 U		5.9	0.799
75-69-4	Trichlorofluoromethane	5.9 U		5.9	0.877
75-01-4	Vinyl Chloride	5.9 U		5.9	0.437
1330-20-7	Xylene (Total)	5.9 U		5.9	0.497

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/11/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**QSB2A**	QC Batch:	90038 -111
Sample #:	**345042**	Anal. Batch:	208001
Matrix:	Soil	Percent Solids:	85
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/11/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**QSB2B**	QC Batch:	90038 -111
Sample #:	**345043**	Anal. Batch:	208001
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.19

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.0 U		6.0	0.507
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.0 U		6.0	0.903
79-34-5	1,1,2,2-Tetrachloroethane	6.0 U		6.0	0.777
79-00-5	1,1,2-Trichloroethane	6.0 U		6.0	0.706
75-34-3	1,1-Dichloroethane	6.0 U		6.0	0.862
75-35-4	1,1-Dichloroethylene	6.0 U		6.0	0.872
106-93-4	1,2-Dibromoethane	6.0 U		6.0	0.815
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.48
95-50-1	1,2-Dichlorobenzene	6.0 U		6.0	0.576
107-06-2	1,2-Dichloroethane	6.0 U		6.0	0.513
156-59-2	cis-1,2-Dichloroethene	6.0 U		6.0	0.845
156-60-5	trans-1,2-Dichloroethene	6.0 U		6.0	0.837
78-87-5	1,2-Dichloropropane	6.0 U		6.0	0.697
87-61-6	1,2,3-Trichlorobenzene	6.0 U		6.0	0.647
120-82-1	1,2,4-Trichlorobenzene	6.0 U		6.0	0.488
541-73-1	1,3-Dichlorobenzene	6.0 U		6.0	0.319
106-46-7	1,4-Dichlorobenzene	6.0 U		6.0	0.845
78-93-3	Methyl Ethyl Ketone	24 U		24	5.95
591-78-6	2-Hexanone	12 U	UJ,c	12	2.69
108-10-1	4-Methyl-2-Pentanone	12 U	UJ,c	12	1.74
67-64-1	**Acetone**	**24**	B,Z	24	5.95
71-43-2	Benzene	6.0 U		6.0	0.627
74-97-5	Bromochloromethane	6.0 U		6.0	0.906
75-27-4	Dichlorobromomethane	6.0 U		6.0	0.596
75-25-2	Bromoform	6.0 U		6.0	0.688
74-83-9	Bromomethane	6.0 U		6.0	1.79
75-15-0	Carbon Disulfide	6.0 U	UJ,c	6.0	1.73
56-23-5	Carbon Tetrachloride	6.0 U		6.0	0.555
108-90-7	Chlorobenzene	6.0 U		6.0	0.787
75-00-3	Chloroethane	6.0 U		6.0	1.61
67-66-3	Chloroform	6.0 U		6.0	0.531

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/11/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**QSB2B**	QC Batch:	90038 -111
Sample #:	**345043**	Anal. Batch:	208001
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.19

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.0 U		6.0	0.992
110-82-7	Cyclohexane	12 U		12	0.376
10061-01-5	cis-1,3-Dichloropropene	6.0 U		6.0	0.584
10061-02-6	trans-1,3-Dichloropropene	6.0 U		6.0	0.620
75-71-8	Dichlorodifluoromethane	6.0 U		6.0	0.795
124-48-1	Chlorodibromomethane	6.0 U		6.0	0.615
100-41-4	Ethylbenzene	6.0 U		6.0	0.503
98-82-8	Isopropylbenzene	6.0 U		6.0	0.650
79-20-9	Methyl Acetate	24 U	UJ,c	24	4.13
108-87-2	Methylcyclohexane	12 U		12	1.01
1634-04-4	Methyl(tert)butyl Ether	6.0 U		6.0	0.763
75-09-2	**Methylene Chloride**	**4.9 J**	J,c	24	3.34
100-42-5	Styrene	6.0 U		6.0	0.526
127-18-4	Tetrachloroethene	6.0 U		6.0	0.729
108-88-3	**Toluene**	**0.65 J**		6.0	0.552
79-01-6	Trichloroethene	6.0 U		6.0	0.806
75-69-4	Trichlorofluoromethane	6.0 U		6.0	0.884
75-01-4	Vinyl Chloride	6.0 U		6.0	0.440
1330-20-7	Xylene (Total)	6.0 U		6.0	0.501

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/11/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**QSB2B**	QC Batch:	90038 -111
Sample #:	**345043**	Anal. Batch:	208001
Matrix:	Soil	Percent Solids:	84
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/11/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**QSB2C**	QC Batch:	90038 -111
Sample #:	**345044**	Anal. Batch:	208001
Matrix:	Soil	Percent Solids:	91
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	5.5 U		5.5	0.469
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.5 U		5.5	0.835
79-34-5	1,1,2,2-Tetrachloroethane	5.5 U		5.5	0.718
79-00-5	1,1,2-Trichloroethane	5.5 U		5.5	0.652
75-34-3	1,1-Dichloroethane	5.5 U		5.5	0.796
75-35-4	1,1-Dichloroethylene	5.5 U		5.5	0.806
106-93-4	1,2-Dibromoethane	5.5 U		5.5	0.754
96-12-8	1,2-Dibromo-3-chloropropane	11 U		11	2.29
95-50-1	1,2-Dichlorobenzene	5.5 U		5.5	0.532
107-06-2	1,2-Dichloroethane	5.5 U		5.5	0.474
156-59-2	cis-1,2-Dichloroethene	5.5 U		5.5	0.781
156-60-5	trans-1,2-Dichloroethene	5.5 U		5.5	0.773
78-87-5	1,2-Dichloropropane	5.5 U		5.5	0.645
87-61-6	1,2,3-Trichlorobenzene	5.5 U		5.5	0.598
120-82-1	1,2,4-Trichlorobenzene	5.5 U		5.5	0.451
541-73-1	1,3-Dichlorobenzene	5.5 U		5.5	0.295
106-46-7	1,4-Dichlorobenzene	5.5 U		5.5	0.781
78-93-3	Methyl Ethyl Ketone	22 U		22	5.50
591-78-6	2-Hexanone	11 U	UJ,c	11	2.49
108-10-1	4-Methyl-2-Pentanone	11 U	UJ,c	11	1.61
67-64-1	**Acetone**	**22**	B,z	22	5.50
71-43-2	Benzene	5.5 U		5.5	0.580
74-97-5	Bromochloromethane	5.5 U		5.5	0.837
75-27-4	Dichlorobromomethane	5.5 U		5.5	0.551
75-25-2	Bromoform	5.5 U		5.5	0.636
74-83-9	Bromomethane	5.5 U		5.5	1.65
75-15-0	Carbon Disulfide	5.5 U	UJ,c	5.5	1.60
56-23-5	Carbon Tetrachloride	5.5 U		5.5	0.513
108-90-7	Chlorobenzene	5.5 U		5.5	0.727
75-00-3	Chloroethane	5.5 U		5.5	1.49
67-66-3	Chloroform	5.5 U		5.5	0.491

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/11/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**QSB2C**	QC Batch:	90038 -111
Sample #:	**345044**	Anal. Batch:	208001
Matrix:	Soil	Percent Solids:	91
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	5.5 U		5.5	0.917
110-82-7	Cyclohexane	11 U		11	0.348
10061-01-5	cis-1,3-Dichloropropene	5.5 U		5.5	0.540
10061-02-6	trans-1,3-Dichloropropene	5.5 U		5.5	0.573
75-71-8	Dichlorodifluoromethane	5.5 U		5.5	0.735
124-48-1	Chlorodibromomethane	5.5 U		5.5	0.569
100-41-4	Ethylbenzene	5.5 U		5.5	0.465
98-82-8	Isopropylbenzene	5.5 U		5.5	0.601
79-20-9	Methyl Acetate	22 U	VJc	22	3.82
108-87-2	Methylcyclohexane	11 U		11	0.930
1634-04-4	Methyl(tert)butyl Ether	5.5 U		5.5	0.705
75-09-2	**Methylene Chloride**	**4.0 J**	J,c	22	3.09
100-42-5	Styrene	5.5 U		5.5	0.486
127-18-4	Tetrachloroethene	5.5 U		5.5	0.674
108-88-3	Toluene	5.5 U		5.5	0.510
79-01-6	Trichloroethene	5.5 U		5.5	0.745
75-69-4	Trichlorofluoromethane	5.5 U		5.5	0.817
75-01-4	Vinyl Chloride	5.5 U		5.5	0.407
1330-20-7	Xylene (Total)	5.5 U		5.5	0.463

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/11/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**QSB2C**	QC Batch:	90038 -111
Sample #:	**345044**	Anal. Batch:	208001
Matrix:	Soil	Percent Solids:	91
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 16:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**EQB1**	QC Batch:	89888 -115
Sample #:	**345045**	Anal. Batch:	207752
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Volatile Organics OLM4.2+ TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	1.0 U		1.0	0.142
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1.0 U		1.0	0.179
79-34-5	1,1,2,2-Tetrachloroethane	1.0 U		1.0	0.148
79-00-5	1,1,2-Trichloroethane	1.0 U		1.0	0.142
75-34-3	1,1-Dichloroethane	1.0 U		1.0	0.057
75-35-4	1,1-Dichloroethylene	1.0 U		1.0	0.133
106-93-4	1,2-Dibromoethane	1.0 U		1.0	0.171
96-12-8	1,2-Dibromo-3-chloropropane	5.0 U		5.0	0.270
95-50-1	1,2-Dichlorobenzene	1.0 U		1.0	0.164
107-06-2	1,2-Dichloroethane	1.0 U		1.0	0.111
156-59-2	cis-1,2-Dichloroethene	1.0 U		1.0	0.139
156-60-5	trans-1,2-Dichloroethene	1.0 U		1.0	0.143
78-87-5	1,2-Dichloropropane	1.0 U		1.0	0.255
87-61-6	1,2,3-Trichlorobenzene	1.0 U		1.0	0.228
120-82-1	1,2,4-Trichlorobenzene	1.0 U		1.0	0.189
541-73-1	1,3-Dichlorobenzene	1.0 U		1.0	0.160
106-46-7	1,4-Dichlorobenzene	1.0 U		1.0	0.124
78-93-3	Methyl Ethyl Ketone	20 U		20	0.417
591-78-6	2-Hexanone	20 U		20	0.455
108-10-1	4-Methyl-2-Pentanone	20 U		20	0.364
67-64-1	**Acetone**	**2.9 J**	Bz	20	1.07
71-43-2	Benzene	1.0 U		1.0	0.022
74-97-5	Bromochloromethane	1.0 U		1.0	0.076
75-27-4	Dichlorobromomethane	1.0 U		1.0	0.431
75-25-2	Bromoform	1.0 U		1.0	0.110
74-83-9	Bromomethane	1.0 U		1.0	0.267
75-15-0	Carbon Disulfide	5.0 U	UJ,c	5.0	0.059
56-23-5	Carbon Tetrachloride	1.0 U		1.0	0.115
108-90-7	Chlorobenzene	1.0 U		1.0	0.157
75-00-3	Chloroethane	1.0 U		1.0	0.180
67-66-3	Chloroform	1.0 U		1.0	0.101

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 16:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**EQB1**	QC Batch:	89888 -115
Sample #:	**345045**	Anal. Batch:	207752
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Volatile Organics OLM4.2+ TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	1.0 U		1.0	0.103
110-82-7	Cyclohexane	5.0 U		5.0	0.215
10061-01-5	cis-1,3-Dichloropropene	1.0 U		1.0	0.189
10061-02-6	trans-1,3-Dichloropropene	1.0 U		1.0	0.117
75-71-8	Dichlorodifluoromethane	1.0 U		1.0	0.120
124-48-1	Chlorodibromomethane	1.0 U		1.0	0.108
100-41-4	Ethylbenzene	1.0 U		1.0	0.195
98-82-8	Isopropylbenzene	1.0 U		1.0	0.090
79-20-9	Methyl Acetate	10 U		10	0.231
108-87-2	Methylcyclohexane	5.0 U		5.0	0.168
1634-04-4	Methyl(tert)butyl Ether	1.0 U		1.0	0.077
75-09-2	**Methylene Chloride**	**0.60 J**	B,Z	4.0	0.117
100-42-5	Styrene	1.0 U		1.0	0.137
127-18-4	Tetrachloroethene	1.0 U		1.0	0.193
108-88-3	Toluene	1.0 U		1.0	0.214
79-01-6	Trichloroethene	1.0 U		1.0	0.211
75-69-4	Trichlorofluoromethane	1.0 U		1.0	0.051
75-01-4	Vinyl Chloride	1.0 U		1.0	0.119
1330-20-7	Xylene (Total)	3.0 U		3.0	0.160

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 16:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**EQB1**	QC Batch:	89888 -115
Sample #:	**345045**	Anal. Batch:	207752
Matrix:	QC Water	Percent Solids:	n/a
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/L)**	**Qualifier**

No compound was detected.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 16:20
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/15/03 by DLVV
		Anal. Method:	USEPA-8260B
Sample ID:	**Trip Blank**	QC Batch:	89888 -115
Sample #:	**345046**	Anal. Batch:	207752
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Volatile Organics OLM4.2+ TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	1.0 U		1.0	0.142
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1.0 U		1.0	0.179
79-34-5	1,1,2,2-Tetrachloroethane	1.0 U		1.0	0.148
79-00-5	1,1,2-Trichloroethane	1.0 U		1.0	0.142
75-34-3	1,1-Dichloroethane	1.0 U		1.0	0.057
75-35-4	1,1-Dichloroethylene	1.0 U		1.0	0.133
106-93-4	1,2-Dibromoethane	1.0 U		1.0	0.171
96-12-8	1,2-Dibromo-3-chloropropane	5.0 U		5.0	0.270
95-50-1	1,2-Dichlorobenzene	1.0 U		1.0	0.164
107-06-2	1,2-Dichloroethane	1.0 U		1.0	0.111
156-59-2	cis-1,2-Dichloroethene	1.0 U		1.0	0.139
156-60-5	trans-1,2-Dichloroethene	1.0 U		1.0	0.143
78-87-5	1,2-Dichloropropane	1.0 U		1.0	0.255
87-61-6	1,2,3-Trichlorobenzene	1.0 U		1.0	0.228
120-82-1	1,2,4-Trichlorobenzene	1.0 U		1.0	0.189
541-73-1	1,3-Dichlorobenzene	1.0 U		1.0	0.160
106-46-7	1,4-Dichlorobenzene	1.0 U		1.0	0.124
78-93-3	Methyl Ethyl Ketone	20 U		20	0.417
591-78-6	2-Hexanone	20 U		20	0.455
108-10-1	4-Methyl-2-Pentanone	20 U		20	0.364
67-64-1	Acetone	20 U		20	1.07
71-43-2	Benzene	1.0 U		1.0	0.022
74-97-5	Bromochloromethane	1.0 U		1.0	0.076
75-27-4	Dichlorobromomethane	1.0 U		1.0	0.431
75-25-2	Bromoform	1.0 U		1.0	0.110
74-83-9	Bromomethane	1.0 U		1.0	0.267
75-15-0	Carbon Disulfide	5.0 U	UJ,c	5.0	0.059
56-23-5	Carbon Tetrachloride	1.0 U		1.0	0.115
108-90-7	Chlorobenzene	1.0 U		1.0	0.157
75-00-3	Chloroethane	1.0 U		1.0	0.180
67-66-3	Chloroform	1.0 U		1.0	0.101

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 16:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**Trip Blank**	QC Batch:	89888 -115
Sample #:	**345046**	Anal. Batch:	207752
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Volatile Organics OLM4.2+ TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	1.0 U	1.0	0.103
110-82-7	Cyclohexane	5.0 U	5.0	0.215
10061-01-5	cis-1,3-Dichloropropene	1.0 U	1.0	0.189
10061-02-6	trans-1,3-Dichloropropene	1.0 U	1.0	0.117
75-71-8	Dichlorodifluoromethane	1.0 U	1.0	0.120
124-48-1	Chlorodibromomethane	1.0 U	1.0	0.108
100-41-4	Ethylbenzene	1.0 U	1.0	0.195
98-82-8	Isopropylbenzene	1.0 U	1.0	0.090
79-20-9	Methyl Acetate	10 U	10	0.231
108-87-2	Methylcyclohexane	5.0 U	5.0	0.168
1634-04-4	Methyl(tert)butyl Ether	1.0 U	1.0	0.077
75-09-2	**Methylene Chloride**	**1.0 J** B,2	4.0	0.117
100-42-5	Styrene	1.0 U	1.0	0.137
127-18-4	Tetrachloroethene	1.0 U	1.0	0.193
108-88-3	**Toluene**	**0.27 J**	1.0	0.214
79-01-6	Trichloroethene	1.0 U	1.0	0.211
75-69-4	Trichlorofluoromethane	1.0 U	1.0	0.051
75-01-4	Vinyl Chloride	1.0 U	1.0	0.119
1330-20-7	Xylene (Total)	3.0 U	3.0	0.160

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 16:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**Trip Blank**	QC Batch:	89888 -115
Sample #:	**345046**	Anal. Batch:	207752
Matrix:	QC Water	Percent Solids:	n/a
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/L)**	**Qualifier**

No compound was detected.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 08:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB1C**	QC Batch:	89845 -109
Sample #:	**345028**	Anal. Batch:	207828
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	170 U		170	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	170 U		170	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	170 U		170	1.58
95-95-4	2,4,5-Trichlorophenol	170 U		170	4.01
88-06-2	2,4,6-Trichlorophenol	170 U		170	3.14
120-83-2	2,4-Dichlorophenol	170 U		170	4.22
105-67-9	2,4-Dimethylphenol	170 U		170	9.53
51-28-5	2,4-Dinitrophenol	330 U		330	3.84
121-14-2	2,4-Dinitrotoluene	170 U		170	3.78
606-20-2	2,6-Dinitrotoluene	170 U		170	33.2
91-58-7	2-Chloronaphthalene	170 U		170	2.76
95-57-8	2-Chlorophenol	170 U		170	2.41
91-57-6	2-Methylnaphthalene	170 U		170	3.29
95-48-7	2-Methylphenol	170 U		170	5.81
88-74-4	2-Nitroaniline	170 U		170	5.52
88-75-5	2-Nitrophenol	170 U		170	2.04
91-94-1	3,3'-Dichlorobenzidine	170 U		170	80.0
99-09-2	3-Nitroaniline	170 U		170	40.0
534-52-1	4,6-Dinitro-2-Methylphenol	170 U		170	5.41
101-55-3	4-Bromophenyl Phenylether	170 U		170	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**21 J**		170	6.25
106-47-8	4-Chloroaniline	170 U	UJ,c	170	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	170 U		170	3.92
106-44-5	4-Methylphenol	170 U		170	7.64
100-01-6	4-Nitroaniline	170 U		170	8.70
100-02-7	4-Nitrophenol	330 U		330	3.40
83-32-9	Acenaphthene	170 U		170	2.06
208-96-8	Acenaphthylene	170 U		170	1.80
98-86-2	Acetophenone	170 U		170	2.28

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 08:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB1C**	QC Batch:	89845 -109
Sample #:	**345028**	Anal. Batch:	207828
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	170 U		170	5.54
1912-24-9	Atrazine	170 U		170	8.26
100-52-7	Benzaldehyde	170 U	UJ,c	170	4.86
56-55-3	Benzo (a) Anthracene	170 U		170	16.0
50-32-8	Benzo (a) Pyrene	170 U		170	6.85
205-99-2	Benzo (b) Fluoranthene	170 U		170	11.7
191-24-2	Benzo (g,h,i,) Perylene	170 U		170	10.5
207-08-9	Benzo (k) Fluoranthene	170 U		170	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	170 U		170	3.77
111-44-4	Bis (2-Chloroethyl) Ether	170 U		170	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**45 J**		170	2.48
85-68-7	Butyl Benzyl Phthalate	170 U		170	5.38
105-60-2	Caprolactam	330 U		330	7.66
86-74-8	Carbazole	170 U		170	7.32
218-01-9	Chrysene	170 U		170	12.2
53-70-3	Dibenzo (a,h) Anthracene	170 U		170	7.08
132-64-9	Dibenzofuran	170 U		170	3.79
84-66-2	**Diethylphthalate**	**26 J**		170	2.28
131-11-3	Dimethylphthalate	170 U		170	3.97
84-74-2	**Di-n-Butylphthalate**	**30 J**		170	4.58
117-84-0	Di-n-Octylphthalate	170 U		170	3.72
206-44-0	Fluoranthene	170 U		170	2.82
86-73-7	Fluorene	170 U		170	2.02
118-74-1	Hexachlorobenzene	170 U		170	3.01
87-68-3	Hexachlorobutadiene	170 U		170	4.64
77-47-4	Hexachlorocyclopentadiene	170 U		170	2.38
67-72-1	Hexachloroethane	170 U		170	2.80
193-39-5	Indeno (1,2,3-cd) Pyrene	170 U		170	4.70
78-59-1	Isophorone	170 U		170	2.08
91-20-3	Naphthalene	170 U		170	3.30
98-95-3	Nitrobenzene	170 U		170	3.84

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 08:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB1C**	QC Batch:	89845 -109
Sample #:	**345028**	Anal. Batch:	207828
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	170 U	170	3.95
86-30-6	N-Nitroso-di-Phenylamine	170 U	170	5.70
87-86-5	Pentachlorophenol	330 U	330	5.27
85-01-8	Phenanthrene	170 U	170	2.76
108-95-2	Phenol	170 U	170	4.75
129-00-0	Pyrene	170 U	170	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 08:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB1C**	QC Batch:	89845 -109
Sample #:	**345028**	Anal. Batch:	207828
Matrix:	Soil	Percent Solids:	85
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	52	E	B,x
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	39	E	B,x
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	86	E	B,x
2-Ethyl-1-Hexanol	104-76-7	25	E	NJ,+
3-Hexene-2,5-dione	4436-75-3	200	E	NJ,+
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,9-diene-2,8	1000143924 (1000143-92-4)	39	E	NJ,+
Erucylamide	112-84-5	220	E	NJ,+
Hexadecanoic acid, butyl ester	111-06-8	28	E	NJ,+
Octadecanoic acid, 2-methylpropyl ester	646-13-9	30	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 09:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB2A**	QC Batch:	90209 -116
Sample #:	**345029**	Anal. Batch:	208293
Matrix:	Soil	Percent Solids:	63
Unit:	ug/kg dry	Dilution Factor:	24

CAS Number	Semivolatile Organics *OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	4000 U		4000	59.0
95-94-3	1,2,4,5-Tetrachloro-benzene	4000 U		4000	689
108-60-1	Bis (2-Chloroisopropyl)-Ether	4000 U		4000	31.7
95-95-4	2,4,5-Trichlorophenol	4000 U	UJ,S	4000	80.2
88-06-2	2,4,6-Trichlorophenol	4000 U	UJ,S	4000	62.9
120-83-2	2,4-Dichlorophenol	4000 U	UJ,S	4000	84.5
105-67-9	2,4-Dimethylphenol	4000 U	UJ,S	4000	191
51-28-5	2,4-Dinitrophenol	8000 U	UJ,S	8000	76.8
121-14-2	**2,4-Dinitrotoluene**	**1800 J**	J,M	4000	75.6
606-20-2	2,6-Dinitrotoluene	4000 U		4000	665
91-58-7	2-Chloronaphthalene	4000 U		4000	55.2
95-57-8	2-Chlorophenol	4000 U	UJ,S	4000	48.2
91-57-6	2-Methylnaphthalene	4000 U		4000	65.8
95-48-7	2-Methylphenol	4000 U	UJ,S	4000	116
88-74-4	2-Nitroaniline	4000 U	R,M	4000	110
88-75-5	2-Nitrophenol	4000 U	UJ,S	4000	40.8
91-94-1	3,3'-Dichlorobenzidine	4000 U	R,M	4000	1600
99-09-2	3-Nitroaniline	4000 U	R,M	4000	799
534-52-1	4,6-Dinitro-2-Methylphenol	4000 U	UJ,S	4000	108
101-55-3	4-Bromophenyl Phenylether	4000 U		4000	81.1
59-50-7	4-Chloro-3-Methylphenol	4000 U	UJ,S	4000	125
106-47-8	4-Chloroaniline	4000 U	R,M	4000	30.2
7005-72-3	4-Chlorophenylphenyl-Ether	4000 U		4000	78.5
106-44-5	4-Methylphenol	4000 U	UJ,S	4000	153
100-01-6	4-Nitroaniline	4000 U	R,M	4000	174
100-02-7	4-Nitrophenol	8000 U	UJ,S	8000	67.9
83-32-9	Acenaphthene	4000 U		4000	41.3
208-96-8	Acenaphthylene	4000 U		4000	36.0
98-86-2	Acetophenone	4000 U		4000	45.6

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 09:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB2A**	QC Batch:	90209 -116
Sample #:	**345029**	Anal. Batch:	208293
Matrix:	Soil	Percent Solids:	63
Unit:	ug/kg dry	Dilution Factor:	24

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	4000 U		4000	111
1912-24-9	Atrazine	4000 U	UJ,e	4000	165
100-52-7	Benzaldehyde	4000 U	UJ,e	4000	97.2
56-55-3	Benzo (a) Anthracene	4000 U		4000	319
~~50-32-8~~	~~*Benzo (a) Pyrene~~	~~4000 UR~~	~~R,i~~	~~4000~~	~~137~~
~~205-99-2~~	~~*Benzo (b) Fluoranthene~~	~~4000 UR~~	~~R,i~~	~~4000~~	~~234~~
~~191-24-2~~	~~*Benzo (g,h,i,) Perylene~~	~~4000 UR~~	~~R,i~~	~~4000~~	~~209~~
~~207-08-9~~	~~*Benzo (k) Fluoranthene~~	~~4000 UR~~	~~R,i~~	~~4000~~	~~322~~
111-91-1	Bis (2-Chloroethoxy)-Methane	4000 U		4000	75.4
111-44-4	Bis (2-Chloroethyl) Ether	4000 U		4000	41.5
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**1000 J**	J,e	4000	49.7
85-68-7	Butyl Benzyl Phthalate	4000 U		4000	108
105-60-2	Caprolactam	8000 U		8000	153
86-74-8	Carbazole	4000 U		4000	146
218-01-9	Chrysene	4000 U		4000	245
~~53-70-3~~	~~*Dibenzo (a,h) Anthracene~~	~~4000 UR~~	~~R,i~~	~~4000~~	~~142~~
132-64-9	Dibenzofuran	4000 U		4000	75.8
84-66-2	**Diethylphthalate**	**120 J**	J,i	4000	45.6
131-11-3	Dimethylphthalate	4000 U		4000	79.4
84-74-2	**Di-n-Butylphthalate**	**26000**	J,M	4000	91.7
117-84-0	Di-n-Octylphthalate	4000 U	UJ,e	4000	74.4
206-44-0	**Fluoranthene**	**190 J**	J,M	4000	56.4
86-73-7	Fluorene	4000 U		4000	40.3
118-74-1	Hexachlorobenzene	4000 U		4000	60.2
87-68-3	Hexachlorobutadiene	4000 U		4000	92.9
77-47-4	Hexachlorocyclopentadiene	4000 U		4000	47.5
67-72-1	Hexachloroethane	4000 U		4000	56.0
~~193-39-5~~	~~*Indeno (1,2,3-cd) Pyrene~~	~~4000 UR~~	~~R,i~~	~~4000~~	~~94.1~~
78-59-1	Isophorone	4000 U		4000	41.5
91-20-3	Naphthalene	4000 U		4000	66.0
98-95-3	Nitrobenzene	4000 U		4000	76.8

* See attached Statement of Data Qualifications.

* See dilution analysis for these results, AS 12/15/03

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 09:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB2A**	QC Batch:	90209 -116
Sample #:	**345029**	Anal. Batch:	208293
Matrix:	Soil	Percent Solids:	63
Unit:	ug/kg dry	Dilution Factor:	24

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	4000 U		4000	79.0
86-30-6	**N-Nitroso-di-Phenylamine**	**300 J**	J,M	4000	114
87-86-5	Pentachlorophenol	8000 U	UJ,S	8000	105
85-01-8	Phenanthrene	4000 U		4000	55.2
108-95-2	Phenol	4000 U	UJ,S	4000	95.0
129-00-0	**Pyrene**	**110 J**		4000	35.5

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 09:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB2A**	QC Batch:	90209 -109
Sample #:	**345029**	Anal. Batch:	208293
Matrix:	Soil	Percent Solids:	63
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
3-Hexene-2,5-dione	4436-75-3	400	E NJ+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 09:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB2A**	QC Batch:	90209 -116
Sample #:	**345029DL**	Anal. Batch:	208293
Matrix:	Soil	Percent Solids:	63
Unit:	ug/kg dry	Dilution Factor:	240

Do not use. See neat analysis -JS 12/15/03

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	40000 U		40000	590
95-94-3	1,2,4,5-Tetrachloro-benzene	40000 U		40000	6890
108-60-1	Bis (2-Chloroisopropyl)-Ether	40000 U		40000	317
95-95-4	2,4,5-Trichlorophenol	40000 U		40000	802
88-06-2	2,4,6-Trichlorophenol	40000 U		40000	629
120-83-2	2,4-Dichlorophenol	40000 U		40000	845
105-67-9	2,4-Dimethylphenol	40000 U		40000	1910
51-28-5	2,4-Dinitrophenol	80000 U		80000	768
121-14-2	2,4-Dinitrotoluene	40000 U		40000	756
606-20-2	2,6-Dinitrotoluene	40000 U		40000	6650
91-58-7	2-Chloronaphthalene	40000 U		40000	552
95-57-8	2-Chlorophenol	40000 U		40000	482
91-57-6	2-Methylnaphthalene	40000 U		40000	658
95-48-7	2-Methylphenol	40000 U		40000	1160
88-74-4	2-Nitroaniline	40000 U		40000	1100
88-75-5	2-Nitrophenol	40000 U		40000	408
91-94-1	3,3'-Dichlorobenzidine	40000 U	UJ,c	40000	16000
99-09-2	3-Nitroaniline	40000 U		40000	7990
534-52-1	4,6-Dinitro-2-Methylphenol	40000 U		40000	1080
101-55-3	4-Bromophenyl Phenylether	40000 U		40000	811
59-50-7	4-Chloro-3-Methylphenol	40000 U		40000	1250
106-47-8	4-Chloroaniline	40000 U	UJ,c	40000	302
7005-72-3	4-Chlorophenylphenyl-Ether	40000 U		40000	785
106-44-5	4-Methylphenol	40000 U		40000	1530
100-01-6	4-Nitroaniline	40000 U		40000	1740
100-02-7	4-Nitrophenol	80000 U		80000	679
83-32-9	Acenaphthene	40000 U		40000	413
208-96-8	Acenaphthylene	40000 U		40000	360
98-86-2	Acetophenone	40000 U		40000	456

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 09:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB2A**	QC Batch:	90209 -116
Sample #:	**345029DL**	Anal. Batch:	208293
Matrix:	Soil	Percent Solids:	63
Unit:	ug/kg dry	Dilution Factor:	240

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	40000 U		40000	1110
1912-24-9	Atrazine	40000 U	UJ,c	40000	1650
100-52-7	Benzaldehyde	40000 U	UJ,c	40000	972
56-55-3	Benzo (a) Anthracene	40000 U		40000	3190
50-32-8	Benzo (a) Pyrene	40000 U		40000	1370
205-99-2	Benzo (b) Fluoranthene	40000 U		40000	2340
191-24-2	Benzo (g,h,i,) Perylene	40000 U		40000	2090
207-08-9	Benzo (k) Fluoranthene	40000 U		40000	3220
111-91-1	Bis (2-Chloroethoxy)-Methane	40000 U		40000	754
111-44-4	Bis (2-Chloroethyl) Ether	40000 U		40000	415
117-81-7	Bis (2-ethylhexyl)-Phthalate	40000 U	UJ,c	40000	497
85-68-7	Butyl Benzyl Phthalate	40000 U		40000	1080
105-60-2	Caprolactam	80000 U		80000	1530
86-74-8	Carbazole	40000 U		40000	1460
218-01-9	Chrysene	40000 U		40000	2450
53-70-3	Dibenzo (a,h) Anthracene	40000 U		40000	1420
132-64-9	Dibenzofuran	40000 U		40000	758
84-66-2	**Diethylphthalate**	**860 J**		40000	456
131-11-3	Dimethylphthalate	40000 U		40000	794
84-74-2	**Di-n-Butylphthalate**	**21000 J**		40000	917
117-84-0	Di-n-Octylphthalate	40000 U	UJ,c	40000	744
206-44-0	Fluoranthene	40000 U		40000	564
86-73-7	Fluorene	40000 U		40000	403
118-74-1	Hexachlorobenzene	40000 U		40000	602
87-68-3	Hexachlorobutadiene	40000 U		40000	929
77-47-4	Hexachlorocyclopentadiene	40000 U		40000	475
67-72-1	Hexachloroethane	40000 U		40000	560
193-39-5	Indeno (1,2,3-cd) Pyrene	40000 U		40000	941
78-59-1	Isophorone	40000 U		40000	415
91-20-3	Naphthalene	40000 U		40000	660
98-95-3	Nitrobenzene	40000 U		40000	768

* Use only these results from this dilution, * 12/15/03

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 09:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB2A**	QC Batch:	90209 -116
Sample #:	**345029DL**	Anal. Batch:	208293
Matrix:	Soil	Percent Solids:	63
Unit:	ug/kg dry	Dilution Factor:	240

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	40000 U	40000	790
86-30-6	N-Nitroso-di-Phenylamine	40000 U	40000	1140
87-86-5	Pentachlorophenol	80000 U	80000	1050
85-01-8	Phenanthrene	40000 U	40000	552
108-95-2	Phenol	40000 U	40000	950
129-00-0	Pyrene	40000 U	40000	355

Do not use,
See neat analysis
12/15/03

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB2B**	QC Batch:	90209 -109
Sample #:	**345030**	Anal. Batch:	207828
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	200 U		200	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	200 U		200	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	200 U		200	1.58
95-95-4	2,4,5-Trichlorophenol	200 U		200	4.01
88-06-2	2,4,6-Trichlorophenol	200 U		200	3.14
120-83-2	2,4-Dichlorophenol	200 U		200	4.22
105-67-9	2,4-Dimethylphenol	200 U		200	9.53
51-28-5	2,4-Dinitrophenol	390 U		390	3.84
121-14-2	2,4-Dinitrotoluene	200 U		200	3.78
606-20-2	2,6-Dinitrotoluene	200 U		200	33.2
91-58-7	2-Chloronaphthalene	200 U		200	2.76
95-57-8	2-Chlorophenol	200 U		200	2.41
91-57-6	2-Methylnaphthalene	200 U		200	3.29
95-48-7	2-Methylphenol	200 U		200	5.81
88-74-4	2-Nitroaniline	200 U		200	5.52
88-75-5	2-Nitrophenol	200 U		200	2.04
91-94-1	3,3'-Dichlorobenzidine	200 U		200	80.0
99-09-2	3-Nitroaniline	200 U		200	40.0
534-52-1	4,6-Dinitro-2-Methylphenol	200 U		200	5.41
101-55-3	4-Bromophenyl Phenylether	200 U		200	4.06
59-50-7	4-Chloro-3-Methylphenol	200 U		200	6.25
106-47-8	4-Chloroaniline	200 U	UJ,c	200	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	200 U		200	3.92
106-44-5	4-Methylphenol	200 U		200	7.64
100-01-6	4-Nitroaniline	200 U		200	8.70
100-02-7	4-Nitrophenol	390 U		390	3.40
83-32-9	Acenaphthene	200 U		200	2.06
208-96-8	Acenaphthylene	200 U		200	1.80
98-86-2	Acetophenone	200 U		200	2.28

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB2B**	QC Batch:	90209 -109
Sample #:	**345030**	Anal. Batch:	207828
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	200 U		200	5.54
1912-24-9	Atrazine	200 U		200	8.26
100-52-7	Benzaldehyde	200 U	UJ,c	200	4.86
56-55-3	Benzo (a) Anthracene	200 U		200	16.0
50-32-8	Benzo (a) Pyrene	200 U		200	6.85
205-99-2	Benzo (b) Fluoranthene	200 U		200	11.7
191-24-2	Benzo (g,h,i,) Perylene	200 U		200	10.5
207-08-9	Benzo (k) Fluoranthene	200 U		200	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	200 U		200	3.77
111-44-4	Bis (2-Chloroethyl) Ether	200 U		200	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**44 J**		200	2.48
85-68-7	Butyl Benzyl Phthalate	200 U		200	5.38
105-60-2	Caprolactam	390 U		390	7.66
86-74-8	Carbazole	200 U		200	7.32
218-01-9	Chrysene	200 U		200	12.2
53-70-3	Dibenzo (a,h) Anthracene	200 U		200	7.08
132-64-9	Dibenzofuran	200 U		200	3.79
84-66-2	**Diethylphthalate**	**20 J**	B,z	200	2.28
131-11-3	Dimethylphthalate	200 U		200	3.97
84-74-2	**Di-n-Butylphthalate**	**18 J**		200	4.58
117-84-0	Di-n-Octylphthalate	200 U		200	3.72
206-44-0	Fluoranthene	200 U		200	2.82
86-73-7	Fluorene	200 U		200	2.02
118-74-1	Hexachlorobenzene	200 U		200	3.01
87-68-3	Hexachlorobutadiene	200 U		200	4.64
77-47-4	Hexachlorocyclopentadiene	200 U		200	2.38
67-72-1	Hexachloroethane	200 U		200	2.80
193-39-5	Indeno (1,2,3-cd) Pyrene	200 U		200	4.70
78-59-1	Isophorone	200 U		200	2.08
91-20-3	Naphthalene	200 U		200	3.30
98-95-3	Nitrobenzene	200 U		200	3.84

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB2B**	QC Batch:	90209 -109
Sample #:	**345030**	Anal. Batch:	207828
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	200 U	200	3.95
86-30-6	N-Nitroso-di-Phenylamine	200 U	200	5.70
87-86-5	Pentachlorophenol	390 U	390	5.27
85-01-8	Phenanthrene	200 U	200	2.76
108-95-2	Phenol	200 U	200	4.75
129-00-0	Pyrene	200 U	200	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB2B**	QC Batch:	90209 -109
Sample #:	**345030**	Anal. Batch:	207828
Matrix:	Soil	Percent Solids:	85
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	45	E	B,x
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	24	E	B,x
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	67	E	B,x
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,9-diene-2,8	1000143924 (1000143-92-4)	25	E	NJ,+
Erucylamide	112-84-5	150	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB2C**	QC Batch:	90209 -109
Sample #:	**345031**	Anal. Batch:	207828
Matrix:	Soil	Percent Solids:	86
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	200 U		200	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	200 U		200	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	200 U		200	1.58
95-95-4	2,4,5-Trichlorophenol	200 U		200	4.01
88-06-2	2,4,6-Trichlorophenol	200 U		200	3.14
120-83-2	2,4-Dichlorophenol	200 U		200	4.22
105-67-9	2,4-Dimethylphenol	200 U		200	9.53
51-28-5	2,4-Dinitrophenol	380 U		380	3.84
121-14-2	2,4-Dinitrotoluene	200 U		200	3.78
606-20-2	2,6-Dinitrotoluene	200 U		200	33.2
91-58-7	2-Chloronaphthalene	200 U		200	2.76
95-57-8	2-Chlorophenol	200 U		200	2.41
91-57-6	2-Methylnaphthalene	200 U		200	3.29
95-48-7	2-Methylphenol	200 U		200	5.81
88-74-4	2-Nitroaniline	200 U		200	5.52
88-75-5	2-Nitrophenol	200 U		200	2.04
91-94-1	3,3'-Dichlorobenzidine	200 U		200	80.0
99-09-2	3-Nitroaniline	200 U		200	40.0
534-52-1	4,6-Dinitro-2-Methylphenol	200 U		200	5.41
101-55-3	4-Bromophenyl Phenylether	200 U		200	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**15 J**		200	6.25
106-47-8	4-Chloroaniline	200 U	VJ,c	200	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	200 U		200	3.92
106-44-5	4-Methylphenol	200 U		200	7.64
100-01-6	4-Nitroaniline	200 U		200	8.70
100-02-7	4-Nitrophenol	380 U		380	3.40
83-32-9	Acenaphthene	200 U		200	2.06
208-96-8	Acenaphthylene	200 U		200	1.80
98-86-2	Acetophenone	200 U		200	2.28

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB2C**	QC Batch:	90209 -109
Sample #:	**345031**	Anal. Batch:	207828
Matrix:	Soil	Percent Solids:	86
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	200 U		200	5.54
1912-24-9	Atrazine	200 U		200	8.26
100-52-7	Benzaldehyde	200 U	UJ,c	200	4.86
56-55-3	Benzo (a) Anthracene	200 U		200	16.0
50-32-8	Benzo (a) Pyrene	200 U		200	6.85
205-99-2	Benzo (b) Fluoranthene	200 U		200	11.7
191-24-2	Benzo (g,h,i,) Perylene	200 U		200	10.5
207-08-9	Benzo (k) Fluoranthene	200 U		200	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	200 U		200	3.77
111-44-4	Bis (2-Chloroethyl) Ether	200 U		200	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**41 J**		200	2.48
85-68-7	Butyl Benzyl Phthalate	200 U		200	5.38
105-60-2	Caprolactam	380 U		380	7.66
86-74-8	Carbazole	200 U		200	7.32
218-01-9	Chrysene	200 U		200	12.2
53-70-3	Dibenzo (a,h) Anthracene	200 U		200	7.08
132-64-9	Dibenzofuran	200 U		200	3.79
84-66-2	**Diethylphthalate**	**18 J**	B,z	200	2.28
131-11-3	Dimethylphthalate	200 U		200	3.97
84-74-2	**Di-n-Butylphthalate**	**25 J**		200	4.58
117-84-0	Di-n-Octylphthalate	200 U		200	3.72
206-44-0	Fluoranthene	200 U		200	2.82
86-73-7	Fluorene	200 U		200	2.02
118-74-1	Hexachlorobenzene	200 U		200	3.01
87-68-3	Hexachlorobutadiene	200 U		200	4.64
77-47-4	Hexachlorocyclopentadiene	200 U		200	2.38
67-72-1	Hexachloroethane	200 U		200	2.80
193-39-5	Indeno (1,2,3-cd) Pyrene	200 U		200	4.70
78-59-1	Isophorone	200 U		200	2.08
91-20-3	Naphthalene	200 U		200	3.30
98-95-3	Nitrobenzene	200 U		200	3.84

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB2C**	QC Batch:	90209 -109
Sample #:	**345031**	Anal. Batch:	207828
Matrix:	Soil	Percent Solids:	86
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	200 U	200	3.95
86-30-6	N-Nitroso-di-Phenylamine	200 U	200	5.70
87-86-5	Pentachlorophenol	380 U	380	5.27
85-01-8	Phenanthrene	200 U	200	2.76
108-95-2	Phenol	200 U	200	4.75
129-00-0	Pyrene	200 U	200	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB2C**	QC Batch:	90209 -109
Sample #:	**345031**	Anal. Batch:	207828
Matrix:	Soil	Percent Solids:	86
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	CAS Number	Result (ug/kg dr	Qualifier	
(Z)-9-Octadecenamide	301-02-0	62	E	B,X
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	24	E	B,X
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,9-diene-2,8	1000143924 (1000143-92-4)	30	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB3A**	QC Batch:	90209 -109
Sample #:	**345032**	Anal. Batch:	207828
Matrix:	Soil	Percent Solids:	88
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	190 U		190	2.71
95-94-3	1,2,4,5-Tetrachloro-benzene	190 U		190	31.6
108-60-1	Bis (2-Chloroisopropyl)-Ether	190 U		190	1.45
95-95-4	2,4,5-Trichlorophenol	190 U		190	3.67
88-06-2	2,4,6-Trichlorophenol	190 U		190	2.88
120-83-2	2,4-Dichlorophenol	190 U		190	3.87
105-67-9	2,4-Dimethylphenol	190 U		190	8.73
51-28-5	2,4-Dinitrophenol	380 U		380	3.52
121-14-2	2,4-Dinitrotoluene	190 U		190	3.47
606-20-2	2,6-Dinitrotoluene	190 U		190	30.5
91-58-7	2-Chloronaphthalene	190 U		190	2.53
95-57-8	2-Chlorophenol	190 U		190	2.21
91-57-6	2-Methylnaphthalene	190 U		190	3.01
95-48-7	2-Methylphenol	190 U		190	5.32
88-74-4	2-Nitroaniline	190 U		190	5.06
88-75-5	2-Nitrophenol	190 U		190	1.87
91-94-1	3,3'-Dichlorobenzidine	190 U		190	73.4
99-09-2	3-Nitroaniline	190 U		190	36.6
534-52-1	4,6-Dinitro-2-Methylphenol	190 U		190	4.96
101-55-3	4-Bromophenyl Phenylether	190 U		190	3.72
59-50-7	**4-Chloro-3-Methylphenol**	**12 J**		190	5.73
106-47-8	4-Chloroaniline	190 U	UJ,e	190	1.39
7005-72-3	4-Chlorophenylphenyl-Ether	190 U		190	3.60
106-44-5	4-Methylphenol	190 U		190	7.01
100-01-6	4-Nitroaniline	190 U		190	7.98
100-02-7	4-Nitrophenol	380 U		380	3.11
83-32-9	Acenaphthene	190 U		190	1.89
208-96-8	Acenaphthylene	190 U		190	1.65
98-86-2	Acetophenone	190 U		190	2.09

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB3A**	QC Batch:	90209 -109
Sample #:	**345032**	Anal. Batch:	207828
Matrix:	Soil	Percent Solids:	88
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	190 U		190	5.08
1912-24-9	Atrazine	190 U		190	7.57
100-52-7	Benzaldehyde	190 U	VJ,c	190	4.46
56-55-3	Benzo (a) Anthracene	190 U		190	14.6
50-32-8	Benzo (a) Pyrene	190 U		190	6.28
205-99-2	Benzo (b) Fluoranthene	190 U		190	10.7
191-24-2	Benzo (g,h,i,) Perylene	190 U		190	9.59
207-08-9	Benzo (k) Fluoranthene	190 U		190	14.7
111-91-1	Bis (2-Chloroethoxy)-Methane	190 U		190	3.45
111-44-4	Bis (2-Chloroethyl) Ether	190 U		190	1.90
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**46 J**		190	2.28
85-68-7	Butyl Benzyl Phthalate	190 U		190	4.93
105-60-2	Caprolactam	380 U		380	7.02
86-74-8	Carbazole	190 U		190	6.71
218-01-9	Chrysene	190 U		190	11.2
53-70-3	Dibenzo (a,h) Anthracene	190 U		190	6.49
132-64-9	Dibenzofuran	190 U		190	3.48
84-66-2	**Diethylphthalate**	**18 J**	B,Z	190	2.09
131-11-3	Dimethylphthalate	190 U		190	3.64
84-74-2	**Di-n-Butylphthalate**	**59 J**		190	4.20
117-84-0	Di-n-Octylphthalate	190 U		190	3.41
206-44-0	Fluoranthene	190 U		190	2.59
86-73-7	Fluorene	190 U		190	1.85
118-74-1	Hexachlorobenzene	190 U		190	2.76
87-68-3	Hexachlorobutadiene	190 U		190	4.26
77-47-4	Hexachlorocyclopentadiene	190 U		190	2.18
67-72-1	Hexachloroethane	190 U		190	2.57
193-39-5	Indeno (1,2,3-cd) Pyrene	190 U		190	4.31
78-59-1	Isophorone	190 U		190	1.90
91-20-3	Naphthalene	190 U		190	3.03
98-95-3	Nitrobenzene	190 U		190	3.52

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB3A**	QC Batch:	90209 -109
Sample #:	**345032**	Anal. Batch:	207828
Matrix:	Soil	Percent Solids:	88
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	190 U	190	3.62
86-30-6	N-Nitroso-di-Phenylamine	190 U	190	5.23
87-86-5	Pentachlorophenol	380 U	380	4.83
85-01-8	Phenanthrene	190 U	190	2.53
108-95-2	Phenol	190 U	190	4.36
129-00-0	Pyrene	190 U	190	1.63

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB3A**	QC Batch:	90209 -109
Sample #:	**345032**	Anal. Batch:	207828
Matrix:	Soil	Percent Solids:	88
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	46	E	B,X
1,2-Benzenedicarboxylic acid, butyl 2-methylpropyl ester	17851-53-5	21	E	NJ,+
Tetratetracontane	7098-22-8	27	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB3B**	QC Batch:	90210 -110
Sample #:	**345033**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	200 U		200	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	200 U		200	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	200 U		200	1.58
95-95-4	2,4,5-Trichlorophenol	200 U		200	4.01
88-06-2	2,4,6-Trichlorophenol	200 U		200	3.14
120-83-2	2,4-Dichlorophenol	200 U		200	4.22
105-67-9	2,4-Dimethylphenol	200 U		200	9.53
51-28-5	2,4-Dinitrophenol	390 U		390	3.84
121-14-2	2,4-Dinitrotoluene	200 U		200	3.78
606-20-2	2,6-Dinitrotoluene	200 U		200	33.2
91-58-7	2-Chloronaphthalene	200 U		200	2.76
95-57-8	2-Chlorophenol	200 U		200	2.41
91-57-6	2-Methylnaphthalene	200 U		200	3.29
95-48-7	2-Methylphenol	200 U		200	5.81
88-74-4	2-Nitroaniline	200 U		200	5.52
88-75-5	2-Nitrophenol	200 U		200	2.04
91-94-1	3,3'-Dichlorobenzidine	200 U	UJ,M	200	80.0
99-09-2	3-Nitroaniline	200 U	UJ,M	200	40.0
534-52-1	4,6-Dinitro-2-Methylphenol	200 U		200	5.41
101-55-3	4-Bromophenyl Phenylether	200 U		200	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**14 J**		200	6.25
106-47-8	4-Chloroaniline	200 U	UJ,C	200	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	200 U		200	3.92
106-44-5	4-Methylphenol	200 U		200	7.64
100-01-6	4-Nitroaniline	200 U	UJ,C	200	8.70
100-02-7	4-Nitrophenol	390 U		390	3.40
83-32-9	Acenaphthene	200 U		200	2.06
208-96-8	Acenaphthylene	200 U		200	1.80
98-86-2	Acetophenone	200 U		200	2.28

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB3B**	QC Batch:	90210 -110
Sample #:	**345033**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	200 U		200	5.54
1912-24-9	Atrazine	200 U		200	8.26
100-52-7	Benzaldehyde	200 U	UJ,c	200	4.86
56-55-3	Benzo (a) Anthracene	200 U		200	16.0
50-32-8	Benzo (a) Pyrene	200 U		200	6.85
205-99-2	Benzo (b) Fluoranthene	200 U		200	11.7
191-24-2	Benzo (g,h,i,) Perylene	200 U		200	10.5
207-08-9	Benzo (k) Fluoranthene	200 U		200	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	200 U		200	3.77
111-44-4	Bis (2-Chloroethyl) Ether	200 U		200	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**47 J**		200	2.48
85-68-7	Butyl Benzyl Phthalate	200 U		200	5.38
105-60-2	Caprolactam	390 U	UJ,c	390	7.66
86-74-8	Carbazole	200 U		200	7.32
218-01-9	Chrysene	200 U		200	12.2
53-70-3	Dibenzo (a,h) Anthracene	200 U		200	7.08
132-64-9	Dibenzofuran	200 U		200	3.79
84-66-2	**Diethylphthalate**	**11 J**		200	2.28
131-11-3	Dimethylphthalate	200 U		200	3.97
84-74-2	**Di-n-Butylphthalate**	**23 J**	J,M	200	4.58
117-84-0	**Di-n-Octylphthalate**	**38 J**		200	3.72
206-44-0	Fluoranthene	200 U		200	2.82
86-73-7	Fluorene	200 U		200	2.02
118-74-1	Hexachlorobenzene	200 U		200	3.01
87-68-3	Hexachlorobutadiene	200 U		200	4.64
77-47-4	Hexachlorocyclopentadiene	200 U		200	2.38
67-72-1	Hexachloroethane	200 U		200	2.80
193-39-5	Indeno (1,2,3-cd) Pyrene	200 U		200	4.70
78-59-1	Isophorone	200 U		200	2.08
91-20-3	Naphthalene	200 U		200	3.30
98-95-3	Nitrobenzene	200 U		200	3.84

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB3B**	QC Batch:	90210 -110
Sample #:	**345033**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	200 U	200	3.95
86-30-6	N-Nitroso-di-Phenylamine	200 U	200	5.70
87-86-5	Pentachlorophenol	390 U	390	5.27
85-01-8	Phenanthrene	200 U	200	2.76
108-95-2	Phenol	200 U	200	4.75
129-00-0	Pyrene	200 U	200	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/16/03 JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**37SB3B**	QC Batch:	90210 -110
Sample #:	**345033**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	84
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	120	E	B,X
1,2-Benzenedicarboxylic acid, butyl cyclohexyl ester	84-64-0	26	E	NJ,+
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,9-diene-2,8	1000143924 (1000143-92-4)	26	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/15/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**37SB3C**	QC Batch:	90209 -109
Sample #:	**345034**	Anal. Batch:	207828
Matrix:	Soil	Percent Solids:	93
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	180 U		180	2.71
95-94-3	1,2,4,5-Tetrachloro-benzene	180 U		180	31.6
108-60-1	Bis (2-Chloroisopropyl)-Ether	180 U		180	1.45
95-95-4	2,4,5-Trichlorophenol	180 U		180	3.67
88-06-2	2,4,6-Trichlorophenol	180 U		180	2.88
120-83-2	2,4-Dichlorophenol	180 U		180	3.87
105-67-9	2,4-Dimethylphenol	180 U		180	8.73
51-28-5	2,4-Dinitrophenol	350 U		350	3.52
121-14-2	2,4-Dinitrotoluene	180 U		180	3.47
606-20-2	2,6-Dinitrotoluene	180 U		180	30.5
91-58-7	2-Chloronaphthalene	180 U		180	2.53
95-57-8	2-Chlorophenol	180 U		180	2.21
91-57-6	2-Methylnaphthalene	180 U		180	3.01
95-48-7	2-Methylphenol	180 U		180	5.32
88-74-4	2-Nitroaniline	180 U		180	5.06
88-75-5	2-Nitrophenol	180 U		180	1.87
91-94-1	3,3'-Dichlorobenzidine	180 U		180	73.4
99-09-2	3-Nitroaniline	180 U		180	36.6
534-52-1	4,6-Dinitro-2-Methylphenol	180 U		180	4.96
101-55-3	4-Bromophenyl Phenylether	180 U		180	3.72
59-50-7	**4-Chloro-3-Methylphenol**	**18 J**		180	5.73
106-47-8	4-Chloroaniline	180 U	UJ,c	180	1.39
7005-72-3	4-Chlorophenylphenyl-Ether	180 U		180	3.60
106-44-5	4-Methylphenol	180 U		180	7.01
100-01-6	4-Nitroaniline	180 U		180	7.98
100-02-7	4-Nitrophenol	350 U		350	3.11
83-32-9	Acenaphthene	180 U		180	1.89
208-96-8	Acenaphthylene	180 U		180	1.65
98-86-2	Acetophenone	180 U		180	2.09

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/15/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**37SB3C**	QC Batch:	90209 -109
Sample #:	**345034**	Anal. Batch:	207828
Matrix:	Soil	Percent Solids:	93
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	180 U		180	5.08
1912-24-9	Atrazine	180 U		180	7.57
100-52-7	Benzaldehyde	180 U	VJc	180	4.46
56-55-3	Benzo (a) Anthracene	180 U		180	14.6
50-32-8	Benzo (a) Pyrene	180 U		180	6.28
205-99-2	Benzo (b) Fluoranthene	180 U		180	10.7
191-24-2	Benzo (g,h,i,) Perylene	180 U		180	9.59
207-08-9	Benzo (k) Fluoranthene	180 U		180	14.7
111-91-1	Bis (2-Chloroethoxy)-Methane	180 U		180	3.45
111-44-4	Bis (2-Chloroethyl) Ether	180 U		180	1.90
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**44 J**		180	2.28
85-68-7	Butyl Benzyl Phthalate	180 U		180	4.93
105-60-2	Caprolactam	350 U		350	7.02
86-74-8	Carbazole	180 U		180	6.71
218-01-9	Chrysene	180 U		180	11.2
53-70-3	Dibenzo (a,h) Anthracene	180 U		180	6.49
132-64-9	Dibenzofuran	180 U		180	3.48
84-66-2	**Diethylphthalate**	**17 J**	Bz	180	2.09
131-11-3	Dimethylphthalate	180 U		180	3.64
84-74-2	**Di-n-Butylphthalate**	**20 J**		180	4.20
117-84-0	Di-n-Octylphthalate	180 U		180	3.41
206-44-0	Fluoranthene	180 U		180	2.59
86-73-7	Fluorene	180 U		180	1.85
118-74-1	Hexachlorobenzene	180 U		180	2.76
87-68-3	Hexachlorobutadiene	180 U		180	4.26
77-47-4	Hexachlorocyclopentadiene	180 U		180	2.18
67-72-1	Hexachloroethane	180 U		180	2.57
193-39-5	Indeno (1,2,3-cd) Pyrene	180 U		180	4.31
78-59-1	Isophorone	180 U		180	1.90
91-20-3	Naphthalene	180 U		180	3.03
98-95-3	Nitrobenzene	180 U		180	3.52

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB3C**	QC Batch:	90209 -109
Sample #:	**345034**	Anal. Batch:	207828
Matrix:	Soil	Percent Solids:	93
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	180 U	180	3.62
86-30-6	N-Nitroso-di-Phenylamine	180 U	180	5.23
87-86-5	Pentachlorophenol	350 U	350	4.83
85-01-8	Phenanthrene	180 U	180	2.53
108-95-2	Phenol	180 U	180	4.36
129-00-0	Pyrene	180 U	180	1.63

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB3C**	QC Batch:	90209 -109
Sample #:	**345034**	Anal. Batch:	207828
Matrix:	Soil	Percent Solids:	93
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	110	E	B,x
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	26	E	B,x
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	72	E	B,x
Erucylamide	112-84-5	450	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**QSB1A**	QC Batch:	90209 -109
Sample #:	**345035**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	81
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	210 U		210	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	210 U		210	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	210 U		210	1.58
95-95-4	2,4,5-Trichlorophenol	210 U		210	4.01
88-06-2	2,4,6-Trichlorophenol	270 U		270	3.14
120-83-2	2,4-Dichlorophenol	210 U		210	4.22
105-67-9	2,4-Dimethylphenol	210 U		210	9.53
51-28-5	2,4-Dinitrophenol	410 U		410	3.84
121-14-2	**2,4-Dinitrotoluene**	**77 J**		210	3.78
606-20-2	2,6-Dinitrotoluene	210 U		210	33.2
91-58-7	2-Chloronaphthalene	210 U		210	2.76
95-57-8	2-Chlorophenol	210 U		210	2.41
91-57-6	2-Methylnaphthalene	210 U		210	3.29
95-48-7	2-Methylphenol	210 U		210	5.81
88-74-4	2-Nitroaniline	270 U		270	5.52
88-75-5	2-Nitrophenol	210 U		210	2.04
91-94-1	3,3'-Dichlorobenzidine	210 U		210	80.0
99-09-2	3-Nitroaniline	210 U		210	40.0
534-52-1	4,6-Dinitro-2-Methylphenol	210 U		210	5.41
101-55-3	4-Bromophenyl Phenylether	210 U		210	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**18 J**		210	6.25
106-47-8	4-Chloroaniline	210 U	UJ,c	210	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	210 U		210	3.92
106-44-5	4-Methylphenol	210 U		210	7.64
100-01-6	4-Nitroaniline	210 U	UJ,c	210	8.70
100-02-7	4-Nitrophenol	410 U		410	3.40
83-32-9	Acenaphthene	210 U		210	2.06
208-96-8	Acenaphthylene	210 U		210	1.80
98-86-2	Acetophenone	210 U		210	2.28

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**QSB1A**	QC Batch:	90209 -109
Sample #:	**345035**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	81
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	210 U		210	5.54
1912-24-9	Atrazine	210 U		210	8.26
100-52-7	Benzaldehyde	210 U	UJ,c	210	4.86
56-55-3	Benzo (a) Anthracene	210 U		210	16.0
~~50-32-8~~	~~*Benzo (a) Pyrene~~	~~210 UR~~	R,i	~~210~~	~~6.85~~
~~205-99-2~~	~~*Benzo (b) Fluoranthene~~	~~210 UR~~	R,i	~~210~~	~~11.7~~
~~191-24-2~~	~~*Benzo (g,h,i,) Perylene~~	~~210 UR~~	R,i	~~210~~	~~10.5~~
~~207-08-9~~	~~*Benzo (k) Fluoranthene~~	~~210 UR~~	R,i	~~210~~	~~16.1~~
111-91-1	Bis (2-Chloroethoxy)-Methane	210 U		210	3.77
111-44-4	Bis (2-Chloroethyl) Ether	210 U		210	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**86 J**		210	2.48
85-68-7	Butyl Benzyl Phthalate	210 U		210	5.38
105-60-2	Caprolactam	410 U	UJ,c	410	7.66
86-74-8	Carbazole	210 U		210	7.32
218-01-9	Chrysene	210 U		210	12.2
~~53-70-3~~	~~*Dibenzo (a,h) Anthracene~~	~~210 UR~~	R,i	~~210~~	~~7.08~~
132-64-9	Dibenzofuran	210 U		210	3.79
84-66-2	**Diethylphthalate**	**21 J**	B,z	210	2.28
131-11-3	Dimethylphthalate	210 U		210	3.97
84-74-2	**Di-n-Butylphthalate**	**1100**		210	4.58
117-84-0	Di-n-Octylphthalate	210 U		210	3.72
206-44-0	**Fluoranthene**	**4.0 J**		210	2.82
86-73-7	Fluorene	210 U		210	2.02
118-74-1	Hexachlorobenzene	210 U		210	3.01
87-68-3	Hexachlorobutadiene	210 U		210	4.64
77-47-4	Hexachlorocyclopentadiene	210 U		210	2.38
67-72-1	Hexachloroethane	210 U		210	2.80
~~193-39-5~~	~~*Indeno (1,2,3-cd) Pyrene~~	~~210 UR~~	R,i	~~210~~	~~4.70~~
78-59-1	Isophorone	210 U		210	2.08
91-20-3	Naphthalene	210 U		210	3.30
98-95-3	Nitrobenzene	210 U		210	3.84

* See attached Statement of Data Qualifications.

* See dilution for these results, AB 12/10/03

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**QSB1A**	QC Batch:	90209 -109
Sample #:	**345035**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	81
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	210 U	210	3.95
86-30-6	**N-Nitroso-di-Phenylamine**	**21 J**	210	5.70
87-86-5	Pentachlorophenol	410 U	410	5.27
85-01-8	Phenanthrene	210 U	210	2.76
108-95-2	Phenol	210 U	210	4.75
129-00-0	**Pyrene**	**2.0 J**	210	1.78

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**QSB1A**	QC Batch:	90209 -109
Sample #:	**345035**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	81
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	32	E	B,X
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,9-diene-2,8	1000143924 (1000143-42-4)	24	E	NJ+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 00:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/16/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**QSB1A**	QC Batch:	90208 -109
Sample #:	**345035DL**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	81
Unit:	ug/kg dry	Dilution Factor:	6.2

Do not use. See neat analysis JS 12/15/03

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	1000 U		1000	15.3
95-94-3	1,2,4,5-Tetrachloro-benzene	1000 U		1000	178
108-60-1	Bis (2-Chloroisopropyl)-Ether	1000 U		1000	8.18
95-95-4	2,4,5-Trichlorophenol	1000 U		1000	20.7
88-06-2	2,4,6-Trichlorophenol	1000 U		1000	16.2
120-83-2	2,4-Dichlorophenol	1000 U		1000	21.8
105-67-9	2,4-Dimethylphenol	1000 U		1000	49.2
51-28-5	2,4-Dinitrophenol	2100 U		2100	19.8
121-14-2	2,4-Dinitrotoluene	1000 U		1000	19.5
606-20-2	2,6-Dinitrotoluene	1000 U		1000	172
91-58-7	2-Chloronaphthalene	1000 U		1000	14.3
95-57-8	2-Chlorophenol	1000 U		1000	12.5
91-57-6	2-Methylnaphthalene	1000 U		1000	17.0
95-48-7	2-Methylphenol	1000 U		1000	30.0
88-74-4	2-Nitroaniline	1000 U		1000	28.5
88-75-5	2-Nitrophenol	1000 U		1000	10.5
91-94-1	3,3'-Dichlorobenzidine	1000 U		1000	414
99-09-2	3-Nitroaniline	1000 U		1000	206
534-52-1	4,6-Dinitro-2-Methylphenol	1000 U		1000	28.0
101-55-3	4-Bromophenyl Phenylether	1000 U		1000	21.0
59-50-7	4-Chloro-3-Methylphenol	1000 U		1000	32.3
106-47-8	4-Chloroaniline	1000 U	UJ,c	1000	7.81
7005-72-3	4-Chlorophenylphenyl-Ether	1000 U		1000	20.3
106-44-5	4-Methylphenol	1000 U		1000	39.5
100-01-6	4-Nitroaniline	1000 U	UJ,c	1000	45.0
100-02-7	4-Nitrophenol	2100 U		2100	17.5
83-32-9	Acenaphthene	1000 U		1000	10.7
208-96-8	Acenaphthylene	1000 U		1000	9.30
98-86-2	Acetophenone	1000 U		1000	11.8

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/16/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**QSB1A**	QC Batch:	90209 -109
Sample #:	**345035DL**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	81
Unit:	ug/kg dry	Dilution Factor:	6.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	1000 U		1000	28.6
1912-24-9	Atrazine	1000 U		1000	42.7
100-52-7	Benzaldehyde	1000 U	UJ,c	1000	25.1
56-55-3	Benzo (a) Anthracene	1000 U		1000	82.5
50-32-8	Benzo (a) Pyrene	1000 U		1000	35.4
205-99-2	Benzo (b) Fluoranthene	1000 U		1000	60.5
191-24-2	Benzo (g,h,i,) Perylene	1000 U		1000	54.1
207-08-9	Benzo (k) Fluoranthene	1000 U		1000	83.1
111-91-1	Bis (2-Chloroethoxy)-Methane	1000 U		1000	19.5
111-44-4	Bis (2-Chloroethyl) Ether	1000 U		1000	10.7
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**160 J**		1000	12.8
85-68-7	Butyl Benzyl Phthalate	1000 U		1000	27.8
105-60-2	Caprolactam	2100 U	UJ,c	2100	39.6
86-74-8	Carbazole	1000 U		1000	37.8
218-01-9	Chrysene	1000 U		1000	63.2
53-70-3	Dibenzo (a,h) Anthracene	1000 U		1000	36.6
132-64-9	Dibenzofuran	1000 U		1000	19.6
84-66-2	Diethylphthalate	1000 U		1000	11.8
131-11-3	Dimethylphthalate	1000 U		1000	20.5
84-74-2	**Di-n-Butylphthalate**	**330 J**		1000	23.7
117-84-0	Di-n-Octylphthalate	1000 U		1000	19.2
206-44-0	Fluoranthene	1000 U		1000	14.6
86-73-7	Fluorene	1000 U		1000	10.4
118-74-1	Hexachlorobenzene	1000 U		1000	15.6
87-68-3	Hexachlorobutadiene	1000 U		1000	24.0
77-47-4	Hexachlorocyclopentadiene	1000 U		1000	12.3
67-72-1	Hexachloroethane	1000 U		1000	14.5
193-39-5	Indeno (1,2,3-cd) Pyrene	1000 U		1000	24.3
78-59-1	Isophorone	1000 U		1000	10.7
91-20-3	Naphthalene	1000 U		1000	17.1
98-95-3	Nitrobenzene	1000 U		1000	19.8

* Use only these results, * 12/15/03

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 08:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**QSB1A**	QC Batch:	90209 -109
Sample #:	**345035DL**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	81
Unit:	ug/kg dry	Dilution Factor:	6.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	1000 U	1000	20.4
86-30-6	N-Nitroso-di-Phenylamine	1000 U	1000	29.5
87-86-5	Pentachlorophenol	2100 U	2100	27.2
85-01-8	Phenanthrene	1000 U	1000	14.3
108-95-2	Phenol	1000 U	1000	24.6
129-00-0	Pyrene	1000 U	1000	9.18

Do not use
See neat analysis
12/15/03

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD3**	QC Batch:	90209 -109
Sample #:	**345036**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	230 U		230	3.44
95-94-3	1,2,4,5-Tetrachloro-benzene	230 U		230	40.2
108-60-1	Bis (2-Chloroisopropyl)-Ether	230 U		230	1.85
95-95-4	2,4,5-Trichlorophenol	230 U	UL,S	230	4.68
88-06-2	2,4,6-Trichlorophenol	230 U	UL,S	230	3.67
120-83-2	2,4-Dichlorophenol	230 U	UL,S	230	4.93
105-67-9	2,4-Dimethylphenol	230 U	UL,S	230	11.1
51-28-5	2,4-Dinitrophenol	440 U	UL,S	440	4.48
121-14-2	**2,4-Dinitrotoluene**	**120 J**		230	4.41
606-20-2	2,6-Dinitrotoluene	230 U		230	38.8
91-58-7	2-Chloronaphthalene	230 U		230	3.22
95-57-8	2-Chlorophenol	230 U	UL,S	230	2.81
91-57-6	2-Methylnaphthalene	230 U		230	3.84
95-48-7	2-Methylphenol	230 U	UL,S	230	6.78
88-74-4	2-Nitroaniline	230 U		230	6.44
88-75-5	2-Nitrophenol	230 U	UL,S	230	2.38
91-94-1	3,3'-Dichlorobenzidine	230 U		230	93.4
99-09-2	3-Nitroaniline	230 U		230	46.6
534-52-1	4,6-Dinitro-2-Methylphenol	230 U	UL,S	230	6.31
101-55-3	4-Bromophenyl Phenylether	230 U		230	4.73
59-50-7	4-Chloro-3-Methylphenol	230 U	UL,S	230	7.29
106-47-8	4-Chloroaniline	230 U	UJ,C	230	1.76
7005-72-3	4-Chlorophenylphenyl-Ether	230 U		230	4.58
106-44-5	4-Methylphenol	230 U	UL,S	230	8.92
100-01-6	4-Nitroaniline	230 U	UJ,C	230	10.2
100-02-7	4-Nitrophenol	440 U	UL,S	440	3.96
83-32-9	Acenaphthene	230 U		230	2.41
208-96-8	Acenaphthylene	230 U		230	2.10
98-86-2	Acetophenone	230 U		230	2.66

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD3**	QC Batch:	90209 -109
Sample #:	**345036**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.4

	CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
	120-12-7	Anthracene	230 U		230	6.47
	1912-24-9	Atrazine	230 U		230	9.63
	100-52-7	Benzaldehyde	230 U	UJ,c	230	5.67
	56-55-3	Benzo (a) Anthracene	230 U		230	18.6
★	~~50-32-8~~	~~*Benzo (a) Pyrene~~	~~230 UR~~	R,i	~~230~~	~~7.99~~
★	~~205-99-2~~	~~*Benzo (b) Fluoranthene~~	~~230 UR~~	R,i	~~230~~	~~13.7~~
★	~~191-24-2~~	~~*Benzo (g,h,i,) Perylene~~	~~230 UR~~	R,i	~~230~~	~~12.2~~
★	~~207-08-9~~	~~*Benzo (k) Fluoranthene~~	~~230 UR~~	R,i	~~230~~	~~18.8~~
	111-91-1	Bis (2-Chloroethoxy)-Methane	230 U		230	4.40
	111-44-4	Bis (2-Chloroethyl) Ether	230 U		230	2.42
	117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**160 J**		230	2.90
	85-68-7	Butyl Benzyl Phthalate	230 U		230	6.27
	105-60-2	Caprolactam	440 U	UJ,c	440	8.93
	86-74-8	Carbazole	230 U		230	8.54
	218-01-9	Chrysene	230 U		230	14.3
★	~~53-70-3~~	~~*Dibenzo (a,h) Anthracene~~	~~230 UR~~	R,i	~~230~~	~~8.26~~
	132-64-9	Dibenzofuran	230 U		230	4.42
	84-66-2	**Diethylphthalate**	**16 J**	B,Z	230	2.66
	131-11-3	Dimethylphthalate	230 U		230	4.63
	84-74-2	**Di-n-Butylphthalate**	**1800**		230	5.35
	117-84-0	Di-n-Octylphthalate	230 U		230	4.34
	206-44-0	Fluoranthene	230 U		230	3.29
	86-73-7	Fluorene	230 U		230	2.35
	118-74-1	Hexachlorobenzene	230 U		230	3.51
	87-68-3	Hexachlorobutadiene	230 U		230	5.42
	77-47-4	Hexachlorocyclopentadiene	230 U		230	2.77
	67-72-1	Hexachloroethane	230 U		230	3.27
★	~~193-39-5~~	~~*Indeno (1,2,3-cd) Pyrene~~	~~230 UR~~	R,i	~~230~~	~~5.49~~
	78-59-1	Isophorone	230 U		230	2.42
	91-20-3	Naphthalene	230 U		230	3.85
	98-95-3	Nitrobenzene	230 U		230	4.48

* See attached Statement of Data Qualifications.

★ See dilution analysis for these results, AS 12/15/03

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD3**	QC Batch:	90209 -109
Sample #:	**345036**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	230 U		230	4.61
86-30-6	**N-Nitroso-di-Phenylamine**	**16 J**		230	6.65
87-86-5	Pentachlorophenol	440 U	UL,S	440	6.15
85-01-8	Phenanthrene	230 U		230	3.22
108-95-2	Phenol	230 U	UL,S	230	5.54
129-00-0	**Pyrene**	**3.0 J**		230	2.07

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD3**	QC Batch:	90209 -109
Sample #:	**345036**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	74
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	27	E	B,X
2 (5H)-Furanone	497-23-4	63	E	NJ,T
2-Fluoro-4-nitrophenol	403-19-0	25	E	NJ,T
2-Pentadecanone, 6,10,14-trimethyl-	502-69-2	40	E	NJ,T
Heneicosane	629-94-7	30	E	B,X
Hentriacontane	630-04-6	220	E	NJ,T

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 00:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/16/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**SBD3**	QC Batch:	90209 -109
Sample #:	**345036DL**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	6.8

Do not use
See neat analysis
12/15/03

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	1200 U		1200	16.7
95-94-3	1,2,4,5-Tetrachloro-benzene	1200 U		1200	195
108-60-1	Bis (2-Chloroisopropyl)-Ether	1200 U		1200	8.98
95-95-4	2,4,5-Trichlorophenol	1200 U		1200	22.7
88-06-2	2,4,6-Trichlorophenol	1200 U		1200	17.8
120-83-2	2,4-Dichlorophenol	1200 U		1200	23.9
105-67-9	2,4-Dimethylphenol	1200 U		1200	54.0
51-28-5	2,4-Dinitrophenol	2300 U		2300	21.8
121-14-2	2,4-Dinitrotoluene	1200 U		1200	21.4
606-20-2	2,6-Dinitrotoluene	1200 U		1200	188
91-58-7	2-Chloronaphthalene	1200 U		1200	15.6
95-57-8	2-Chlorophenol	1200 U		1200	13.7
91-57-6	2-Methylnaphthalene	1200 U		1200	18.6
95-48-7	2-Methylphenol	1200 U		1200	32.9
88-74-4	2-Nitroaniline	1200 U		1200	31.3
88-75-5	2-Nitrophenol	1200 U		1200	11.6
91-94-1	3,3'-Dichlorobenzidine	1200 U		1200	454
99-09-2	3-Nitroaniline	1200 U		1200	226
534-52-1	4,6-Dinitro-2-Methylphenol	1200 U		1200	30.7
101-55-3	4-Bromophenyl Phenylether	1200 U		1200	23.0
59-50-7	4-Chloro-3-Methylphenol	1200 U		1200	35.4
106-47-8	4-Chloroaniline	1200 U	UJ,C	1200	8.57
7005-72-3	4-Chlorophenylphenyl-Ether	1200 U		1200	22.2
106-44-5	4-Methylphenol	1200 U		1200	43.3
100-01-6	4-Nitroaniline	1200 U	UJ,C	1200	49.3
100-02-7	4-Nitrophenol	2300 U		2300	19.2
83-32-9	Acenaphthene	1200 U		1200	11.7
208-96-8	Acenaphthylene	1200 U		1200	10.2
98-86-2	Acetophenone	1200 U		1200	12.9

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD3**	QC Batch:	90209 -109
Sample #:	**345036DL**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	6.8

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	1200 U		1200	31.4
1912-24-9	Atrazine	1200 U		1200	46.8
100-52-7	Benzaldehyde	1200 U	UJ,c	1200	27.5
56-55-3	Benzo (a) Anthracene	1200 U		1200	90.4
50-32-8	Benzo (a) Pyrene	1200 U	UJ,i	1200	38.8
205-99-2	Benzo (b) Fluoranthene	1200 U	UJ,i	1200	66.4
191-24-2	Benzo (g,h,i,) Perylene	1200 U	UJ,i	1200	59.3
207-08-9	Benzo (k) Fluoranthene	1200 U	UJ,i	1200	91.1
111-91-1	Bis (2-Chloroethoxy)-Methane	1200 U		1200	21.4
111-44-4	Bis (2-Chloroethyl) Ether	1200 U		1200	11.8
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**270 J**		1200	14.1
85-68-7	Butyl Benzyl Phthalate	1200 U		1200	30.5
105-60-2	Caprolactam	2300 U	UJ,c	2300	43.4
86-74-8	Carbazole	1200 U		1200	41.5
218-01-9	Chrysene	1200 U		1200	69.4
53-70-3	Dibenzo (a,h) Anthracene	1200 U	UJ,i	1200	40.1
132-64-9	Dibenzofuran	1200 U		1200	21.5
84-66-2	**Diethylphthalate**	**40 J**	B,z	1200	12.9
131-11-3	Dimethylphthalate	1200 U		1200	22.5
84-74-2	**Di-n-Butylphthalate**	**2000**		1200	26.0
117-84-0	Di-n-Octylphthalate	1200 U		1200	21.1
206-44-0	Fluoranthene	1200 U		1200	16.0
86-73-7	Fluorene	1200 U		1200	11.4
118-74-1	Hexachlorobenzene	1200 U		1200	17.1
87-68-3	Hexachlorobutadiene	1200 U		1200	26.3
77-47-4	Hexachlorocyclopentadiene	1200 U		1200	13.5
67-72-1	Hexachloroethane	1200 U		1200	15.9
193-39-5	Indeno (1,2,3-cd) Pyrene	1200 U	UJ,i	1200	26.7
78-59-1	Isophorone	1200 U		1200	11.8
91-20-3	Naphthalene	1200 U		1200	18.7
98-95-3	Nitrobenzene	1200 U		1200	21.8

* Use only these results, * 12/15/03

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD3**	QC Batch:	90209 -109
Sample #:	**345036DL**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	6.8

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	1200 U	1200	22.4
86-30-6	N-Nitroso-di-Phenylamine	1200 U	1200	32.3
87-86-5	Pentachlorophenol	2300 U	2300	29.9
85-01-8	Phenanthrene	1200 U	1200	15.6
108-95-2	Phenol	1200 U	1200	26.9
129-00-0	Pyrene	1200 U	1200	10.1

Do not use
See next analysis
12/15/03

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**QSB1B**	QC Batch:	90209 -109
Sample #:	**345037**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	200 U		200	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	200 U		200	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	200 U		200	1.58
95-95-4	2,4,5-Trichlorophenol	200 U		200	4.01
88-06-2	2,4,6-Trichlorophenol	200 U		200	3.14
120-83-2	2,4-Dichlorophenol	200 U		200	4.22
105-67-9	2,4-Dimethylphenol	200 U		200	9.53
51-28-5	2,4-Dinitrophenol	390 U		390	3.84
121-14-2	2,4-Dinitrotoluene	200 U		200	3.78
606-20-2	2,6-Dinitrotoluene	200 U		200	33.2
91-58-7	2-Chloronaphthalene	200 U		200	2.76
95-57-8	2-Chlorophenol	200 U		200	2.41
91-57-6	2-Methylnaphthalene	200 U		200	3.29
95-48-7	2-Methylphenol	200 U		200	5.81
88-74-4	2-Nitroaniline	200 U		200	5.52
88-75-5	2-Nitrophenol	200 U		200	2.04
91-94-1	3,3'-Dichlorobenzidine	200 U		200	80.0
99-09-2	3-Nitroaniline	200 U		200	40.0
534-52-1	4,6-Dinitro-2-Methylphenol	200 U		200	5.41
101-55-3	4-Bromophenyl Phenylether	200 U		200	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**29 J**		200	6.25
106-47-8	4-Chloroaniline	200 U	UJc	200	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	200 U		200	3.92
106-44-5	4-Methylphenol	200 U		200	7.64
100-01-6	4-Nitroaniline	200 U	UJc	200	8.70
100-02-7	4-Nitrophenol	390 U		390	3.40
83-32-9	Acenaphthene	200 U		200	2.06
208-96-8	Acenaphthylene	200 U		200	1.80
98-86-2	Acetophenone	200 U		200	2.28

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/15/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**QSB1B**	QC Batch:	90209 -109
Sample #:	**345037**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	200 U		200	5.54
1912-24-9	Atrazine	200 U		200	8.26
100-52-7	Benzaldehyde	200 U	UJ,c	200	4.86
56-55-3	Benzo (a) Anthracene	200 U		200	16.0
50-32-8	Benzo (a) Pyrene	200 U		200	6.85
205-99-2	Benzo (b) Fluoranthene	200 U		200	11.7
191-24-2	Benzo (g,h,i,) Perylene	200 U		200	10.5
207-08-9	Benzo (k) Fluoranthene	200 U		200	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	200 U		200	3.77
111-44-4	Bis (2-Chloroethyl) Ether	200 U		200	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**49 J**		200	2.48
85-68-7	Butyl Benzyl Phthalate	200 U		200	5.38
105-60-2	Caprolactam	390 U	UJ,c	390	7.66
86-74-8	Carbazole	200 U		200	7.32
218-01-9	Chrysene	200 U		200	12.2
53-70-3	Dibenzo (a,h) Anthracene	200 U		200	7.08
132-64-9	Dibenzofuran	200 U		200	3.79
84-66-2	**Diethylphthalate**	**18 J**	B,Z	200	2.28
131-11-3	Dimethylphthalate	200 U		200	3.97
84-74-2	**Di-n-Butylphthalate**	**38 J**		200	4.58
117-84-0	Di-n-Octylphthalate	200 U		200	3.72
206-44-0	Fluoranthene	200 U		200	2.82
86-73-7	Fluorene	200 U		200	2.02
118-74-1	Hexachlorobenzene	200 U		200	3.01
87-68-3	Hexachlorobutadiene	200 U		200	4.64
77-47-4	Hexachlorocyclopentadiene	200 U		200	2.38
67-72-1	Hexachloroethane	200 U		200	2.80
193-39-5	Indeno (1,2,3-cd) Pyrene	200 U		200	4.70
78-59-1	Isophorone	200 U		200	2.08
91-20-3	Naphthalene	200 U		200	3.30
98-95-3	Nitrobenzene	200 U		200	3.84

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**QSB1B**	QC Batch:	90209 -109
Sample #:	**345037**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	200 U	200	3.95
86-30-6	N-Nitroso-di-Phenylamine	200 U	200	5.70
87-86-5	Pentachlorophenol	390 U	390	5.27
85-01-8	Phenanthrene	200 U	200	2.76
108-95-2	Phenol	200 U	200	4.75
129-00-0	Pyrene	200 U	200	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/15/03 JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**QSB1B**	QC Batch:	90209 -109
Sample #:	**345037**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	84
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	120	E	B,x
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	51	E	B,x
2-Ethyl-1-Hexanol	104-76-7	27	E	NJ,+
3-Hexene-2,5-dione	4436-75-3	210	E	NJ,+
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,9-diene-2,8	1000143924 (1000143-92-4)	42	E	NJ,+
Eicosane	112-95-8	27	E	B,x
Erucylamide	112-84-5	540	E	NJ,+
Hexatriacontane	630-06-8	42	E	NJ,+
Nonadecane, 9-methyl-	13287-24-6	23	E	NJ,+
Octacosane	630-02-4	36	E	NJ,+
Octadecane, 3-ethyl-5-(2-ethylbutyl)-	55282-12-7	29	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**QSB1C**	QC Batch:	90209 -109
Sample #:	**345038**	Anal. Batch:	208293
Matrix:	Soil	Percent Solids:	93
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	180 U		180	2.71
95-94-3	1,2,4,5-Tetrachloro-benzene	180 U		180	31.6
108-60-1	Bis (2-Chloroisopropyl)-Ether	180 U		180	1.45
95-95-4	2,4,5-Trichlorophenol	180 U		180	3.67
88-06-2	2,4,6-Trichlorophenol	180 U		180	2.88
120-83-2	2,4-Dichlorophenol	180 U		180	3.87
105-67-9	2,4-Dimethylphenol	180 U		180	8.73
51-28-5	2,4-Dinitrophenol	350 U		350	3.52
121-14-2	2,4-Dinitrotoluene	180 U		180	3.47
606-20-2	2,6-Dinitrotoluene	180 U		180	30.5
91-58-7	2-Chloronaphthalene	180 U		180	2.53
95-57-8	2-Chlorophenol	180 U		180	2.21
91-57-6	2-Methylnaphthalene	180 U		180	3.01
95-48-7	2-Methylphenol	180 U		180	5.32
88-74-4	2-Nitroaniline	180 U		180	5.06
88-75-5	2-Nitrophenol	180 U		180	1.87
91-94-1	3,3'-Dichlorobenzidine	180 U		180	73.4
99-09-2	3-Nitroaniline	180 U		180	36.6
534-52-1	4,6-Dinitro-2-Methylphenol	180 U		180	4.96
101-55-3	4-Bromophenyl Phenylether	180 U		180	3.72
59-50-7	**4-Chloro-3-Methylphenol**	**12 J**		180	5.73
106-47-8	4-Chloroaniline	180 U	UJ,c	180	1.39
7005-72-3	4-Chlorophenylphenyl-Ether	180 U		180	3.60
106-44-5	4-Methylphenol	180 U		180	7.01
100-01-6	4-Nitroaniline	180 U	UJ,c	180	7.98
100-02-7	4-Nitrophenol	350 U		350	3.11
83-32-9	Acenaphthene	180 U		180	1.89
208-96-8	Acenaphthylene	180 U		180	1.65
98-86-2	Acetophenone	180 U		180	2.09

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/16/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**QSB1C**	QC Batch:	90209 -109
Sample #:	**345038**	Anal. Batch:	208293
Matrix:	Soil	Percent Solids:	93
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	180 U		180	5.08
1912-24-9	Atrazine	180 U		180	7.57
100-52-7	Benzaldehyde	180 U	UJ,c	180	4.46
56-55-3	Benzo (a) Anthracene	180 U		180	14.6
50-32-8	Benzo (a) Pyrene	180 U		180	6.28
205-99-2	Benzo (b) Fluoranthene	180 U		180	10.7
191-24-2	Benzo (g,h,i,) Perylene	180 U		180	9.59
207-08-9	Benzo (k) Fluoranthene	180 U		180	14.7
111-91-1	Bis (2-Chloroethoxy)-Methane	180 U		180	3.45
111-44-4	Bis (2-Chloroethyl) Ether	180 U		180	1.90
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**42 J**		180	2.28
85-68-7	Butyl Benzyl Phthalate	180 U		180	4.93
105-60-2	Caprolactam	350 U	UJ,c	350	7.02
86-74-8	Carbazole	180 U		180	6.71
218-01-9	Chrysene	180 U		180	11.2
53-70-3	Dibenzo (a,h) Anthracene	180 U		180	6.49
132-64-9	Dibenzofuran	180 U		180	3.48
84-66-2	**Diethylphthalate**	**13 J**	B,z	180	2.09
131-11-3	Dimethylphthalate	180 U		180	3.64
84-74-2	**Di-n-Butylphthalate**	**31 J**		180	4.20
117-84-0	Di-n-Octylphthalate	180 U		180	3.41
206-44-0	Fluoranthene	180 U		180	2.59
86-73-7	Fluorene	180 U		180	1.85
118-74-1	Hexachlorobenzene	180 U		180	2.76
87-68-3	Hexachlorobutadiene	180 U		180	4.26
77-47-4	Hexachlorocyclopentadiene	180 U		180	2.18
67-72-1	Hexachloroethane	180 U		180	2.57
193-39-5	Indeno (1,2,3-cd) Pyrene	180 U		180	4.31
78-59-1	Isophorone	180 U		180	1.90
91-20-3	Naphthalene	180 U		180	3.03
98-95-3	Nitrobenzene	180 U		180	3.52

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**QSB1C**	QC Batch:	90209 -109
Sample #:	**345038**	Anal. Batch:	208293
Matrix:	Soil	Percent Solids:	93
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	180 U	180	3.62
86-30-6	N-Nitroso-di-Phenylamine	180 U	180	5.23
87-86-5	Pentachlorophenol	350 U	350	4.83
85-01-8	Phenanthrene	180 U	180	2.53
108-95-2	Phenol	180 U	180	4.36
129-00-0	Pyrene	180 U	180	1.63

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/16/03 JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**QSB1C**	QC Batch:	90209 -109
Sample #:	**345038**	Anal. Batch:	208293
Matrix:	Soil	Percent Solids:	93
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	80	E	B,x
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	30	E	B,x
2,6,10,14,18,22-Tetracosahexaene,2,6,10,15,19,23-h	111-02-4	55	E	NJ,+
2-Ethyl-1-Hexanol	104-76-7	21	E	NJ,+
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,9-diene-2,8	1000143924 (1000143-92-4)	26	E	NJ,+
Eicosane	112-95-8	29	E	B,x
Erucylamide	112-84-5	380	E	NJ,+
Heneicosane	629-94-7	39	E	B,x
Heptacosane	593-49-7	31	E	NJ,+
Nonadecane, 9-methyl-	13287-24-6	45	E	NJ,+
Octacosane	630-02-4	42	E	NJ,+
Tetratriacontane	14167-59-0	34	E	B,x

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 14:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/16/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**QSB3A**	QC Batch:	90209 -109
Sample #:	**345039**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U		220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U		220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U		220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U		220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U		220	3.41
120-83-2	2,4-Dichlorophenol	220 U		220	4.58
105-67-9	2,4-Dimethylphenol	220 U		220	10.3
51-28-5	2,4-Dinitrophenol	420 U		420	4.16
121-14-2	**2,4-Dinitrotoluene**	**120 J**		220	4.10
606-20-2	2,6-Dinitrotoluene	220 U		220	36.0
91-58-7	2-Chloronaphthalene	220 U		220	2.99
95-57-8	2-Chlorophenol	220 U		220	2.61
91-57-6	2-Methylnaphthalene	220 U		220	3.56
95-48-7	2-Methylphenol	220 U		220	6.29
88-74-4	2-Nitroaniline	220 U		220	5.98
88-75-5	2-Nitrophenol	220 U		220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U		220	86.7
99-09-2	3-Nitroaniline	220 U		220	43.3
534-52-1	4,6-Dinitro-2-Methylphenol	220 U		220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U		220	4.39
59-50-7	4-Chloro-3-Methylphenol	220 U		220	6.77
106-47-8	4-Chloroaniline	220 U	UJ,c	220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U		220	4.25
106-44-5	4-Methylphenol	220 U		220	8.28
100-01-6	4-Nitroaniline	220 U	UJ,c	220	9.43
100-02-7	4-Nitrophenol	420 U		420	3.68
83-32-9	Acenaphthene	220 U		220	2.24
208-96-8	Acenaphthylene	220 U		220	1.95
98-86-2	Acetophenone	220 U		220	2.47

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 14:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/16/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**QSB3A**	QC Batch:	90209 -109
Sample #:	**345039**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	220 U		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U	UJ,C	220	5.27
56-55-3	Benzo (a) Anthracene	220 U		220	17.3
~~50-32-8~~	~~*Benzo (a) Pyrene~~	~~220 UR~~	~~R,1~~	~~220~~	~~7.42~~
~~205-99-2~~	~~*Benzo (b) Fluoranthene~~	~~220 UR~~	~~R,1~~	~~220~~	~~12.7~~
~~191-24-2~~	~~*Benzo (g,h,i,) Perylene~~	~~220 UR~~	~~R,1~~	~~220~~	~~11.3~~
~~207-08-9~~	~~*Benzo (k) Fluoranthene~~	~~220 UR~~	~~R,1~~	~~220~~	~~17.4~~
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**290**		220	2.69
85-68-7	**Butyl Benzyl Phthalate**	**44 J**	B,X	220	5.82
105-60-2	Caprolactam	420 U	UJ,C	420	8.29
86-74-8	Carbazole	220 U		220	7.93
218-01-9	Chrysene	220 U		220	13.3
~~53-70-3~~	~~*Dibenzo (a,h) Anthracene~~	~~220 UR~~	~~R,1~~	~~220~~	~~7.67~~
132-64-9	Dibenzofuran	220 U		220	4.11
84-66-2	**Diethylphthalate**	**18 J**	B,Z	220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**1700**		220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	**Fluoranthene**	**8.0 J**		220	3.06
86-73-7	Fluorene	220 U		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U		220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
~~193-39-5~~	~~*Indeno (1,2,3-cd) Pyrene~~	~~220 UR~~	~~R,1~~	~~220~~	~~5.10~~
78-59-1	Isophorone	220 U		220	2.25
91-20-3	Naphthalene	220 U		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

* See attached Statement of Data Qualifications.

★ See dilution analysis results, ★ 12/15/03

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**QSB3A**	QC Batch:	90209 -109
Sample #:	**345039**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	**N-Nitroso-di-Phenylamine**	**32 J**	220	6.18
87-86-5	Pentachlorophenol	420 U	420	5.71
85-01-8	**Phenanthrene**	**3.0 J**	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	**Pyrene**	**4.0 J**	220	1.92

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**QSB3A**	QC Batch:	90209 -109
Sample #:	**345039**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	78
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	28	E	B,X
2-Cyclopenten-1-one, 3-methyl-2-(1,3-pentadienyl)-,	22610-80-6	23	E	NJ,+
Docosane	629-97-0	230	E	NJ,+
Eicosane	112-95-8	180	E	B,X
Octacosane	630-02-4	410	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 14:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/16/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**QSB3A**	QC Batch:	90209 -109
Sample #:	**345039DL**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	6.4

Do not use
See neat analysis

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	1100 U		1100	15.7
95-94-3	1,2,4,5-Tetrachloro-benzene	1100 U		1100	184
108-60-1	Bis (2-Chloroisopropyl)-Ether	1100 U		1100	8.45
95-95-4	2,4,5-Trichlorophenol	1100 U		1100	21.4
88-06-2	2,4,6-Trichlorophenol	1100 U		1100	16.8
120-83-2	2,4-Dichlorophenol	1100 U		1100	22.5
105-67-9	2,4-Dimethylphenol	1100 U		1100	50.8
51-28-5	2,4-Dinitrophenol	2200 U		2200	20.5
121-14-2	2,4-Dinitrotoluene	1100 U		1100	20.2
606-20-2	2,6-Dinitrotoluene	1100 U		1100	177
91-58-7	2-Chloronaphthalene	1100 U		1100	14.7
95-57-8	2-Chlorophenol	1100 U		1100	12.9
91-57-6	2-Methylnaphthalene	1100 U		1100	17.5
95-48-7	2-Methylphenol	1100 U		1100	31.0
88-74-4	2-Nitroaniline	1100 U		1100	29.4
88-75-5	2-Nitrophenol	1100 U		1100	10.9
91-94-1	3,3'-Dichlorobenzidine	1100 U		1100	427
99-09-2	3-Nitroaniline	1100 U		1100	213
534-52-1	4,6-Dinitro-2-Methylphenol	1100 U		1100	28.9
101-55-3	4-Bromophenyl Phenylether	1100 U		1100	21.6
59-50-7	4-Chloro-3-Methylphenol	1100 U		1100	33.3
106-47-8	4-Chloroaniline	1100 U	UJ,c	1100	8.06
7005-72-3	4-Chlorophenylphenyl-Ether	1100 U		1100	20.9
106-44-5	4-Methylphenol	1100 U		1100	40.8
100-01-6	4-Nitroaniline	1100 U	UJ,c	1100	46.4
100-02-7	4-Nitrophenol	2200 U		2200	18.1
83-32-9	Acenaphthene	1100 U		1100	11.0
208-96-8	Acenaphthylene	1100 U		1100	9.60
98-86-2	Acetophenone	1100 U		1100	12.2

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 14:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/16/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**QSB3A**	QC Batch:	90209 -109
Sample #:	**345039DL**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	6.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	1100 U		1100	29.6
1912-24-9	Atrazine	1100 U		1100	44.0
100-52-7	Benzaldehyde	1100 U	U,c	1100	25.9
56-55-3	Benzo (a) Anthracene	1100 U		1100	85.1
50-32-8	Benzo (a) Pyrene	1100 U		1100	36.5
205-99-2	Benzo (b) Fluoranthene	1100 U		1100	62.5
191-24-2	Benzo (g,h,i,) Perylene	1100 U		1100	55.8
207-08-9	Benzo (k) Fluoranthene	1100 U		1100	85.8
111-91-1	Bis (2-Chloroethoxy)-Methane	1100 U		1100	20.1
111-44-4	Bis (2-Chloroethyl) Ether	1100 U		1100	11.1
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**320 J**		1100	13.2
85-68-7	Butyl Benzyl Phthalate	1100 U		1100	28.7
105-60-2	Caprolactam	2200 U	U,c	2200	40.8
86-74-8	Carbazole	1100 U		1100	39.0
218-01-9	Chrysene	1100 U		1100	65.3
53-70-3	Dibenzo (a,h) Anthracene	1100 U		1100	37.8
132-64-9	Dibenzofuran	1100 U		1100	20.2
84-66-2	**Diethylphthalate**	**20 J**	B,z	1100	12.2
131-11-3	Dimethylphthalate	1100 U		1100	21.2
84-74-2	**Di-n-Butylphthalate**	**1300**		1100	24.4
117-84-0	Di-n-Octylphthalate	1100 U		1100	19.8
206-44-0	Fluoranthene	1100 U		1100	15.0
86-73-7	Fluorene	1100 U		1100	10.8
118-74-1	Hexachlorobenzene	1100 U		1100	16.1
87-68-3	Hexachlorobutadiene	1100 U		1100	24.8
77-47-4	Hexachlorocyclopentadiene	1100 U		1100	12.7
67-72-1	Hexachloroethane	1100 U		1100	14.9
193-39-5	Indeno (1,2,3-cd) Pyrene	1100 U		1100	25.1
78-59-1	Isophorone	1100 U		1100	11.1
91-20-3	Naphthalene	1100 U		1100	17.6
98-95-3	Nitrobenzene	1100 U		1100	20.5

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**QSB3A**	QC Batch:	90209 -109
Sample #:	**345039DL**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	6.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	1100 U	1100	21.1
86-30-6	N-Nitroso-di-Phenylamine	1100 U	1100	30.4
87-86-5	Pentachlorophenol	2200 U	2200	28.1
85-01-8	Phenanthrene	1100 U	1100	14.7
108-95-2	Phenol	1100 U	1100	25.3
129-00-0	Pyrene	1100 U	1100	9.47

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12/15/03

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 14:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/16/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**QSB3B**	QC Batch:	90209 -109
Sample #:	**345040**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	87
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	200 U		200	2.71
95-94-3	1,2,4,5-Tetrachloro-benzene	200 U		200	31.6
108-60-1	Bis (2-Chloroisopropyl)-Ether	200 U		200	1.45
95-95-4	2,4,5-Trichlorophenol	200 U		200	3.67
88-06-2	2,4,6-Trichlorophenol	200 U		200	2.88
120-83-2	2,4-Dichlorophenol	200 U		200	3.87
105-67-9	2,4-Dimethylphenol	200 U		200	8.73
51-28-5	2,4-Dinitrophenol	380 U		380	3.52
121-14-2	2,4-Dinitrotoluene	200 U		200	3.47
606-20-2	2,6-Dinitrotoluene	200 U		200	30.5
91-58-7	2-Chloronaphthalene	200 U		200	2.53
95-57-8	2-Chlorophenol	200 U		200	2.21
91-57-6	2-Methylnaphthalene	200 U		200	3.01
95-48-7	2-Methylphenol	200 U		200	5.32
88-74-4	2-Nitroaniline	200 U		200	5.06
88-75-5	2-Nitrophenol	200 U		200	1.87
91-94-1	3,3'-Dichlorobenzidine	200 U		200	73.4
99-09-2	3-Nitroaniline	200 U		200	36.6
534-52-1	4,6-Dinitro-2-Methylphenol	200 U		200	4.96
101-55-3	4-Bromophenyl Phenylether	200 U		200	3.72
59-50-7	**4-Chloro-3-Methylphenol**	**9.0 J**		200	5.73
106-47-8	4-Chloroaniline	200 U	UJ,c	200	1.39
7005-72-3	4-Chlorophenylphenyl-Ether	200 U		200	3.60
106-44-5	4-Methylphenol	200 U		200	7.01
100-01-6	4-Nitroaniline	200 U	UJ,c	200	7.98
100-02-7	4-Nitrophenol	380 U		380	3.11
83-32-9	Acenaphthene	200 U		200	1.89
208-96-8	Acenaphthylene	200 U		200	1.65
98-86-2	Acetophenone	200 U		200	2.09

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 14:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/16/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**QSB3B**	QC Batch:	90209 -109
Sample #:	**345040**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	87
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	200 U		200	5.08
1912-24-9	Atrazine	200 U		200	7.57
100-52-7	Benzaldehyde	200 U	UJ,c	200	4.46
56-55-3	Benzo (a) Anthracene	200 U		200	14.6
50-32-8	Benzo (a) Pyrene	200 U		200	6.28
205-99-2	Benzo (b) Fluoranthene	200 U		200	10.7
191-24-2	Benzo (g,h,i,) Perylene	200 U		200	9.59
207-08-9	Benzo (k) Fluoranthene	200 U		200	14.7
111-91-1	Bis (2-Chloroethoxy)-Methane	200 U		200	3.45
111-44-4	Bis (2-Chloroethyl) Ether	200 U		200	1.90
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**45 J**		200	2.28
85-68-7	Butyl Benzyl Phthalate	200 U		200	4.93
105-60-2	Caprolactam	380 U	UJ,c	380	7.02
86-74-8	Carbazole	200 U		200	6.71
218-01-9	Chrysene	200 U		200	11.2
53-70-3	Dibenzo (a,h) Anthracene	200 U		200	6.49
132-64-9	Dibenzofuran	200 U		200	3.48
84-66-2	**Diethylphthalate**	**14 J**	B,z	200	2.09
131-11-3	Dimethylphthalate	200 U		200	3.64
84-74-2	**Di-n-Butylphthalate**	**27 J**		200	4.20
117-84-0	Di-n-Octylphthalate	200 U		200	3.41
206-44-0	Fluoranthene	200 U		200	2.59
86-73-7	Fluorene	200 U		200	1.85
118-74-1	Hexachlorobenzene	200 U		200	2.76
87-68-3	Hexachlorobutadiene	200 U		200	4.26
77-47-4	Hexachlorocyclopentadiene	200 U		200	2.18
67-72-1	Hexachloroethane	200 U		200	2.57
193-39-5	Indeno (1,2,3-cd) Pyrene	200 U		200	4.31
78-59-1	Isophorone	200 U		200	1.90
91-20-3	Naphthalene	200 U		200	3.03
98-95-3	Nitrobenzene	200 U		200	3.52

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 14:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**QSB3B**	QC Batch:	90209 -109
Sample #:	**345040**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	87
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	200 U	200	3.62
86-30-6	N-Nitroso-di-Phenylamine	200 U	200	5.23
87-86-5	Pentachlorophenol	380 U	380	4.83
85-01-8	Phenanthrene	200 U	200	2.53
108-95-2	Phenol	200 U	200	4.36
129-00-0	Pyrene	200 U	200	1.63

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 14:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**QSB3B**	QC Batch:	90209 -109
Sample #:	**345040**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	87
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	62	E	B,X
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	35	E	B,X
2,6,10-Dodecatriene-1-ol, 3,7,11-trimethyl-	4602-84-0	40	E	NJ,+
2-Ethyl-1-Hexanol	104-76-7	23	E	NJ,+
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,9-diene-2,8	1000143924 (1000143-92-4)	21	E	NJ,+
Docosane	629-97-0	33	E	NJ,+
Erucylamide	112-84-5	310	E	NJ,+
Heneicosane	629-94-7	21	E	B,X
Tetratriacontane	14167-59-0	33	E	B,X

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**QSB3C**	QC Batch:	90209 -109
Sample #:	**345041**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	92
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	180 U		180	2.71
95-94-3	1,2,4,5-Tetrachloro-benzene	180 U		180	31.6
108-60-1	Bis (2-Chloroisopropyl)-Ether	180 U		180	1.45
95-95-4	2,4,5-Trichlorophenol	180 U		180	3.67
88-06-2	2,4,6-Trichlorophenol	180 U		180	2.88
120-83-2	2,4-Dichlorophenol	180 U		180	3.87
105-67-9	2,4-Dimethylphenol	180 U		180	8.73
51-28-5	2,4-Dinitrophenol	360 U		360	3.52
121-14-2	2,4-Dinitrotoluene	180 U		180	3.47
606-20-2	2,6-Dinitrotoluene	180 U		180	30.5
91-58-7	2-Chloronaphthalene	180 U		180	2.53
95-57-8	2-Chlorophenol	180 U		180	2.21
91-57-6	2-Methylnaphthalene	180 U		180	3.01
95-48-7	2-Methylphenol	180 U		180	5.32
88-74-4	2-Nitroaniline	180 U		180	5.06
88-75-5	2-Nitrophenol	180 U		180	1.87
91-94-1	3,3'-Dichlorobenzidine	180 U		180	73.4
99-09-2	3-Nitroaniline	180 U		180	36.6
534-52-1	4,6-Dinitro-2-Methylphenol	180 U		180	4.96
101-55-3	4-Bromophenyl Phenylether	180 U		180	3.72
59-50-7	**4-Chloro-3-Methylphenol**	**17 J**		180	5.73
106-47-8	4-Chloroaniline	180 U	UJ,c	180	1.39
7005-72-3	4-Chlorophenylphenyl-Ether	180 U		180	3.60
106-44-5	4-Methylphenol	180 U		180	7.01
100-01-6	4-Nitroaniline	180 U	UJ,c	180	7.98
100-02-7	4-Nitrophenol	360 U		360	3.11
83-32-9	Acenaphthene	180 U		180	1.89
208-96-8	Acenaphthylene	180 U		180	1.65
98-86-2	Acetophenone	180 U		180	2.09

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**QSB3C**	QC Batch:	90209 -109
Sample #:	**345041**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	92
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	180 U		180	5.08
1912-24-9	Atrazine	180 U		180	7.57
100-52-7	Benzaldehyde	180 U	VJ,c	180	4.46
56-55-3	Benzo (a) Anthracene	180 U		180	14.6
50-32-8	Benzo (a) Pyrene	180 U		180	6.28
205-99-2	Benzo (b) Fluoranthene	180 U		180	10.7
191-24-2	Benzo (g,h,i,) Perylene	180 U		180	9.59
207-08-9	Benzo (k) Fluoranthene	180 U		180	14.7
111-91-1	Bis (2-Chloroethoxy)-Methane	180 U		180	3.45
111-44-4	Bis (2-Chloroethyl) Ether	180 U		180	1.90
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**43 J**		180	2.28
85-68-7	Butyl Benzyl Phthalate	180 U		180	4.93
105-60-2	Caprolactam	360 U	VJ,c	360	7.02
86-74-8	Carbazole	180 U		180	6.71
218-01-9	Chrysene	180 U		180	11.2
53-70-3	Dibenzo (a,h) Anthracene	180 U		180	6.49
132-64-9	Dibenzofuran	180 U		180	3.48
84-66-2	**Diethylphthalate**	**13 J**	B,z	180	2.09
131-11-3	Dimethylphthalate	180 U		180	3.64
84-74-2	**Di-n-Butylphthalate**	**24 J**		180	4.20
117-84-0	Di-n-Octylphthalate	180 U		180	3.41
206-44-0	Fluoranthene	180 U		180	2.59
86-73-7	Fluorene	180 U		180	1.85
118-74-1	Hexachlorobenzene	180 U		180	2.76
87-68-3	Hexachlorobutadiene	180 U		180	4.26
77-47-4	Hexachlorocyclopentadiene	180 U		180	2.18
67-72-1	Hexachloroethane	180 U		180	2.57
193-39-5	Indeno (1,2,3-cd) Pyrene	180 U		180	4.31
78-59-1	Isophorone	180 U		180	1.90
91-20-3	Naphthalene	180 U		180	3.03
98-95-3	Nitrobenzene	180 U		180	3.52

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**QSB3C**	QC Batch:	90209 -109
Sample #:	**345041**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	92
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	180 U	180	3.62
86-30-6	N-Nitroso-di-Phenylamine	180 U	180	5.23
87-86-5	Pentachlorophenol	360 U	360	4.83
85-01-8	Phenanthrene	180 U	180	2.53
108-95-2	Phenol	180 U	180	4.36
129-00-0	Pyrene	180 U	180	1.63

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/16/03 JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**QSB3C**	QC Batch:	90209 -109
Sample #:	**345041**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	92
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	79	E	B,X
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	36	E	B,X
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	70	E	B,X
3-Hexene-2,5-dione	4436-75-3	85	E	NJ,+
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,9-diene-2,8	1000143924 (1000143-92-4)	25	E	NJ,+
Ditriacontane	544-85-4	23	E	NJ,+
Docosane	629-97-0	32	E	NJ,+
Heneicosane	629-94-7	27	E	B,X
Tetratriacontane	14167-59-0	31	E	B,X

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:10
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/16/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**QSB2A**	QC Batch:	90209 -109
Sample #:	**345042**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	200 U		200	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	200 U		200	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	200 U		200	1.58
95-95-4	2,4,5-Trichlorophenol	200 U		200	4.01
88-06-2	2,4,6-Trichlorophenol	200 U		200	3.14
120-83-2	2,4-Dichlorophenol	200 U		200	4.22
105-67-9	2,4-Dimethylphenol	200 U		200	9.53
51-28-5	2,4-Dinitrophenol	390 U		390	3.84
121-14-2	2,4-Dinitrotoluene	200 U		200	3.78
606-20-2	2,6-Dinitrotoluene	200 U		200	33.2
91-58-7	2-Chloronaphthalene	200 U		200	2.76
95-57-8	2-Chlorophenol	200 U		200	2.41
91-57-6	2-Methylnaphthalene	200 U		200	3.29
95-48-7	2-Methylphenol	200 U		200	5.81
88-74-4	2-Nitroaniline	200 U		200	5.52
88-75-5	2-Nitrophenol	200 U		200	2.04
91-94-1	3,3'-Dichlorobenzidine	200 U		200	80.0
99-09-2	3-Nitroaniline	200 U		200	40.0
534-52-1	4,6-Dinitro-2-Methylphenol	200 U		200	5.41
101-55-3	4-Bromophenyl Phenylether	200 U		200	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**15 J**		200	6.25
106-47-8	4-Chloroaniline	200 U	UJ,c	200	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	200 U		200	3.92
106-44-5	4-Methylphenol	200 U		200	7.64
100-01-6	4-Nitroaniline	200 U	UJ,c	200	8.70
100-02-7	4-Nitrophenol	390 U		390	3.40
83-32-9	Acenaphthene	200 U		200	2.06
208-96-8	Acenaphthylene	200 U		200	1.80
98-86-2	Acetophenone	200 U		200	2.28

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:10
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/16/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**QSB2A**	QC Batch:	90209 -109
Sample #:	**345042**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	200 U		200	5.54
1912-24-9	Atrazine	200 U		200	8.26
100-52-7	Benzaldehyde	200 U	UJ,c	200	4.86
56-55-3	Benzo (a) Anthracene	200 U		200	16.0
50-32-8	Benzo (a) Pyrene	200 U		200	6.85
205-99-2	Benzo (b) Fluoranthene	200 U		200	11.7
191-24-2	Benzo (g,h,i,) Perylene	200 U		200	10.5
207-08-9	Benzo (k) Fluoranthene	200 U		200	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	200 U		200	3.77
111-44-4	Bis (2-Chloroethyl) Ether	200 U		200	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**46 J**		200	2.48
85-68-7	Butyl Benzyl Phthalate	200 U		200	5.38
105-60-2	Caprolactam	390 U	UJ,c	390	7.66
86-74-8	Carbazole	200 U		200	7.32
218-01-9	Chrysene	200 U		200	12.2
53-70-3	Dibenzo (a,h) Anthracene	200 U		200	7.08
132-64-9	Dibenzofuran	200 U		200	3.79
84-66-2	**Diethylphthalate**	**14 J**	B,z	200	2.28
131-11-3	Dimethylphthalate	200 U		200	3.97
84-74-2	**Di-n-Butylphthalate**	**26 J**		200	4.58
117-84-0	Di-n-Octylphthalate	200 U		200	3.72
206-44-0	Fluoranthene	200 U		200	2.82
86-73-7	Fluorene	200 U		200	2.02
118-74-1	Hexachlorobenzene	200 U		200	3.01
87-68-3	Hexachlorobutadiene	200 U		200	4.64
77-47-4	Hexachlorocyclopentadiene	200 U		200	2.38
67-72-1	Hexachloroethane	200 U		200	2.80
193-39-5	Indeno (1,2,3-cd) Pyrene	200 U		200	4.70
78-59-1	Isophorone	200 U		200	2.08
91-20-3	Naphthalene	200 U		200	3.30
98-95-3	Nitrobenzene	200 U		200	3.84

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**QSB2A**	QC Batch:	90209 -109
Sample #:	**345042**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	200 U	200	3.95
86-30-6	N-Nitroso-di-Phenylamine	200 U	200	5.70
87-86-5	Pentachlorophenol	390 U	390	5.27
85-01-8	Phenanthrene	200 U	200	2.76
108-95-2	Phenol	200 U	200	4.75
129-00-0	Pyrene	200 U	200	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:10
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/16/03 JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**QSB2A**	QC Batch:	90209 -109
Sample #:	**345042**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	85
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	300	E	B,X
1-Phenanthrenecarboxylic acid, 1,2,3,4,4a,9,10,10	1235-74-1	120	E	NJ,+
1R-.alpha.-Pinene	7785-70-8	70	E	NJ,+
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,9-diene-2,8	1000143924 (1000143-42-4)	22	E	NJ,+
Ditriacontane	544-85-4	24	E	NJ,+
Docosa-2,6,10,14,18-pentaen-22-al,2,6,10,15,18-pen	1000163047 (1000163-04-7)	47	E	NJ,+
Eicosane	112-95-8	28	E	B,X
Tetratriacontane	14167-59-0	29	E	B,X
a-Pinene	80-56-8	230	E	NJ,+
beta-Pinene	127-91-3	35	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:20
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/16/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**QSB2B**	QC Batch:	90209 -109
Sample #:	**345043**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	200 U		200	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	200 U		200	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	200 U		200	1.58
95-95-4	2,4,5-Trichlorophenol	200 U		200	4.01
88-06-2	2,4,6-Trichlorophenol	200 U		200	3.14
120-83-2	2,4-Dichlorophenol	200 U		200	4.22
105-67-9	2,4-Dimethylphenol	200 U		200	9.53
51-28-5	2,4-Dinitrophenol	390 U		390	3.84
121-14-2	2,4-Dinitrotoluene	200 U		200	3.78
606-20-2	2,6-Dinitrotoluene	200 U		200	33.2
91-58-7	2-Chloronaphthalene	200 U		200	2.76
95-57-8	2-Chlorophenol	200 U		200	2.41
91-57-6	2-Methylnaphthalene	200 U		200	3.29
95-48-7	2-Methylphenol	200 U		200	5.81
88-74-4	2-Nitroaniline	200 U		200	5.52
88-75-5	2-Nitrophenol	200 U		200	2.04
91-94-1	3,3'-Dichlorobenzidine	200 U		200	80.0
99-09-2	3-Nitroaniline	200 U		200	40.0
534-52-1	4,6-Dinitro-2-Methylphenol	200 U		200	5.41
101-55-3	4-Bromophenyl Phenylether	200 U		200	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**15 J**		200	6.25
106-47-8	4-Chloroaniline	200 U	UJ,c	200	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	200 U		200	3.92
106-44-5	4-Methylphenol	200 U		200	7.64
100-01-6	4-Nitroaniline	200 U	UJ,c	200	8.70
100-02-7	4-Nitrophenol	390 U		390	3.40
83-32-9	Acenaphthene	200 U		200	2.06
208-96-8	Acenaphthylene	200 U		200	1.80
98-86-2	Acetophenone	200 U		200	2.28

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**QSB2B**	QC Batch:	90209 -109
Sample #:	**345043**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	200 U		200	5.54
1912-24-9	Atrazine	200 U		200	8.26
100-52-7	Benzaldehyde	200 U	UJ,c	200	4.86
56-55-3	Benzo (a) Anthracene	200 U		200	16.0
50-32-8	Benzo (a) Pyrene	200 U		200	6.85
205-99-2	Benzo (b) Fluoranthene	200 U		200	11.7
191-24-2	Benzo (g,h,i,) Perylene	200 U		200	10.5
207-08-9	Benzo (k) Fluoranthene	200 U		200	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	200 U		200	3.77
111-44-4	Bis (2-Chloroethyl) Ether	200 U		200	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**45 J**		200	2.48
85-68-7	Butyl Benzyl Phthalate	200 U		200	5.38
105-60-2	Caprolactam	390 U	UJ,c	390	7.66
86-74-8	Carbazole	200 U		200	7.32
218-01-9	Chrysene	200 U		200	12.2
53-70-3	Dibenzo (a,h) Anthracene	200 U		200	7.08
132-64-9	Dibenzofuran	200 U		200	3.79
84-66-2	**Diethylphthalate**	**13 J**	B,z	200	2.28
131-11-3	Dimethylphthalate	200 U		200	3.97
84-74-2	**Di-n-Butylphthalate**	**26 J**		200	4.58
117-84-0	Di-n-Octylphthalate	200 U		200	3.72
206-44-0	Fluoranthene	200 U		200	2.82
86-73-7	Fluorene	200 U		200	2.02
118-74-1	Hexachlorobenzene	200 U		200	3.01
87-68-3	Hexachlorobutadiene	200 U		200	4.64
77-47-4	Hexachlorocyclopentadiene	200 U		200	2.38
67-72-1	Hexachloroethane	200 U		200	2.80
193-39-5	Indeno (1,2,3-cd) Pyrene	200 U		200	4.70
78-59-1	Isophorone	200 U		200	2.08
91-20-3	Naphthalene	200 U		200	3.30
98-95-3	Nitrobenzene	200 U		200	3.84

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**QSB2B**	QC Batch:	90209 -109
Sample #:	**345043**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	200 U	200	3.95
86-30-6	N-Nitroso-di-Phenylamine	200 U	200	5.70
87-86-5	Pentachlorophenol	390 U	390	5.27
85-01-8	Phenanthrene	200 U	200	2.76
108-95-2	Phenol	200 U	200	4.75
129-00-0	Pyrene	200 U	200	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**QSB2B**	QC Batch:	90209 -109
Sample #:	**345043**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	84
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	40	E	B,X
10-Methylnonadecane	56862-62-5	27	E	NJ,+
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	67	E	B,X
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,9-diene-2,8	1000143924 (1000143-92-4)	23	E	NJ,+
7-Nonenamide	90949-53-4	77	E	NJ,+
Docosa-2,6,10,14,18-pentaen-22-al,2,6,10,15,18-pen	1000163047 (1000163-04-7)	49	E	NJ,+
Erucylamide	112-84-5	400	E	NJ,+
Heneicosane	629-94-7	29	E	B,X
Heptadecane, 9-octyl-	7225-64-1	36	E	NJ,+
Octacosane	630-02-4	45	E	NJ,+
Tetratriacontane	14167-59-0	42	E	B,X

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**QSB2C**	QC Batch:	90209 -109
Sample #:	**345044**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	91
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	190 U		190	2.71
95-94-3	1,2,4,5-Tetrachloro-benzene	190 U		190	31.6
108-60-1	Bis (2-Chloroisopropyl)-Ether	190 U		190	1.45
95-95-4	2,4,5-Trichlorophenol	190 U		190	3.67
88-06-2	2,4,6-Trichlorophenol	190 U		190	2.88
120-83-2	2,4-Dichlorophenol	190 U		190	3.87
105-67-9	2,4-Dimethylphenol	190 U		190	8.73
51-28-5	2,4-Dinitrophenol	360 U		360	3.52
121-14-2	2,4-Dinitrotoluene	190 U		190	3.47
606-20-2	2,6-Dinitrotoluene	190 U		190	30.5
91-58-7	2-Chloronaphthalene	190 U		190	2.53
95-57-8	2-Chlorophenol	190 U		190	2.21
91-57-6	2-Methylnaphthalene	190 U		190	3.01
95-48-7	2-Methylphenol	190 U		190	5.32
88-74-4	2-Nitroaniline	190 U		190	5.06
88-75-5	2-Nitrophenol	190 U		190	1.87
91-94-1	3,3'-Dichlorobenzidine	190 U		190	73.4
99-09-2	3-Nitroaniline	190 U		190	36.6
534-52-1	4,6-Dinitro-2-Methylphenol	190 U		190	4.96
101-55-3	4-Bromophenyl Phenylether	190 U		190	3.72
59-50-7	**4-Chloro-3-Methylphenol**	**10 J**		190	5.73
106-47-8	4-Chloroaniline	190 U	UJ,c	190	1.39
7005-72-3	4-Chlorophenylphenyl-Ether	190 U		190	3.60
106-44-5	4-Methylphenol	190 U		190	7.01
100-01-6	4-Nitroaniline	190 U	UJ,c	190	7.98
100-02-7	4-Nitrophenol	360 U		360	3.11
83-32-9	Acenaphthene	190 U		190	1.89
208-96-8	Acenaphthylene	190 U		190	1.65
98-86-2	Acetophenone	190 U		190	2.09

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**QSB2C**	QC Batch:	90209 -109
Sample #:	**345044**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	91
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	190 U		190	5.08
1912-24-9	Atrazine	190 U		190	7.57
100-52-7	Benzaldehyde	190 U	UJ,C	190	4.46
56-55-3	Benzo (a) Anthracene	190 U		190	14.6
50-32-8	Benzo (a) Pyrene	190 U		190	6.28
205-99-2	Benzo (b) Fluoranthene	190 U		190	10.7
191-24-2	Benzo (g,h,i,) Perylene	190 U		190	9.59
207-08-9	Benzo (k) Fluoranthene	190 U		190	14.7
111-91-1	Bis (2-Chloroethoxy)-Methane	190 U		190	3.45
111-44-4	Bis (2-Chloroethyl) Ether	190 U		190	1.90
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**44 J**		190	2.28
85-68-7	Butyl Benzyl Phthalate	190 U		190	4.93
105-60-2	Caprolactam	360 U	UJ,C	360	7.02
86-74-8	Carbazole	190 U		190	6.71
218-01-9	Chrysene	190 U		190	11.2
53-70-3	Dibenzo (a,h) Anthracene	190 U		190	6.49
132-64-9	Dibenzofuran	190 U		190	3.48
84-66-2	**Diethylphthalate**	**11 J**	B,Z	190	2.09
131-11-3	Dimethylphthalate	190 U		190	3.64
84-74-2	**Di-n-Butylphthalate**	**23 J**		190	4.20
117-84-0	Di-n-Octylphthalate	190 U		190	3.41
206-44-0	Fluoranthene	190 U		190	2.59
86-73-7	Fluorene	190 U		190	1.85
118-74-1	Hexachlorobenzene	190 U		190	2.76
87-68-3	Hexachlorobutadiene	190 U		190	4.26
77-47-4	Hexachlorocyclopentadiene	190 U		190	2.18
67-72-1	Hexachloroethane	190 U		190	2.57
193-39-5	Indeno (1,2,3-cd) Pyrene	190 U		190	4.31
78-59-1	Isophorone	190 U		190	1.90
91-20-3	Naphthalene	190 U		190	3.03
98-95-3	Nitrobenzene	190 U		190	3.52

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**QSB2C**	QC Batch:	90209 -109
Sample #:	**345044**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	91
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	190 U	190	3.62
86-30-6	N-Nitroso-di-Phenylamine	190 U	190	5.23
87-86-5	Pentachlorophenol	360 U	360	4.83
85-01-8	Phenanthrene	190 U	190	2.53
108-95-2	Phenol	190 U	190	4.36
129-00-0	Pyrene	190 U	190	1.63

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
		Prep. Method:	
Submittal #:	**36440-2**	Analyzed:	10/16/03 JMK1
Submittal:	Delivery Order 0046 RAAP	Anal. Method:	USEPA-8270C
		QC Batch:	90209 -109
Sample ID:	**QSB2C**	Anal. Batch:	208294
Sample #:	**345044**	Percent Solids:	91
Matrix:	Soil	Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	69	E	B,X
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	33	E	B,X
2,6,10-Dodecatrien-1-ol, 3,7,11-trimethyl-, acetate	4128-17-0	40	E	NJ,+
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,9-diene-2,8	1000143924 (10001143-92-4)	19	E	NJ,+
Erucylamide	112-84-5	360	E	NJ,+
Heneicosane	629-94-7	23	E	B,X
Heptadecane	629-78-7	24	E	NJ,+
Hexatriacontane	630-06-8	27	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 16:20
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	10/08/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3510C
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/17/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**EQB1**	QC Batch:	89818 -108
Sample #:	**345045**	Anal. Batch:	207854
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	5.0 U	5.0	0.013
95-94-3	1,2,4,5-Tetrachloro-benzene	5.0 U	5.0	0.775
108-60-1	Bis (2-Chloroisopropyl)-Ether	5.0 U	5.0	0.014
95-95-4	2,4,5-Trichlorophenol	5.0 U	5.0	0.014
88-06-2	2,4,6-Trichlorophenol	5.0 U	5.0	0.015
120-83-2	2,4-Dichlorophenol	5.0 U	5.0	0.018
105-67-9	2,4-Dimethylphenol	5.0 U	5.0	0.198
51-28-5	2,4-Dinitrophenol	10 U	10	1.24
121-14-2	2,4-Dinitrotoluene	5.0 U	5.0	0.007
606-20-2	2,6-Dinitrotoluene	5.0 U	5.0	0.052
91-58-7	2-Chloronaphthalene	5.0 U	5.0	0.005
95-57-8	2-Chlorophenol	5.0 U	5.0	0.011
91-57-6	2-Methylnaphthalene	5.0 U	5.0	0.084
95-48-7	2-Methylphenol	5.0 U	5.0	0.007
88-74-4	2-Nitroaniline	5.0 U	5.0	0.010
88-75-5	2-Nitrophenol	5.0 U	5.0	0.011
91-94-1	3,3'-Dichlorobenzidine	5.0 U	5.0	0.058
99-09-2	3-Nitroaniline	5.0 U	5.0	0.032
534-52-1	4,6-Dinitro-2-Methylphenol	5.0 U	5.0	0.054
101-55-3	4-Bromophenyl Phenylether	5.0 U	5.0	0.019
59-50-7	4-Chloro-3-Methylphenol	5.0 U	5.0	0.018
106-47-8	4-Chloroaniline	5.0 U	5.0	0.011
7005-72-3	4-Chlorophenylphenyl-Ether	5.0 U	5.0	0.015
106-44-5	4-Methylphenol	5.0 U	5.0	0.014
100-01-6	4-Nitroaniline	5.0 U	5.0	0.070
100-02-7	4-Nitrophenol	10 U	10	0.134
83-32-9	Acenaphthene	5.0 U	5.0	0.008
208-96-8	Acenaphthylene	5.0 U	5.0	0.007
98-86-2	Acetophenone	5.0 U	5.0	0.011

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 16:20
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	10/08/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3510C
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/17/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**EQB1**	QC Batch:	89818 -108
Sample #:	**345045**	Anal. Batch:	207854
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	5.0 U		5.0	0.014
1912-24-9	Atrazine	5.0 U		5.0	0.018
100-52-7	Benzaldehyde	5.0 U	UJ,c	5.0	0.616
56-55-3	Benzo (a) Anthracene	5.0 U		5.0	0.022
50-32-8	Benzo (a) Pyrene	5.0 U		5.0	0.025
205-99-2	Benzo (b) Fluoranthene	5.0 U		5.0	0.019
191-24-2	Benzo (g,h,i,) Perylene	5.0 U		5.0	0.046
207-08-9	Benzo (k) Fluoranthene	5.0 U		5.0	0.064
111-91-1	Bis (2-Chloroethoxy)-Methane	5.0 U		5.0	0.013
111-44-4	Bis (2-Chloroethyl) Ether	5.0 U		5.0	0.012
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**1.0 J**	B,z	5.0	0.149
85-68-7	**Butyl Benzyl Phthalate**	**0.96 J**		5.0	0.015
105-60-2	Caprolactam	5.0 U	UJ,l	5.0	0.024
86-74-8	Carbazole	5.0 U		5.0	0.015
218-01-9	Chrysene	5.0 U		5.0	0.025
53-70-3	Dibenzo (a,h) Anthracene	5.0 U		5.0	0.025
132-64-9	Dibenzofuran	5.0 U		5.0	0.014
84-66-2	**Diethylphthalate**	**0.10 J**	B,z	5.0	0.074
131-11-3	Dimethylphthalate	5.0 U		5.0	0.013
84-74-2	Di-n-Butylphthalate	5.0 U		5.0	1.60
117-84-0	Di-n-Octylphthalate	5.0 U		5.0	0.162
206-44-0	Fluoranthene	5.0 U		5.0	0.024
86-73-7	Fluorene	5.0 U		5.0	0.012
118-74-1	Hexachlorobenzene	5.0 U		5.0	0.011
87-68-3	Hexachlorobutadiene	5.0 U		5.0	0.019
77-47-4	Hexachlorocyclopentadiene	5.0 U		5.0	0.016
67-72-1	Hexachloroethane	5.0 U		5.0	0.023
193-39-5	Indeno (1,2,3-cd) Pyrene	5.0 U		5.0	0.033
78-59-1	Isophorone	5.0 U		5.0	0.017
91-20-3	Naphthalene	5.0 U		5.0	0.006
98-95-3	Nitrobenzene	5.0 U		5.0	0.012

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 16:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/08/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3510C
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**EQB1**	QC Batch:	89818 -108
Sample #:	**345045**	Anal. Batch:	207854
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	5.0 U	5.0	0.017
86-30-6	N-Nitroso-di-Phenylamine	5.0 U	5.0	0.019
87-86-5	Pentachlorophenol	10 U	10	0.075
85-01-8	Phenanthrene	5.0 U	5.0	0.016
108-95-2	Phenol	5.0 U	5.0	0.006
129-00-0	Pyrene	5.0 U	5.0	0.033

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 16:20
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
Submittal #:	**36440-2**	Prepared:	10/08/03 by DJM
Submittal:	Delivery Order 0046 RAAP	Prep. Method:	
		Analyzed:	10/17/03 JMK1
Sample ID:	**EQB1**	Anal. Method:	USEPA-8270C
Sample #:	**345045**	QC Batch:	89818 -108
Matrix:	QC Water	Anal. Batch:	207854
		Percent Solids:	n/a
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/L)**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	7.08	E	NJ,+
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	0.60	E	NJ,+
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	1.34	E	NJ,+
Eicosane	112-95-8	0.80	E	NJ,+
Heneicosane	629-94-7	0.59	E	NJ,+
Nonacosane	630-03-5	0.86	E	NJ,+
Pentadecane, 8-heptyl-	71005-15-7	0.53	E	NJ,+
Tetratriacontane	14167-59-0	0.64	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 08:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**37SB1C**	QC Batch:	90138 -110
Sample #:	**345028**	Anal. Batch:	208174
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	120 U		120	11.3
208-96-8	Acenaphthylene	240 U		240	13.9
120-12-7	Anthracene	24 U		24	0.840
56-55-3	Benzo (a) Anthracene	24 U	UJ,1	24	0.960
50-32-8	Benzo (a) Pyrene	24 U		24	1.20
205-99-2	Benzo (b) Fluoranthene	24 U		24	1.56
191-24-2	Benzo (g,h,i,) Perylene	24 U		24	15.0
207-08-9	Benzo (k) Fluoranthene	24 U		24	1.20
218-01-9	Chrysene	24 U		24	1.44
53-70-3	Dibenzo (a,h) Anthracene	24 U	UJ,1	24	1.68
206-44-0	Fluoranthene	24 U		24	2.04
86-73-7	Fluorene	24 U		24	1.56
193-39-5	Indeno (1,2,3-cd) Pyrene	24 U		24	0.840
91-20-3	Naphthalene	120 U		120	9.48
85-01-8	Phenanthrene	24 U		24	0.720
129-00-0	Pyrene	24 U	UJ,1	24	1.08

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 09:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
Submittal #:	**36440-2**	Prepared:	10/13/03 by DJM
Submittal:	Delivery Order 0046 RAAP	Prep. Method:	USEPA-8310
		Analyzed:	10/24/03 by TAJ
Sample ID:	**37SB2A**	Anal. Method:	USEPA-8310
Sample #:	**345029**	QC Batch:	90708 -113
Matrix:	Soil	Anal. Batch:	209020
Unit:	ug/kg dry	Percent Solids:	63
		Dilution Factor:	1.6

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	160 U	UJ,s	160	15.0
208-96-8	Acenaphthylene	330 U	UJ,s	330	18.6
120-12-7	**Anthracene**	**2.4 J**	J,s	33	1.12
56-55-3	Benzo (a) Anthracene	33 U	UJ,s	33	1.28
50-32-8	Benzo (a) Pyrene	33 U	UJ,s	33	1.60
205-99-2	**Benzo (b) Fluoranthene**	**7.6 J**	J,d	33	2.08
191-24-2	Benzo (g,h,i,) Perylene	33 U	UJ,s	33	20.0
207-08-9	**Benzo (k) Fluoranthene**	**5.5 J**	J,d	33	1.60
218-01-9	**Chrysene**	**12 J**	J,s	33	1.92
53-70-3	Dibenzo (a,h) Anthracene	33 U	UJ,m	33	2.24
206-44-0	**Fluoranthene**	**70**	J,m	33	2.72
86-73-7	Fluorene	33 U	UJ,s	33	2.08
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**8.1 J**	J,s	33	1.12
91-20-3	Naphthalene	160 U	UJ,s	160	12.6
85-01-8	**Phenanthrene**	**18 J**	J,s	33	0.960
129-00-0	**Pyrene**	**59**	J,m	33	1.44

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ANALYTICAL REPORT

Client:	**URS Corporation**
Project:	Richmond, VA
	RAAP
Submittal #:	**36440-2**
Submittal:	Delivery Order 0046
	RAAP
Sample ID:	**37SB2B**
Sample #:	**345030**
Matrix:	Soil
Unit:	ug/kg dry

Sampled:	10/02/03 @ 09:45
Sampler:	B.F. & J.S.
Received:	10/03/03 @ 09:10
Prepared:	10/13/03 by DJM
Prep. Method:	USEPA-8310
Analyzed:	10/24/03 by TAJ
Anal. Method:	USEPA-8310
QC Batch:	90708 -113
Anal. Batch:	209020
Percent Solids:	85
Dilution Factor:	1.2

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	120 U		120	11.3
208-96-8	Acenaphthylene	250 U		250	13.9
120-12-7	Anthracene	25 U		25	0.840
56-55-3	Benzo (a) Anthracene	25 U		25	0.960
50-32-8	Benzo (a) Pyrene	25 U		25	1.20
205-99-2	Benzo (b) Fluoranthene	25 U		25	1.56
191-24-2	Benzo (g,h,i,) Perylene	25 U		25	15.0
207-08-9	Benzo (k) Fluoranthene	25 U		25	1.20
218-01-9	Chrysene	25 U		25	1.44
53-70-3	Dibenzo (a,h) Anthracene	25 U		25	1.68
206-44-0	Fluoranthene	25 U	UJ,I	25	2.04
86-73-7	Fluorene	25 U		25	1.56
193-39-5	Indeno (1,2,3-cd) Pyrene	25 U		25	0.840
91-20-3	Naphthalene	120 U		120	9.48
85-01-8	Phenanthrene	25 U		25	0.720
129-00-0	Pyrene	25 U		25	1.08

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
Submittal #:	**36440-2**	Prepared:	10/13/03 by DJM
Submittal:	Delivery Order 0046	Prep. Method:	USEPA-8310
	RAAP	Analyzed:	10/24/03 by TAJ
Sample ID:	**37SB2C**	Anal. Method:	USEPA-8310
Sample #:	**345031**	QC Batch:	90708 -113
Matrix:	Soil	Anal. Batch:	209020
Unit:	ug/kg dry	Percent Solids:	86
		Dilution Factor:	1.2

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	120 U		120	11.3
208-96-8	Acenaphthylene	240 U		240	13.9
120-12-7	Anthracene	24 U		24	0.840
56-55-3	Benzo (a) Anthracene	24 U		24	0.960
50-32-8	Benzo (a) Pyrene	24 U		24	1.20
205-99-2	Benzo (b) Fluoranthene	24 U		24	1.56
191-24-2	Benzo (g,h,i,) Perylene	24 U		24	15.0
207-08-9	Benzo (k) Fluoranthene	24 U		24	1.20
218-01-9	Chrysene	24 U		24	1.44
53-70-3	Dibenzo (a,h) Anthracene	24 U		24	1.68
206-44-0	Fluoranthene	24 U	UJ,1	24	2.04
86-73-7	Fluorene	24 U		24	1.56
193-39-5	Indeno (1,2,3-cd) Pyrene	24 U		24	0.840
91-20-3	Naphthalene	120 U		120	9.48
85-01-8	Phenanthrene	24 U		24	0.720
129-00-0	Pyrene	24 U		24	1.08

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**37SB3A**	QC Batch:	90708 -113
Sample #:	**345032**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	88
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	110 U		110	10.3
208-96-8	Acenaphthylene	240 U		240	12.8
120-12-7	Anthracene	24 U		24	0.770
56-55-3	Benzo (a) Anthracene	24 U		24	0.880
50-32-8	Benzo (a) Pyrene	24 U		24	1.10
205-99-2	Benzo (b) Fluoranthene	24 U		24	1.43
191-24-2	Benzo (g,h,i,) Perylene	24 U		24	13.8
207-08-9	Benzo (k) Fluoranthene	24 U		24	1.10
218-01-9	Chrysene	24 U		24	1.32
53-70-3	Dibenzo (a,h) Anthracene	24 U		24	1.54
206-44-0	**Fluoranthene**	**2.2 J**	J,1	24	1.87
86-73-7	Fluorene	24 U		24	1.43
193-39-5	Indeno (1,2,3-cd) Pyrene	24 U		24	0.770
91-20-3	Naphthalene	110 U		110	8.69
85-01-8	Phenanthrene	24 U		24	0.660
129-00-0	**Pyrene**	**1.8 J**		24	0.990

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/28/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**37SB3B**	QC Batch:	90709 -114
Sample #:	**345033**	Anal. Batch:	208739
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	120 U	120	11.3
208-96-8	Acenaphthylene	250 U	250	13.9
120-12-7	Anthracene	25 U	25	0.840
56-55-3	Benzo (a) Anthracene	25 U	25	0.960
50-32-8	Benzo (a) Pyrene	25 U	25	1.20
205-99-2	Benzo (b) Fluoranthene	25 U	25	1.56
191-24-2	Benzo (g,h,i,) Perylene	25 U	25	15.0
207-08-9	Benzo (k) Fluoranthene	25 U	25	1.20
218-01-9	Chrysene	25 U	25	1.44
53-70-3	Dibenzo (a,h) Anthracene	25 U	25	1.68
206-44-0	Fluoranthene	25 U	25	2.04
86-73-7	Fluorene	25 U	25	1.56
193-39-5	Indeno (1,2,3-cd) Pyrene	25 U	25	0.840
91-20-3	Naphthalene	120 U	120	9.48
85-01-8	Phenanthrene	25 U	25	0.720
129-00-0	Pyrene	21 U	21	1.08

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**37SB3C**	QC Batch:	90708 -113
Sample #:	**345034**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	93
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	110 U	UJ,S	110	10.3
208-96-8	Acenaphthylene	230 U		230	12.8
120-12-7	Anthracene	23 U		23	0.770
56-55-3	Benzo (a) Anthracene	23 U		23	0.880
50-32-8	Benzo (a) Pyrene	23 U		23	1.10
205-99-2	Benzo (b) Fluoranthene	23 U		23	1.43
191-24-2	Benzo (g,h,i,) Perylene	23 U		23	13.8
207-08-9	Benzo (k) Fluoranthene	23 U		23	1.10
218-01-9	Chrysene	23 U		23	1.32
53-70-3	Dibenzo (a,h) Anthracene	23 U		23	1.54
206-44-0	Fluoranthene	23 U	UJ,I	23	1.87
86-73-7	Fluorene	23 U	UJ,S	23	1.43
193-39-5	Indeno (1,2,3-cd) Pyrene	23 U		23	0.770
91-20-3	Naphthalene	110 U		110	8.69
85-01-8	Phenanthrene	23 U		23	0.660
129-00-0	**Pyrene**	**1.2 J**	J,S	23	0.990

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**QSB1A**	QC Batch:	90708 -113
Sample #:	**345035**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	81
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	120 U		120	11.3
208-96-8	Acenaphthylene	260 U		260	13.9
120-12-7	Anthracene	26 U		26	0.840
56-55-3	Benzo (a) Anthracene	26 U		26	0.960
50-32-8	Benzo (a) Pyrene	26 U		26	1.20
205-99-2	Benzo (b) Fluoranthene	26 U		26	1.56
191-24-2	Benzo (g,h,i,) Perylene	26 U		26	15.0
207-08-9	Benzo (k) Fluoranthene	26 U		26	1.20
218-01-9	Chrysene	26 U		26	1.44
53-70-3	Dibenzo (a,h) Anthracene	26 U		26	1.68
206-44-0	Fluoranthene	26 U	UJ,I	26	2.04
86-73-7	Fluorene	26 U		26	1.56
193-39-5	Indeno (1,2,3-cd) Pyrene	26 U		26	0.840
91-20-3	Naphthalene	120 U		120	9.48
85-01-8	Phenanthrene	26 U		26	0.720
129-00-0	Pyrene	26 U		26	1.08

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/27/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**SBD3**	QC Batch:	90708 -113
Sample #:	**345036**	Anal. Batch:	208739
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	140 U		140	13.2
208-96-8	Acenaphthylene	290 U		290	16.2
120-12-7	Anthracene	29 U		29	0.980
56-55-3	Benzo (a) Anthracene	29 U		29	1.12
50-32-8	Benzo (a) Pyrene	29 U		29	1.40
205-99-2	Benzo (b) Fluoranthene	29 U		29	1.82
191-24-2	Benzo (g,h,i,) Perylene	29 U		29	17.5
207-08-9	Benzo (k) Fluoranthene	29 U		29	1.40
218-01-9	Chrysene	29 U		29	1.68
53-70-3	Dibenzo (a,h) Anthracene	29 U		29	1.96
206-44-0	**Fluoranthene**	**7.8 J**	J,1	29	2.38
86-73-7	Fluorene	29 U		29	1.82
193-39-5	Indeno (1,2,3-cd) Pyrene	29 U		29	0.980
91-20-3	Naphthalene	140 U		140	11.1
85-01-8	**Phenanthrene**	**1.6 J**		29	0.840
129-00-0	**Pyrene**	**3.8 J**		29	1.26

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/27/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**QSB1B**	QC Batch:	90708 -113
Sample #:	**345037**	Anal. Batch:	208739
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	120 U	UJ,S	120	11.3
208-96-8	Acenaphthylene	570 U		570	13.9
120-12-7	Anthracene	57 U		57	0.840
56-55-3	Benzo (a) Anthracene	57 U		57	0.960
50-32-8	Benzo (a) Pyrene	57 U		57	1.20
205-99-2	Benzo (b) Fluoranthene	57 U		57	1.56
191-24-2	Benzo (g,h,i,) Perylene	57 U		57	15.0
207-08-9	Benzo (k) Fluoranthene	57 U		57	1.20
218-01-9	Chrysene	57 U		57	1.44
53-70-3	Dibenzo (a,h) Anthracene	57 U		57	1.68
206-44-0	Fluoranthene	57 U	UJ,I	57	2.04
86-73-7	Fluorene	57 U	UJ,S	57	1.56
193-39-5	Indeno (1,2,3-cd) Pyrene	57 U		57	0.840
91-20-3	Naphthalene	120 U		120	9.48
85-01-8	Phenanthrene	57 U		57	0.720
129-00-0	Pyrene	57 U		57	1.08

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/27/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**QSB1C**	QC Batch:	90708 -113
Sample #:	**345038**	Anal. Batch:	208739
Matrix:	Soil	Percent Solids:	93
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	110 U		110	10.3
208-96-8	Acenaphthylene	230 U		230	12.8
120-12-7	Anthracene	23 U		23	0.770
56-55-3	Benzo (a) Anthracene	23 U		23	0.880
50-32-8	Benzo (a) Pyrene	23 U		23	1.10
205-99-2	Benzo (b) Fluoranthene	23 U		23	1.43
191-24-2	Benzo (g,h,i,) Perylene	23 U		23	13.8
207-08-9	Benzo (k) Fluoranthene	23 U		23	1.10
218-01-9	Chrysene	23 U		23	1.32
53-70-3	Dibenzo (a,h) Anthracene	23 U		23	1.54
206-44-0	Fluoranthene	23 U	UJ, I	23	1.87
86-73-7	Fluorene	23 U		23	1.43
193-39-5	Indeno (1,2,3-cd) Pyrene	23 U		23	0.770
91-20-3	Naphthalene	110 U		110	8.69
85-01-8	Phenanthrene	23 U		23	0.660
129-00-0	Pyrene	23 U		23	0.990

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/27/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**QSB3A**	QC Batch:	90708 -113
Sample #:	**345039**	Anal. Batch:	208739
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	UJ,S	130	12.2
208-96-8	Acenaphthylene	270 U		270	15.1
120-12-7	Anthracene	27 U		27	0.910
56-55-3	Benzo (a) Anthracene	21 U		21	1.04
50-32-8	Benzo (a) Pyrene	27 U		27	1.30
205-99-2	Benzo (b) Fluoranthene	27 U		27	1.69
191-24-2	Benzo (g,h,i,) Perylene	27 U		27	16.3
207-08-9	Benzo (k) Fluoranthene	27 U		27	1.30
218-01-9	Chrysene	27 U		27	1.56
53-70-3	Dibenzo (a,h) Anthracene	27 U		27	1.82
206-44-0	**Fluoranthene**	**6.4 J**	J,I	27	2.21
86-73-7	Fluorene	27 U	UJ,S	27	1.69
193-39-5	Indeno (1,2,3-cd) Pyrene	27 U		27	0.910
91-20-3	Naphthalene	130 U		130	10.3
85-01-8	Phenanthrene	21 U		21	0.780
129-00-0	**Pyrene**	**3.0 J**	J,S	27	1.17

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 14:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/27/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**QSB3B**	QC Batch:	90708 -113
Sample #:	**345040**	Anal. Batch:	208739
Matrix:	Soil	Percent Solids:	87
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	120 U	UJ,S	120	11.3
208-96-8	Acenaphthylene	240 U		240	13.9
120-12-7	Anthracene	24 U		24	0.840
56-55-3	Benzo (a) Anthracene	24 U		24	0.960
50-32-8	Benzo (a) Pyrene	24 U		24	1.20
205-99-2	Benzo (b) Fluoranthene	24 U		24	1.56
191-24-2	Benzo (g,h,i,) Perylene	24 U		24	15.0
207-08-9	Benzo (k) Fluoranthene	24 U		24	1.20
218-01-9	Chrysene	24 U		24	1.44
53-70-3	Dibenzo (a,h) Anthracene	24 U		24	1.68
206-44-0	Fluoranthene	24 U	UJ,I	24	2.04
86-73-7	Fluorene	24 U	UJ,S	24	1.56
193-39-5	Indeno (1,2,3-cd) Pyrene	24 U		24	0.840
91-20-3	Naphthalene	120 U		120	9.48
85-01-8	Phenanthrene	24 U		24	0.720
129-00-0	Pyrene	24 U		24	1.08

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/27/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**QSB3C**	QC Batch:	90708 -113
Sample #:	**345041**	Anal. Batch:	208739
Matrix:	Soil	Percent Solids:	92
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	110 U	UJ,S	110	10.3
208-96-8	Acenaphthylene	230 U		230	12.8
120-12-7	Anthracene	23 U		23	0.770
56-55-3	Benzo (a) Anthracene	23 U		23	0.880
50-32-8	Benzo (a) Pyrene	23 U		23	1.10
205-99-2	Benzo (b) Fluoranthene	23 U		23	1.43
191-24-2	Benzo (g,h,i,) Perylene	23 U		23	13.8
207-08-9	Benzo (k) Fluoranthene	23 U		23	1.10
218-01-9	Chrysene	23 U		23	1.32
53-70-3	Dibenzo (a,h) Anthracene	23 U		23	1.54
206-44-0	Fluoranthene	23 U	UJ,I	23	1.87
86-73-7	Fluorene	23 U	UJ,S	23	1.43
193-39-5	Indeno (1,2,3-cd) Pyrene	23 U		23	0.770
91-20-3	Naphthalene	110 U		110	8.69
85-01-8	Phenanthrene	23 U		23	0.660
129-00-0	Pyrene	23 U		23	0.990

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/27/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**QSB2A**	QC Batch:	90708 -113
Sample #:	**345042**	Anal. Batch:	208739
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	120 U		120	11.3
208-96-8	Acenaphthylene	250 U		250	13.9
120-12-7	Anthracene	25 U		25	0.840
56-55-3	Benzo (a) Anthracene	25 U		25	0.960
50-32-8	Benzo (a) Pyrene	25 U		25	1.20
205-99-2	Benzo (b) Fluoranthene	25 U		25	1.56
191-24-2	Benzo (g,h,i,) Perylene	25 U		25	15.0
207-08-9	Benzo (k) Fluoranthene	25 U		25	1.20
218-01-9	Chrysene	25 U		25	1.44
53-70-3	Dibenzo (a,h) Anthracene	25 U		25	1.68
206-44-0	Fluoranthene	25 U	UJ,I	25	2.04
86-73-7	Fluorene	25 U		25	1.56
193-39-5	Indeno (1,2,3-cd) Pyrene	25 U		25	0.840
91-20-3	Naphthalene	120 U		120	9.48
85-01-8	Phenanthrene	25 U		25	0.720
129-00-0	Pyrene	25 U		25	1.08

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:20
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/27/03 by TAJ
		Anal. Method:	USEPA-8310
Sample ID:	**QSB2B**	QC Batch:	90708 -113
Sample #:	**345043**	Anal. Batch:	208739
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	120 U		120	11.3
208-96-8	Acenaphthylene	250 U		250	13.9
120-12-7	Anthracene	25 U		25	0.840
56-55-3	Benzo (a) Anthracene	25 U		25	0.960
50-32-8	Benzo (a) Pyrene	25 U		25	1.20
205-99-2	Benzo (b) Fluoranthene	25 U		25	1.56
191-24-2	Benzo (g,h,i,) Perylene	25 U		25	15.0
207-08-9	Benzo (k) Fluoranthene	25 U		25	1.20
218-01-9	Chrysene	25 U		25	1.44
53-70-3	Dibenzo (a,h) Anthracene	25 U		25	1.68
206-44-0	Fluoranthene	25 U	UJ,I	25	2.04
86-73-7	Fluorene	25 U		25	1.56
193-39-5	Indeno (1,2,3-cd) Pyrene	25 U		25	0.840
91-20-3	Naphthalene	120 U		120	9.48
85-01-8	Phenanthrene	25 U		25	0.720
129-00-0	Pyrene	25 U		25	1.08

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/27/03 by TAJ
		Anal. Method:	USEPA-8310
Sample ID:	**QSB2C**	QC Batch:	90708 -113
Sample #:	**345044**	Anal. Batch:	208739
Matrix:	Soil	Percent Solids:	91
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	110 U		110	10.3
208-96-8	Acenaphthylene	230 U		230	12.8
120-12-7	Anthracene	23 U		23	0.770
56-55-3	Benzo (a) Anthracene	23 U		23	0.880
50-32-8	Benzo (a) Pyrene	23 U		23	1.10
205-99-2	Benzo (b) Fluoranthene	23 U		23	1.43
191-24-2	Benzo (g,h,i,) Perylene	23 U		23	13.8
207-08-9	Benzo (k) Fluoranthene	23 U		23	1.10
218-01-9	Chrysene	23 U		23	1.32
53-70-3	Dibenzo (a,h) Anthracene	23 U		23	1.54
206-44-0	Fluoranthene	23 U	UJ,1	23	1.87
86-73-7	Fluorene	23 U		23	1.43
193-39-5	Indeno (1,2,3-cd) Pyrene	23 U		23	0.770
91-20-3	Naphthalene	110 U		110	8.69
85-01-8	Phenanthrene	23 U		23	0.660
129-00-0	Pyrene	23 U		23	0.990

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 16:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/08/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**EQB1**	QC Batch:	90710 -108
Sample #:	**345045**	Anal. Batch:	208174
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	1.2 U	1.2	0.0279
208-96-8	Acenaphthylene	1.2 U	1.2	0.0525
120-12-7	Anthracene	1.2 U	1.2	0.0024
56-55-3	Benzo (a) Anthracene	0.062 U	0.062	0.0026
50-32-8	Benzo (a) Pyrene	0.062 U	0.062	0.0069
205-99-2	Benzo (b) Fluoranthene	0.090 U	0.090	0.0138
191-24-2	Benzo (g,h,i,) Perylene	1.2 U	1.2	0.0539
207-08-9	Benzo (k) Fluoranthene	0.12 U	0.12	0.0043
218-01-9	Chrysene	1.2 U	1.2	0.0034
53-70-3	Dibenzo (a,h) Anthracene	0.24 U	0.24	0.0416
206-44-0	Fluoranthene	1.2 U	1.2	0.0074
86-73-7	Fluorene	1.2 U	1.2	0.0096
193-39-5	Indeno (1,2,3-cd) Pyrene	0.062 U	0.062	0.0050
91-20-3	Naphthalene	0.62 U	0.62	0.0422
85-01-8	Phenanthrene	1.2 U	1.2	0.0032
129-00-0	Pyrene	1.2 U	1.2	0.0194

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 08:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/19/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**37SB1C**	QC Batch:	89967 -113
Sample #:	**345028**	Anal. Batch:	207866
Matrix:	Soil	Percent Solids:	85
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	Benzene-2-methyl-1,3,5-trinitro-	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitrotoluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitrotoluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1.0 U	UJ,C	1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U		0.50	0.131
479-45-8	Methyl-2,4,6-trinitrophenylnitramine	1.0 U		1.0	0.169

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Client:	**URS Corporation**	Sampled:	10/02/03 @ 09:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**37SB2A**	QC Batch:	90258 -114
Sample #:	**345029**	Anal. Batch:	208353
Matrix:	Soil	Percent Solids:	63
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	Benzene-2-methyl-1,3,5-trinitro-	0.50 U		0.50	0.167
121-14-2	**2,4-Dinitrotoluene**	**0.63**	J,M	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitrotoluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	UJ,C	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitrotoluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U		0.50	0.131
479-45-8	Methyl-2,4,6-trinitrophenylnitramine	1.0 U		1.0	0.169

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Client:	**URS Corporation**	Sampled:	10/02/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**37SB2B**	QC Batch:	90258 -114
Sample #:	**345030**	Anal. Batch:	208353
Matrix:	Soil	Percent Solids:	85
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	Benzene-2-methyl-1,3,5-trinitro-	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitrotoluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	UJ,C	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitrotoluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U		0.50	0.131
479-45-8	Methyl-2,4,6-trinitrophenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**37SB2C**	QC Batch:	90258 -114
Sample #:	**345031**	Anal. Batch:	208353
Matrix:	Soil	Percent Solids:	86
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	Benzene-2-methyl-1,3,5-trinitro-	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitrotoluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	UJ,C	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitrotoluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U		0.50	0.131
479-45-8	Methyl-2,4,6-trinitrophenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**37SB3A**	QC Batch:	90258 -114
Sample #:	**345032**	Anal. Batch:	208353
Matrix:	Soil	Percent Solids:	88
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	Benzene-2-methyl-1,3,5-trinitro-	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitrotoluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	UJ,C	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitrotoluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U		0.50	0.131
479-45-8	Methyl-2,4,6-trinitrophenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**37SB3B**	QC Batch:	90259 -115
Sample #:	**345033**	Anal. Batch:	208353
Matrix:	Soil	Percent Solids:	84
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	Benzene-2-methyl-1,3,5-trinitro-	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitrotoluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	UJ,C	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitrotoluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U		0.50	0.131
479-45-8	Methyl-2,4,6-trinitrophenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**37SB3C**	QC Batch:	90258 -114
Sample #:	**345034**	Anal. Batch:	208353
Matrix:	Soil	Percent Solids:	93
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	Benzene-2-methyl-1,3,5-trinitro-	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitrotoluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	UJ,C	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitrotoluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U		0.50	0.131
479-45-8	Methyl-2,4,6-trinitrophenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**QSB1A**	QC Batch:	90258 -114
Sample #:	**345035**	Anal. Batch:	208353
Matrix:	Soil	Percent Solids:	81
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	Benzene-2-methyl-1,3,5-trinitro-	0.50 U		0.50	0.167
121-14-2	**2,4-Dinitrotoluene**	**0.31 J**		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitrotoluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	UJ,C	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitrotoluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U		0.50	0.131
479-45-8	Methyl-2,4,6-trinitrophenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**SBD3**	QC Batch:	90258 -114
Sample #:	**345036**	Anal. Batch:	208353
Matrix:	Soil	Percent Solids:	74
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	Benzene-2-methyl-1,3,5-trinitro-	0.50 U		0.50	0.167
121-14-2	**2,4-Dinitrotoluene**	**0.20 J**		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitrotoluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	UJ,C	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitrotoluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U		0.50	0.131
479-45-8	Methyl-2,4,6-trinitrophenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**QSB1B**	QC Batch:	90258 -114
Sample #:	**345037**	Anal. Batch:	208353
Matrix:	Soil	Percent Solids:	84
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	Benzene-2-methyl-1,3,5-trinitro-	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitrotoluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitrotoluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U		0.50	0.131
479-45-8	Methyl-2,4,6-trinitrophenylnitramine	1.0 U		1.0	0.169

004119

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**QSB1C**	QC Batch:	90258 -114
Sample #:	**345038**	Anal. Batch:	208353
Matrix:	Soil	Percent Solids:	93
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	Benzene-2-methyl-1,3,5-trinitro-	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitrotoluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,c	1.0	0.184
19406-51-0	4-Amino-2,6-dinitrotoluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U		0.50	0.131
479-45-8	Methyl-2,4,6-trinitrophenylnitramine	1.0 U		1.0	0.169

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Client:	**URS Corporation**	Sampled:	10/02/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**QSB3A**	QC Batch:	90258 -114
Sample #:	**345039**	Anal. Batch:	208353
Matrix:	Soil	Percent Solids:	78
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	Benzene-2-methyl-1,3,5-trinitro-	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitrotoluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,c	1.0	0.184
19406-51-0	4-Amino-2,6-dinitrotoluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U		0.50	0.131
479-45-8	Methyl-2,4,6-trinitrophenylnitramine	1.0 U		1.0	0.169

004129

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Client:	**URS Corporation**	Sampled:	10/02/03 @ 14:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**QSB3B**	QC Batch:	90258 -114
Sample #:	**345040**	Anal. Batch:	208353
Matrix:	Soil	Percent Solids:	87
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	Benzene-2-methyl-1,3,5-trinitro-	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitrotoluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,c	1.0	0.184
19406-51-0	4-Amino-2,6-dinitrotoluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U		0.50	0.131
479-45-8	Methyl-2,4,6-trinitrophenylnitramine	1.0 U		1.0	0.169

004137

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**QSB3C**	QC Batch:	90258 -114
Sample #:	**345041**	Anal. Batch:	208353
Matrix:	Soil	Percent Solids:	92
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	Benzene-2-methyl-1,3,5-trinitro-	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitrotoluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,c	1.0	0.184
19406-51-0	4-Amino-2,6-dinitrotoluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U		0.50	0.131
479-45-8	Methyl-2,4,6-trinitrophenylnitramine	1.0 U		1.0	0.169

004139

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**QSB2A**	QC Batch:	90258 -114
Sample #:	**345042**	Anal. Batch:	208353
Matrix:	Soil	Percent Solids:	85
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	Benzene-2-methyl-1,3,5-trinitro-	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitrotoluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ, c	1.0	0.184
19406-51-0	4-Amino-2,6-dinitrotoluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U		0.50	0.131
479-45-8	Methyl-2,4,6-trinitrophenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**QSB2B**	QC Batch:	90258 -114
Sample #:	**345043**	Anal. Batch:	208353
Matrix:	Soil	Percent Solids:	84
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	Benzene-2-methyl-1,3,5-trinitro-	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitrotoluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ, c	1.0	0.184
19406-51-0	4-Amino-2,6-dinitrotoluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U		0.50	0.131
479-45-8	Methyl-2,4,6-trinitrophenylnitramine	1.0 U		1.0	0.169

004149

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**QSB2C**	QC Batch:	90258 -114
Sample #:	**345044**	Anal. Batch:	208353
Matrix:	Soil	Percent Solids:	91
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	Benzene-2-methyl-1,3,5-trinitro-	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitrotoluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJC	1.0	0.184
19406-51-0	4-Amino-2,6-dinitrotoluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U		0.50	0.131
479-45-8	Methyl-2,4,6-trinitrophenylnitramine	1.0 U		1.0	0.169

004153

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 16:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/19/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**EQB1**	QC Batch:	89804 -109
Sample #:	**345045**	Anal. Batch:	207913
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.65 U		0.65	0.150
99-65-0	1,3-Dinitrobenzene	0.65 U		0.65	0.121
118-96-7	Benzene-2-methyl-1,3,5-trinitro-	0.65 U		0.65	0.102
121-14-2	2,4-Dinitrotoluene	0.65 U		0.65	0.114
606-20-2	2,6-Dinitrotoluene	0.65 U		0.65	0.217
35572-78-2	2-Amino-4,6-dinitro-toluene	1.0 U		1.0	0.245
88-72-2	2-Nitrotoluene	0.65 U		0.65	0.175
99-08-1	3-Nitrotoluene	2.0 U	UJ,c	2.0	0.413
19406-51-0	4-Amino-2,6-dinitro-toluene	1.0 U		1.0	0.239
99-99-0	4-Nitrotoluene	2.0 U		2.0	0.488
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	UJ,c	1.0	0.277
98-95-3	Nitrobenzene	0.65 U		0.65	0.0825
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.65 U		0.65	0.109
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	2.0 U		2.0	0.0931

004158

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by JRR
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/11/03 by MSN
	RAAP	Anal. Method:	USEPA-8081A
Sample ID:	**QSB1A**	QC Batch:	90181 -109
Sample #:	**345035**	Anal. Batch:	208238
Matrix:	Soil	Percent Solids:	81
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Chlorinated Pesticides OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
72-54-8	4,4'-DDD	25 U	25	0.286
72-55-9	4,4'-DDE	25 U	25	0.210
50-29-3	4,4'-DDT	25 U	25	0.216
309-00-2	Aldrin	25 U	25	0.365
319-84-6	Alpha-BHC	25 U	25	0.364
57-74-9	A-Chlordane	25 U	25	0.521
5103-74-2	G-Chlordane	25 U	25	0.844
319-85-7	Beta-BHC	25 U	25	1.36
319-86-8	Delta-BHC	25 U	25	0.982
60-57-1	Dieldrin	25 U	25	0.371
115-29-7	Endosulfan I	25 U	25	1.09
33213-65-9	Endosulfan II	25 U	25	0.257
1031-07-8	Endosulfan Sulfate	25 U	25	0.604
72-20-8	Endrin	25 U	25	0.358
7421-93-4	Endrin Aldehyde	25 U	25	1.33
53494-70-5	Endrin Ketone	25 U	25	0.330
58-89-9	Lindane	25 U	25	0.233
76-44-8	Heptachlor	25 U	25	0.846
1024-57-3	Heptachlor Epoxide	25 U	25	0.546
72-43-5	Methoxychlor	25 U	25	0.336
8001-35-2	Toxaphene	210 U	210	28.0

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by JRR
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/11/03 by MSN
	RAAP	Anal. Method:	USEPA-8081A
Sample ID:	**SBD3**	QC Batch:	90181 -109
Sample #:	**345036**	Anal. Batch:	208238
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Chlorinated Pesticides OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
72-54-8	4,4'-DDD	27 U	27	0.333
72-55-9	4,4'-DDE	27 U	27	0.245
50-29-3	4,4'-DDT	27 U	27	0.252
309-00-2	Aldrin	27 U	27	0.426
319-84-6	Alpha-BHC	27 U	27	0.424
57-74-9	A-Chlordane	27 U	27	0.608
5103-74-2	G-Chlordane	27 U	27	0.984
319-85-7	Beta-BHC	27 U	27	1.58
319-86-8	Delta-BHC	27 U	27	1.15
60-57-1	Dieldrin	27 U	27	0.433
115-29-7	Endosulfan I	27 U	27	1.27
33213-65-9	Endosulfan II	27 U	27	0.300
1031-07-8	Endosulfan Sulfate	27 U	27	0.704
72-20-8	Endrin	27 U	27	0.417
7421-93-4	Endrin Aldehyde	27 U	27	1.55
53494-70-5	Endrin Ketone	27 U	27	0.385
58-89-9	Lindane	27 U	27	0.272
76-44-8	Heptachlor	27 U	27	0.987
1024-57-3	Heptachlor Epoxide	27 U	27	0.637
72-43-5	Methoxychlor	27 U	27	0.392
8001-35-2	Toxaphene	230 U	230	32.6

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 16:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/08/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3510C
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by MSN
	RAAP	Anal. Method:	USEPA-8081A
Sample ID:	**EQB1**	QC Batch:	90180 ~108
Sample #:	**345045**	Anal. Batch:	208237
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Chlorinated Pesticides OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
72-54-8	4,4'-DDD	0.10 U	0.10	0.0016
72-55-9	4,4'-DDE	0.10 U	0.10	0.0025
50-29-3	4,4'-DDT	0.10 U	0.10	0.0018
309-00-2	Aldrin	0.050 U	0.050	0.0019
319-84-6	Alpha-BHC	0.050 U	0.050	0.0014
57-74-9	A-Chlordane	0.050 U	0.050	0.0024
5103-74-2	G-Chlordane	0.050 U	0.050	0.0023
319-85-7	Beta-BHC	0.050 U	0.050	0.0039
319-86-8	Delta-BHC	0.050 U	0.050	0.0025
60-57-1	Dieldrin	0.10 U	0.10	0.0034
115-29-7	Endosulfan I	0.050 U	0.050	0.0026
33213-65-9	Endosulfan II	0.10 U	0.10	0.0021
1031-07-8	Endosulfan Sulfate	0.10 U	0.10	0.0022
72-20-8	Endrin	0.10 U	0.10	0.0038
7421-93-4	Endrin Aldehyde	0.10 U	0.10	0.0053
53494-70-5	Endrin Ketone	0.10 U	0.10	0.0020
58-89-9	Lindane	0.050 U	0.050	0.0016
76-44-8	Heptachlor	0.050 U	0.050	0.0021
1024-57-3	Heptachlor Epoxide	0.050 U	0.050	0.0022
72-43-5	Methoxychlor	0.50 U	0.50	0.0032
8001-35-2	Toxaphene	1.0 U	1.0	0.118

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by JRR
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JLRM
	RAAP	Anal. Method:	USEPA-8082
Sample ID:	**QSB1A**	QC Batch:	89881 -109
Sample #:	**345035**	Anal. Batch:	207778
Matrix:	Soil	Percent Solids:	81
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polychlorinated Biphenyls OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
12674-11-2	PCB-1016	81 U	81	19.2
11104-28-2	PCB-1221	41 U	41	2.40
11141-16-5	PCB-1232	41 U	41	6.00
53469-21-9	PCB-1242	41 U	41	3.60
12672-29-6	PCB-1248	41 U	41	6.00
11097-69-1	**PCB-1254**	**53**	41	3.60
11096-82-5	PCB-1260	41 U	41	8.40

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by JRR
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JLRM
	RAAP	Anal. Method:	USEPA-8082
Sample ID:	**SBD3**	QC Batch:	89881 -109
Sample #:	**345036**	Anal. Batch:	207778
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Polychlorinated Biphenyls OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
12674-11-2	PCB-1016	89 U	89	22.4
11104-28-2	PCB-1221	45 U	45	2.80
11141-16-5	PCB-1232	45 U	45	7.00
53469-21-9	PCB-1242	45 U	45	4.20
12672-29-6	PCB-1248	45 U	45	7.00
11097-69-1	**PCB-1254**	**51**	45	4.20
11096-82-5	PCB-1260	45 U	45	9.80

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 16:20
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
Submittal #:	**36440-2**	Prepared:	10/08/03 by DJM
Submittal:	Delivery Order 0046 RAAP	Prep. Method:	USEPA-3510C
		Analyzed:	10/16/03 by JLRM
Sample ID:	**EQB1**	Anal. Method:	USEPA-8082
Sample #:	**345045**	QC Batch:	89851 -108
Matrix:	QC Water	Anal. Batch:	207778
Unit:	ug/L	Percent Solids:	n/a
		Dilution Factor:	1

CAS Number	Polychlorinated Biphenyls OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
12674-11-2	PCB-1016	0.30 U	0.30	0.0753
11104-28-2	PCB-1221	0.50 U	0.50	0.0504
11141-16-5	PCB-1232	0.30 U	0.30	0.0794
53469-21-9	PCB-1242	0.30 U	0.30	0.0809
12672-29-6	PCB-1248	0.25 U	0.25	0.0828
11097-69-1	PCB-1254	0.10 U	0.10	0.0341
11096-82-5	PCB-1260	0.20 U	0.20	0.0481

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8151A
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/14/03 by MSN
		Anal. Method:	USEPA-8151A
Sample ID:	**QSB1A**	QC Batch:	90218 -110
Sample #:	**345035**	Anal. Batch:	208309
Matrix:	Soil	Percent Solids:	81
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Herbicides	Analytical Result	Reporting Limit	MDL
93-76-5	2,4,5-T	62 U	62	2.40
93-72-1	2,4,5-TP (Silvex)	62 U	62	4.80
94-75-7	2,4-D	250 U	250	19.2
94-82-6	2,4-DB	250 U	250	74.4
75-99-0	Dalapon	310 U	310	68.4
1918-00-9	Dicamba	250 U	250	2.40
120-36-5	Dichlorprop	250 U	250	20.4
~~88-85-7~~	~~*Dinoseb~~ *JC 12/16/03	~~250 UR~~ R,1	~~250~~	~~25.2~~ see re-extraction
94-74-6	MCPA	25000 U	25000	1680
93-65-2	MCPP	25000 U	25000	6070

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8151A
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/29/03 by JLRM
		Anal. Method:	USEPA-8151A
Sample ID:	**QSB1A**	QC Batch:	90218 -110
Sample #:	**345035DL**	Anal. Batch:	208404
Matrix:	Soil	Percent Solids:	81
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	*Herbicides	Analytical Result		Reporting Limit	MDL
93-76-5	2,4,5-T	62 U	UJ,h	62	2.40
93-72-1	2,4,5-TP (Silvex)	62 U		62	4.80
94-75-7	2,4-D	250 U		250	19.2
94-82-6	2,4-DB	250 U		250	74.4
75-99-0	Dalapon	310 U		310	68.4
1918-00-9	Dicamba	250 U		250	2.40
120-36-5	Dichlorprop	250 U		250	20.4
88-85-7	Dinoseb	250 U	UJ,h	250	25.2
94-74-6	MCPA	25000 U	UJ,h	25000	1680
93-65-2	MCPP	25000 U		25000	6070

* See attached Statement of Data Qualifications.

Use only the dinoseb result from this analysis, ts 12/16/03

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 00:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8151A
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/14/03 by MSN
		Anal. Method:	USEPA-8151A
Sample ID:	**SBD3**	QC Batch:	90218 -110
Sample #:	**345036**	Anal. Batch:	208309
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Herbicides	Analytical Result	Reporting Limit	MDL
93-76-5	2,4,5-T	68 U	68	2.80
93-72-1	2,4,5-TP (Silvex)	68 U	68	5.60
94-75-7	2,4-D	270 U	270	22.4
94-82-6	2,4-DB	270 U	270	86.8
75-99-0	Dalapon	340 U	340	79.8
1918-00-9	Dicamba	270 U	270	2.80
120-36-5	Dichlorprop	270 U	270	23.8
~~88-85-7~~	~~*Dinoseb~~	~~270 UR~~	~~270~~	~~29.4~~
94-74-6	MCPA	27000 U	27000	1950
93-65-2	MCPP	27000 U	27000	7080

~~*~~ 12/16/03 R,1 see re-extraction

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8151A
Submittal:	Delivery Order 0046	Analyzed:	10/29/03 by JLRM
	RAAP	Anal. Method:	USEPA-8151A
Sample ID:	**SBD3**	QC Batch:	90218 -110
Sample #:	**345036DL**	Anal. Batch:	208404
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	*Herbicides	Analytical Result		Reporting Limit	MDL
93-76-5	2,4,5-T	68 U	UJ,h	68	2.80
93-72-1	2,4,5-TP (Silvex)	68 U		68	5.60
94-75-7	2,4-D	270 U		270	22.4
94-82-6	2,4-DB	270 U		270	86.8
75-99-0	Dalapon	340 U		340	79.8
1918-00-9	Dicamba	270 U		270	2.80
120-36-5	Dichlorprop	270 U		270	23.8
88-85-7	Dinoseb	270 U	UJ,h	270	29.4
94-74-6	MCPA	27000 U	UJ,h	27000	1950
93-65-2	MCPP	27000 U		27000	7080

* See attached Statement of Data Qualifications.

Use only the dinoseb result from this analysis, ✱ 12/16/03

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 16:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8151A
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by MSN
	RAAP	Anal. Method:	USEPA-8151A
Sample ID:	**EQB1**	QC Batch:	90447 -109
Sample #:	**345045**	Anal. Batch:	208309
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Herbicides	Analytical Result	Reporting Limit	MDL
93-76-5	2,4,5-T	0.50 U	0.50	0.053
93-72-1	2,4,5-TP (Silvex)	0.50 U	0.50	0.104
94-75-7	2,4-D	5.0 U	5.0	0.670
94-82-6	2,4-DB	5.0 U	5.0	0.955
75-99-0	Dalapon	5.0 U	5.0	0.862
1918-00-9	Dicamba	0.50 U	0.50	0.104
120-36-5	Dichlorprop	5.0 U	5.0	0.195
88-85-7	Dinoseb	1.0 U	1.0	0.168
94-74-6	MCPA	250 U	250	76.8
93-65-2	MCPP	250 U	250	74.8

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/02/03 @ 08:45
Sampler: B.F. & J.S.
Received: 10/03/03 @ 09:10

Submittal #: **36440-2**
Submittal: Delivery Order 0046
RAAP
Sample ID: **37SB1C**
Sample #: **345028**
Matrix: Soil

Percent Solids: 85

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	13800		500	91.50	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Antimony, Total	0.24 J	B,P	0.50	0.0518	mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	1.7		0.40	0.0232	mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	85		1.0	0.106	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Beryllium, Total	0.52 J		1.0	0.0391	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	0.59 J	B,P	1.0	0.182	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	1700		250	16.6	mg/kg dry	10/17/03	DWJ	USEPA-6010B
Chromium, Total	18		5.0	0.912	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	8.1		1.0	0.208	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	10		1.0	0.368	mg/kg dry	10/17/03	DWJ	USEPA-6010B
Iron, Total	27700		1000	212.000	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Lead, Total	7.6		1.0	0.0218	mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	3230	K,M	250	16.05	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Manganese, Total	503		10	2.640	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Mercury, Total	0.10 U		0.10	0.0077	mg/kg dry	10/09/03	MSS	USEPA-7471A
Nickel, Total	12		0.50	0.0356	mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	1600		100	25.00	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Selenium, Total	0.58 J		1.0	0.0502	mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.047 J		3.0	0.0044	mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	93 J	B,P	100	8.92	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.15 J		0.50	0.0270	mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	33		1.0	0.207	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	45		4.0	0.517	mg/kg dry	10/13/03	KLVM	USEPA-6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 09:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
Submittal #:	**36440-2**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**37SB2A**		
Sample #:	**345029**		
Matrix:	Soil	Percent Solids:	63

Parameter	Analytical Result	Reporting Limit	MDL	DF	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	17000	500	91.50	10	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Antimony, Total	1.2	0.50	0.0518	1	mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	5.0	0.40	0.0232	1	mg/kg dry	10/17/03	JMF	USEPA-6020
Barium, Total	50	1.0	0.106	1	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Beryllium, Total	0.72 J	1.0	0.0391	1	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	1.6	1.0	0.182	1	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	106000	12500	4150.0	50	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Chromium, Total	114 J,S	25	4.560	5	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Cobalt, Total	3.1	1.0	0.208	1	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	193	5.0	1.840	5	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Iron, Total	19500	1000	212.000	100	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Lead, Total	277	50	1.0900	50	mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	3780 K,M	250	16.05	1	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Manganese, Total	164	5.0	1.320	5	mg/kg dry	10/15/03	DWJ	USEPA-6010B
* Mercury, Total	0.60 J,M	0.10	0.0077	1	mg/kg dry	10/09/03	MSS	USEPA-7471A
Nickel, Total	50	5.0	0.3560	10	mg/kg dry	10/17/03	JMF	USEPA-6020
Potassium, Total	677	20	5.00	1	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Selenium, Total	0.43 J	1.0	0.0502	1	mg/kg dry	10/17/03	JMF	USEPA-6020
Silver, Total	0.24 J	3.0	0.0044	1	mg/kg dry	10/17/03	JMF	USEPA-6020
Sodium, Total	87 J B,P	100	8.92	1	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.064 J	0.50	0.0270	1	mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	19	1.0	0.207	1	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	129	20	2.585	5	mg/kg dry	10/15/03	DWJ	USEPA-6010B

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/02/03 @ 09:45
Sampler: B.F. & J.S.
Received: 10/03/03 @ 09:10

Submittal #: **36440-2**
Submittal: Delivery Order 0046
RAAP
Sample ID: **37SB2B**
Sample #: **345030**
Matrix: Soil

Percent Solids: 85

Parameter	Analytical Result	Reporting Limit	MDL	DF	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	17500	500	91.50	10	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Antimony, Total	0.23 J B,P	0.50	0.0518	1	mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	1.3	0.40	0.0232	1	mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	103	5.0	5.300	5	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Beryllium, Total	0.61 J	1.0	0.0391	1	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	1.6 B,P	1.0	0.182	1	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	2610	250	16.6	1	mg/kg dry	10/17/03	DWJ	USEPA-6010B
Chromium, Total	20	5.0	0.912	1	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	11	1.0	0.208	1	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	11	1.0	0.368	1	mg/kg dry	10/17/03	DWJ	USEPA-6010B
Iron, Total	28200	1000	212.000	100	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Lead, Total	7.8	1.0	0.0218	1	mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	4790 K,M	500	32.10	2	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Manganese, Total	419	10	2.640	10	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Mercury, Total	0.10 U	0.10	0.0077	1	mg/kg dry	10/09/03	MSS	USEPA-7471A
Nickel, Total	14	0.50	0.0356	1	mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	2140	100	25.00	1	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Selenium, Total	0.53 J	1.0	0.0502	1	mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.051 J	3.0	0.0044	1	mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	80 J B,P	100	8.92	1	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.19 J	0.50	0.0270	1	mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	43	1.0	0.207	1	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	65	4.0	0.517	1	mg/kg dry	10/13/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10

Submittal #: **36440-2**
Submittal: Delivery Order 0046
RAAP
Sample ID: **37SB2C**
Sample #: **345031**
Matrix: Soil
Percent Solids: 86

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	12700		500	91.50	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Antimony, Total	0.22 J	B,P	0.50	0.0518	mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	1.6		0.40	0.0232	mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	73		1.0	0.106	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Beryllium, Total	0.36 J		1.0	0.0391	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	0.75 J	B,P	1.0	0.182	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	2040		250	16.6	mg/kg dry	10/17/03	DWJ	USEPA-6010B
Chromium, Total	18		5.0	0.912	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	6.9		1.0	0.208	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	10		1.0	0.368	mg/kg dry	10/17/03	DWJ	USEPA-6010B
Iron, Total	17500		500	106.000	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Lead, Total	7.9		1.0	0.0218	mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	3430	K,M	250	16.05	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Manganese, Total	252		5.0	1.320	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Mercury, Total	0.10 U		0.10	0.0077	mg/kg dry	10/09/03	MSS	USEPA-7471A
Nickel, Total	12		0.50	0.0356	mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	1650		100	25.00	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Selenium, Total	0.45 J		1.0	0.0502	mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.042 J		3.0	0.0044	mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	72 J	B,P	100	8.92	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.16 J		0.50	0.0270	mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	27		1.0	0.207	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	38		4.0	0.517	mg/kg dry	10/13/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
Submittal #:	**36440-2**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**37SB3A**		
Sample #:	**345032**		
Matrix:	Soil	Percent Solids:	88

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	10600		500	91.50	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Antimony, Total	0.18 J	B,P	0.50	0.0518	mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	1.0		0.40	0.0232	mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	103		5.0	0.530	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Beryllium, Total	0.48 J		1.0	0.0391	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	1.1	B,P	1.0	0.182	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	1480		250	16.6	mg/kg dry	10/17/03	DWJ	USEPA-6010B
Chromium, Total	15		5.0	0.912	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	5.6		1.0	0.208	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	6.9		1.0	0.368	mg/kg dry	10/17/03	DWJ	USEPA-6010B
Iron, Total	15900		500	106.000	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Lead, Total	15		1.0	0.0218	mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	2600	K,M	250	16.05	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Manganese, Total	403		10	2.640	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Mercury, Total	0.013 J		0.10	0.0077	mg/kg dry	10/09/03	MSS	USEPA-7471A
Nickel, Total	8.4		0.50	0.0356	mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	1290		100	25.00	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Selenium, Total	0.42 J		1.0	0.0502	mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.045 J		3.0	0.0044	mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	83 J	B,P	100	8.92	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.12 J		0.50	0.0270	mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	21		1.0	0.207	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	77		4.0	0.517	mg/kg dry	10/13/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/02/03 @ 10:30
Sampler: B.F. & J.S.
Received: 10/03/03 @ 09:10

Submittal #: **36440-2**
Submittal: Delivery Order 0046
RAAP
Sample ID: **37SB3B**
Sample #: **345033**
Matrix: Soil

Percent Solids: 84

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	15300		500	91.50	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Antimony, Total	0.17 J	B,P	0.50	0.0518	mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	1.0		0.40	0.0232	mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	98		5.0	0.530	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Beryllium, Total	0.46 J		1.0	0.0391	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	1.3	B,P	1.0	0.182	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	1030		250	16.6	mg/kg dry	10/17/03	DWJ	USEPA-6010B
Chromium, Total	18		5.0	0.912	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	7.4		1.0	0.208	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	9.6		1.0	0.368	mg/kg dry	10/17/03	DWJ	USEPA-6010B
Iron, Total	22900		1000	212.000	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Lead, Total	7.4		1.0	0.0218	mg/kg dry	10/09/03	JMF	USEPA-6020
* Magnesium, Total	3550	K,M	250	16.05	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Manganese, Total	267		5.0	1.320	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Mercury, Total	0.10 U		0.10	0.0077	mg/kg dry	10/09/03	MSS	USEPA-7471A
Nickel, Total	11		0.50	0.0356	mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	1820		100	25.00	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Selenium, Total	0.42 J		1.0	0.0502	mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.037 J		3.0	0.0044	mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	69 J	B,P	100	8.92	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.15 J		0.50	0.0270	mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	33		1.0	0.207	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	55		4.0	0.517	mg/kg dry	10/13/03	KLVM	USEPA-6010B

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
Submittal #:	**36440-2**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**37SB3C**		
Sample #:	**345034**		
Matrix:	Soil	Percent Solids:	93

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	12400		500	91.50	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Antimony, Total	0.26 J	B,P	0.50	0.0518	mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	2.1		0.40	0.0232	mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	113		5.0	0.530	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Beryllium, Total	0.34 J		1.0	0.0391	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	0.82 J	B,P	1.0	0.182	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	1590		250	16.6	mg/kg dry	10/17/03	DWJ	USEPA-6010B
Chromium, Total	18		5.0	0.912	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	9.0		1.0	0.208	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	7.7		1.0	0.368	mg/kg dry	10/17/03	DWJ	USEPA-6010B
Iron, Total	26000		1000	212.000	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Lead, Total	9.2		1.0	0.0218	mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	3170	K,M	250	16.05	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Manganese, Total	381		10	2.640	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Mercury, Total	0.10 U		0.10	0.0077	mg/kg dry	10/09/03	MSS	USEPA-7471A
Nickel, Total	11		0.50	0.0356	mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	1480		100	25.00	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Selenium, Total	0.50 J		1.0	0.0502	mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.060 J		3.0	0.0044	mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	67 J	B,P	100	8.92	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.13 J		0.50	0.0270	mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	27		1.0	0.207	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	56		4.0	0.517	mg/kg dry	10/13/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/02/03 @ 13:00
Sampler: B.F. & J.S.
Received: 10/03/03 @ 09:10

Submittal #: **36440-2**
Submittal: Delivery Order 0046
RAAP
Sample ID: **QSB1A**
Sample #: **345035**
Matrix: Soil

Percent Solids: 81

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	16000	500	91.50	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Antimony, Total	0.19 J B,P	0.50	0.0518	mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	1.2	0.40	0.0232	mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	148	5.0	0.530	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Beryllium, Total	0.82 J	1.0	0.0391	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	0.88 J B,P	1.0	0.182	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	10100 J,f	250	16.6	mg/kg dry	10/17/03	DWJ	USEPA-6010B
Chromium, Total	21	5.0	0.912	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	7.6	1.0	0.208	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	10	1.0	0.368	mg/kg dry	10/17/03	DWJ	USEPA-6010B
Iron, Total	22600	1000	212.000	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Lead, Total	15 J,f	1.0	0.0218	mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	3530 K,M	250	16.05	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Manganese, Total	519	10	2.640	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Mercury, Total	0.015 J	0.10	0.0077	mg/kg dry	10/09/03	MSS	USEPA-7471A
Nickel, Total	13	0.50	0.0356	mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	2180	100	25.00	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Selenium, Total	0.59 J	1.0	0.0502	mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.067 J	3.0	0.0044	mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	64 J B,P	100	8.92	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.14 J	0.50	0.0270	mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	29	1.0	0.207	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	67	4.0	0.517	mg/kg dry	10/13/03	KLVM	USEPA-6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/02/03 @ 00:00
Sampler: B.F. & J.S.
Received: 10/03/03 @ 09:10

Submittal #: **36440-2**
Submittal: Delivery Order 0046
RAAP
Sample ID: **SBD3**
Sample #: **345036**
Matrix: Soil

Percent Solids: 74

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	12600		500	91.50	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Antimony, Total	0.20 J	B,P	0.50	0.0518	mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	1.6		0.40	0.0232	mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	113		5.0	0.530	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Beryllium, Total	0.57 J		1.0	0.0391	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	1.1	B,P	1.0	0.182	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	36300	J,f	2500	166.0	mg/kg dry	10/17/03	DWJ	USEPA-6010B
Chromium, Total	17		5.0	0.912	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	5.9		1.0	0.208	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	13		1.0	0.368	mg/kg dry	10/17/03	DWJ	USEPA-6010B
Iron, Total	16700		500	106.000	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Lead, Total	32	J,f	1.0	0.0218	mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	2880	K,M	250	16.05	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Manganese, Total	415		10	2.640	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Mercury, Total	0.025 J		0.10	0.0077	mg/kg dry	10/09/03	MSS	USEPA-7471A
Nickel, Total	14		0.50	0.0356	mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	1810		100	25.00	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Selenium, Total	0.63 J		1.0	0.0502	mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.075 J		3.0	0.0044	mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	65 J	B,P	100	8.92	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.13 J		0.50	0.0270	mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	23		1.0	0.207	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	55		4.0	0.517	mg/kg dry	10/13/03	KLVM	USEPA-6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
Submittal #:	**36440-2**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**QSB1B**		
Sample #:	**345037**		
Matrix:	Soil	Percent Solids:	84

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	14000	500	91.50	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Antimony, Total	0.15 J B,P	0.50	0.0518	mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	0.97	0.40	0.0232	mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	110	10	0.530	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Beryllium, Total	0.66 J	1.0	0.0391	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	1.3 B,P	1.0	0.182	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	2260	250	16.6	mg/kg dry	10/17/03	DWJ	USEPA-6010B
Chromium, Total	18	5.0	0.912	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	8.1	1.0	0.208	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	7.6	1.0	0.368	mg/kg dry	10/17/03	DWJ	USEPA-6010B
Iron, Total	19600	500	106.000	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Lead, Total	7.2	1.0	0.0218	mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	3280 K,M	250	16.05	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Manganese, Total	372	10	2.640	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Mercury, Total	0.10 U	0.10	0.0077	mg/kg dry	10/09/03	MSS	USEPA-7471A
Nickel, Total	13	0.50	0.0356	mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	1580	100	25.00	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Selenium, Total	0.49 J	1.0	0.0502	mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.051 J	3.0	0.0044	mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	59 J B,P	100	8.92	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.15 J	0.50	0.0270	mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	29	1.0	0.207	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	55	4.0	0.517	mg/kg dry	10/13/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/02/03 @ 13:30
Sampler: B.F. & J.S.
Received: 10/03/03 @ 09:10

Submittal #: **36440-2**
Submittal: Delivery Order 0046
RAAP
Sample ID: **QSB1C**
Sample #: **345038**
Matrix: Soil

Percent Solids: 93

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	3360		100	18.30	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Antimony, Total	0.15 J	B,P	0.50	0.0518	mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	0.54		0.40	0.0232	mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	27		1.0	0.106	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Beryllium, Total	0.18 J		1.0	0.0391	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	1.4	B,P	1.0	0.182	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	622		250	16.6	mg/kg dry	10/17/03	DWJ	USEPA-6010B
Chromium, Total	6.0		5.0	0.912	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	3.3		1.0	0.208	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	1.5		1.0	0.368	mg/kg dry	10/17/03	DWJ	USEPA-6010B
Iron, Total	6530		200	42.400	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Lead, Total	2.6		1.0	0.0218	mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	855	K,M	50	3.21	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Manganese, Total	81		1.0	0.264	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Mercury, Total	0.10 U		0.10	0.0077	mg/kg dry	10/09/03	MSS	USEPA-7471A
Nickel, Total	4.4		0.50	0.0356	mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	439		20	5.00	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Selenium, Total	0.24 J		1.0	0.0502	mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.026 J		3.0	0.0044	mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	31 J	B,P	100	8.92	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.039 J		0.50	0.0270	mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	8.3		1.0	0.207	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	17		4.0	0.517	mg/kg dry	10/13/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/02/03 @ 14:30
Sampler: B.F. & J.S.
Received: 10/03/03 @ 09:10

Submittal #: **36440-2**
Submittal: Delivery Order 0046
RAAP
Sample ID: **QSB3A**
Sample #: **345039**
Matrix: Soil

Percent Solids: 78

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	14500		500	91.50	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Antimony, Total	0.17 J	B,P	0.50	0.0518	mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	1.4		0.40	0.0232	mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	137		5.0	0.530	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Beryllium, Total	0.89 J		1.0	0.0391	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	1.6	B,P	1.0	0.182	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	25600		2500	166.0	mg/kg dry	10/17/03	DWJ	USEPA-6010B
Chromium, Total	19		5.0	0.912	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	8.4		1.0	0.208	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	12		1.0	0.368	mg/kg dry	10/17/03	DWJ	USEPA-6010B
Iron, Total	20600		1000	212.000	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Lead, Total	21		1.0	0.0218	mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	3380	K,M	250	16.05	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Manganese, Total	511		10	2.640	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Mercury, Total	0.019 J		0.10	0.0077	mg/kg dry	10/09/03	MSS	USEPA-7471A
Nickel, Total	15		0.50	0.0356	mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	1330		100	25.00	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Selenium, Total	0.67 J		1.0	0.0502	mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.063 J		3.0	0.0044	mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	60 J	B,P	100	8.92	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.16 J		0.50	0.0270	mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	28		1.0	0.207	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	65		4.0	0.517	mg/kg dry	10/13/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/02/03 @ 14:45
Sampler: B.F. & J.S.
Received: 10/03/03 @ 09:10

Submittal #: **36440-2**
Submittal: Delivery Order 0046
RAAP
Sample ID: **QSB3B**
Sample #: **345040**
Matrix: Soil

Percent Solids: 87

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	9890		500	91.50	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Antimony, Total	0.15 J	B,P	0.50	0.0518	mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	0.76		0.40	0.0232	mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	75		1.0	0.106	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Beryllium, Total	0.62 J		1.0	0.0391	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	1.2	B,P	1.0	0.182	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	2000		250	16.6	mg/kg dry	10/17/03	DWJ	USEPA-6010B
Chromium, Total	14		5.0	0.912	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	6.7		1.0	0.208	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	6.5		1.0	0.368	mg/kg dry	10/17/03	DWJ	USEPA-6010B
Iron, Total	15500		500	106.000	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Lead, Total	5.5		1.0	0.0218	mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	2730	K,M	250	16.05	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Manganese, Total	273		5.0	1.320	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Mercury, Total	0.10 U		0.10	0.0077	mg/kg dry	10/09/03	MSS	USEPA-7471A
Nickel, Total	9.6		0.50	0.0356	mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	1270		100	25.00	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Selenium, Total	0.41 J		1.0	0.0502	mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.033 J		3.0	0.0044	mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	56 J	B,P	100	8.92	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.11 J		0.50	0.0270	mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	24		1.0	0.207	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	45		4.0	0.517	mg/kg dry	10/13/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
Submittal #:	**36440-2**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**QSB3C**		
Sample #:	**345041**		
Matrix:	Soil	Percent Solids:	92

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	5130		250	45.75	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Antimony, Total	0.11	J B,P	0.50	0.0518	mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	0.63		0.40	0.0232	mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	42		1.0	0.106	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Beryllium, Total	0.28	J	1.0	0.0391	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	1.3	B,P	1.0	0.182	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	1080		250	16.6	mg/kg dry	10/17/03	DWJ	USEPA-6010B
Chromium, Total	8.8		5.0	0.912	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	4.4		1.0	0.208	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	3.3		1.0	0.368	mg/kg dry	10/17/03	DWJ	USEPA-6010B
Iron, Total	8730		200	42.400	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Lead, Total	3.5		1.0	0.0218	mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	1280	K,M	250	16.05	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Manganese, Total	151		5.0	1.320	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Mercury, Total	0.10	U	0.10	0.0077	mg/kg dry	10/09/03	MSS	USEPA-7471A
Nickel, Total	5.9		0.50	0.0356	mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	651		20	5.00	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Selenium, Total	0.31	J	1.0	0.0502	mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.028	J	3.0	0.0044	mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	49	J B,P	100	8.92	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.058	J	0.50	0.0270	mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	12		1.0	0.207	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	25		4.0	0.517	mg/kg dry	10/13/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/02/03 @ 15:10
Sampler: B.F. & J.S.
Received: 10/03/03 @ 09:10

Submittal #: **36440-2**
Submittal: Delivery Order 0046
RAAP
Sample ID: **QSB2A**
Sample #: **345042**
Matrix: Soil

Percent Solids: 85

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	7820		250	45.75	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Antimony, Total	0.13 J	B,P	0.50	0.0518	mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	0.64		0.40	0.0232	mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	96		1.0	0.106	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Beryllium, Total	0.58 J		1.0	0.0391	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	0.95 J	B,P	1.0	0.182	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	943		250	16.6	mg/kg dry	10/17/03	DWJ	USEPA-6010B
Chromium, Total	12		5.0	0.912	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	5.9		1.0	0.208	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	6.0		1.0	0.368	mg/kg dry	10/17/03	DWJ	USEPA-6010B
Iron, Total	12700		500	106.000	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Lead, Total	9.6		1.0	0.0218	mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	2220	K,M	250	16.05	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Manganese, Total	319		5.0	1.320	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Mercury, Total	0.10 U		0.10	0.0077	mg/kg dry	10/09/03	MSS	USEPA-7471A
Nickel, Total	8.5		0.50	0.0356	mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	1070		100	25.00	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Selenium, Total	0.35 J		1.0	0.0502	mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.036 J		3.0	0.0044	mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	63 J	B,P	100	8.92	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.10 J		0.50	0.0270	mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	17		1.0	0.207	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	58		4.0	0.517	mg/kg dry	10/13/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/02/03 @ 15:20
Sampler: B.F. & J.S.
Received: 10/03/03 @ 09:10

Submittal #: **36440-2**
Submittal: Delivery Order 0046
RAAP
Sample ID: **QSB2B**
Sample #: **345043**
Matrix: Soil

Percent Solids: 84

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	14200		500	91.50	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Antimony, Total	0.28 J	B,P	0.50	0.0518	mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	0.90		0.40	0.0232	mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	116		5.0	0.530	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Beryllium, Total	0.74 J		1.0	0.0391	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	1.6	B,P	1.0	0.182	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	1900		250	16.6	mg/kg dry	10/17/03	DWJ	USEPA-6010B
Chromium, Total	17		5.0	0.912	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	8.4		1.0	0.208	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	8.3		1.0	0.368	mg/kg dry	10/17/03	DWJ	USEPA-6010B
Iron, Total	20000		500	106.000	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Lead, Total	7.6		1.0	0.0218	mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	3370	K,M	250	16.05	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Manganese, Total	441		100	2.640	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Mercury, Total	0.10 U		0.10	0.0077	mg/kg dry	10/09/03	MSS	USEPA-7471A
Nickel, Total	13		0.50	0.0356	mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	1230		100	25.00	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Selenium, Total	0.47 J		1.0	0.0502	mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.055 J		3.0	0.0044	mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	67 J	B,P	100	8.92	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.15 J		0.50	0.0270	mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	30		1.0	0.207	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	61		4.0	0.517	mg/kg dry	10/13/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
Submittal #:	**36440-2**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**QSB2C**		
Sample #:	**345044**		
Matrix:	Soil	Percent Solids:	91

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	7970		250	45.75	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Antimony, Total	0.16 J	B,P	0.50	0.0518	mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	0.70		0.40	0.0232	mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	66		1.0	0.106	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Beryllium, Total	0.41 J		1.0	0.0391	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	0.88 J	B,P	1.0	0.182	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	1230		250	16.6	mg/kg dry	10/17/03	DWJ	USEPA-6010B
Chromium, Total	10		5.0	0.912	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	5.6		1.0	0.208	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	5.3		1.0	0.368	mg/kg dry	10/17/03	DWJ	USEPA-6010B
Iron, Total	12500		500	106.000	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Lead, Total	4.4		1.0	0.0218	mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	1890	K,M	250	16.05	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Manganese, Total	222		5.0	1.320	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Mercury, Total	0.10 U		0.10	0.0077	mg/kg dry	10/09/03	MSS	USEPA-7471A
Nickel, Total	7.1		0.50	0.0356	mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	876		20	5.00	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Selenium, Total	0.33 J		1.0	0.0502	mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.032 J		3.0	0.0044	mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	55 J	B,P	100	8.92	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.080 J		0.50	0.0270	mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	18		1.0	0.207	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	33		4.0	0.517	mg/kg dry	10/13/03	KLVM	USEPA-6010B

000169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 16:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10

Submittal #: **36440-2**
Submittal: Delivery Order 0046
RAAP
Sample ID: **EQB1**
Sample #: **345045**
Matrix: QC Water
Percent Solids: n/a

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	100 U	100	18.7	ug/L	10/17/03	DSC	EPA-200.7/6010B
Antimony, Total	1.0 U	1.0	0.552	ug/L	10/16/03	JMF	EPA-200.8/6020
Arsenic, Total	1.0 U	1.0	0.429	ug/L	10/16/03	JMF	EPA-200.8/6020
Barium, Total	10 U	10	1.82	ug/L	10/17/03	DSC	EPA-200.7/6010B
Beryllium, Total	0.3 J	4.0	0.295	ug/L	10/17/03	DSC	EPA-200.7/6010B
Cadmium, Total	0.5 U	0.5	0.135	ug/L	10/16/03	JMF	EPA-200.8/6020
Calcium, Total	500 U	500	33.9000	ug/L	10/17/03	DSC	EPA-200.7/6010B
Chromium, Total	1.0 U	1.0	0.554	ug/L	10/16/03	JMF	EPA-200.8/6020
Cobalt, Total	10 U	10	3.91	ug/L	10/17/03	DSC	EPA-200.7/6010B
Copper, Total	10 U	10	5.36	ug/L	10/17/03	DSC	EPA-200.7/6010B
Iron, Total	100 U	100	2.95	ug/L	10/17/03	DSC	EPA-200.7/6010B
Lead, Total	0.3 J	1.0	0.281	ug/L	10/16/03	JMF	EPA-200.8/6020
Magnesium, Total	500 U	500	57.4000	ug/L	10/17/03	DSC	EPA-200.7/6010B
Manganese, Total	10 U	10	3.16	ug/L	10/17/03	DSC	EPA-200.7/6010B
Mercury, Total	0.4 U	0.4	0.0584	ug/L	10/13/03	MSS	USEPA-7470A
Nickel, Total	1.0 U	1.0	0.410	ug/L	10/16/03	JMF	EPA-200.8/6020
Potassium, Total	200 U	200	59.7000	ug/L	10/17/03	DSC	EPA-200.7/6010B
Selenium, Total	2.0 U	2.0	0.933	ug/L	10/16/03	JMF	EPA-200.8/6020
Silver, Total	0.5 U	0.5	0.0765	ug/L	10/16/03	JMF	EPA-200.8/6020
Sodium, Total	220 J B,P	500	76.9000	ug/L	10/17/03	DSC	EPA-200.7/6010B
Thallium, Total	1.0 U	1.0	0.208	ug/L	10/16/03	JMF	EPA-200.8/6020
Vanadium, Total	10 U	10	2.89	ug/L	10/17/03	DSC	EPA-200.7/6010B
Zinc, Total	20 U	20	4.55	ug/L	10/17/03	DSC	EPA-200.7/6010B

000170

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 08:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
Submittal #:	**36440-2**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**37SB1C**		
Sample #:	**345028**		
Matrix:	Soil	Percent Solids:	85

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	85	0.1	0.1	%	10/09/03	TAM	SW-846 3550B
Cyanide, Total	0.09 J	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

005441

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 09:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
Submittal #:	**36440-2**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**37SB2A**		
Sample #:	**345029**		
Matrix:	Soil	Percent Solids:	63

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	63	0.1	0.1	%	10/09/03	TAM	SW-846 3550B
Cyanide, Total	0.50	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
Submittal #:	**36440-2**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**37SB2B**		
Sample #:	**345030**		
Matrix:	Soil	Percent Solids:	85

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	85	0.1	0.1	%	10/09/03	TAM	SW-846 3550B
Cyanide, Total	0.04 J	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
Submittal #:	**36440-2**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**37SB2C**		
Sample #:	**345031**		
Matrix:	Soil	Percent Solids:	86

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	86	0.1	0.1	%	10/09/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
Submittal #:	**36440-2**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**37SB3A**		
Sample #:	**345032**		
Matrix:	Soil	Percent Solids:	88

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	88	0.1	0.1	%	10/09/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
Submittal #:	**36440-2**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**37SB3B**		
Sample #:	**345033**		
Matrix:	Soil	Percent Solids:	84

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	84	0.1	0.1	%	10/09/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
Submittal #:	**36440-2**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**37SB3C**		
Sample #:	**345034**		
Matrix:	Soil	Percent Solids:	93

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	93	0.1	0.1	%	10/09/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

005450

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
Submittal #:	**36440-2**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**QSB1A**		
Sample #:	**345035**		
Matrix:	Soil	Percent Solids:	81

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	81	0.1	0.1	%	10/09/03	TAM	SW-846 3550B
Cyanide, Total	0.81	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
Submittal #:	**36440-2**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**SBD3**		
Sample #:	**345036**		
Matrix:	Soil	Percent Solids:	74

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	74	0.1	0.1	%	10/09/03	TAM	SW-846 3550B
Cyanide, Total	1.3	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
Submittal #:	**36440-2**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**QSB1B**		
Sample #:	**345037**		
Matrix:	Soil	Percent Solids:	84

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	84	0.1	0.1	%	10/09/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
Submittal #:	**36440-2**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**QSB1C**		
Sample #:	**345038**		
Matrix:	Soil	Percent Solids:	93

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	93	0.1	0.1	%	10/09/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
Submittal #:	**36440-2**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**QSB3A**		
Sample #:	**345039**		
Matrix:	Soil	Percent Solids:	78

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	78	0.1	0.1	%	10/09/03	TAM	SW-846 3550B
Cyanide, Total	2.2	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 14:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
Submittal #:	**36440-2**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**QSB3B**		
Sample #:	**345040**		
Matrix:	Soil	Percent Solids:	87

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	87	0.1	0.1	%	10/09/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

005456

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TriMatrix
Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
Submittal #:	**36440-2**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**QSB3C**		
Sample #:	**345041**		
Matrix:	Soil	Percent Solids:	92

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	92	0.1	0.1	%	10/09/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

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TriMatrix
Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
Submittal #:	**36440-2**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**QSB2A**		
Sample #:	**345042**		
Matrix:	Soil	Percent Solids:	85

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	85	0.1	0.1	%	10/09/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

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TriMatrix
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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
Submittal #:	**36440-2**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**QSB2B**		
Sample #:	**345043**		
Matrix:	Soil	Percent Solids:	84

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	84	0.1	0.1	%	10/09/03	TAM	SW-846 3550B
Cyanide, Total	0.06 J	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
Submittal #:	**36440-2**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**QSB2C**		
Sample #:	**345044**		
Matrix:	Soil	Percent Solids:	91

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	91	0.1	0.1	%	10/09/03	TAM	SW-846 3550B
Cyanide, Total	0.04 J	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

005469

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TriMatrix
Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 16:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
Submittal #:	**36440-2**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**EQB1**		
Sample #:	**345045**		
Matrix:	QC Water	Percent Solids:	n/a

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Cyanide, Total	10 U	10	3.40000	ug/L	10/16/03	JLB	USEPA-9012A

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DATA VALIDATION WORKSHEET

Volatile Organic Analysis by GC/MS

Reviewer: AS
Date: December-03
DV Level: II III IV
Review Document:
X NFG - Region III Modifications
X Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-2
Test Name: 8260B
Method No.: VOC

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Do sample preservation, collection and storage condition meet method requirement?	x		
	If the temperature of the cooler was elevated (> 10 ^{O}C) or bubble size in aqueous sample was too big (tiny bubble is OK.), then flag all positive results with a "L" and all non-detects "UL".			
1.5	Do any soil samples contain more than 50% water?		x	
	If any sample analyzed as a soil, other than TCLP, contains % moisture greater than 50%, noted in the DV			

Notes:
1. four coolers @ 3.3C, 0.7C, 1.9C, & 0.9C
2. 37SB1B was cancelled by client.

2.0 Holding Times		Yes	No	NA
2.1	Were sample preserved as specified in the method or project QAPP?	see above		
2.2	Have any technical holding times, determined from date of sampling to date of analysis, been exceeded? If yes, L(+)/UL(-). For aqueous unpreserved - 7 days for aromatic compounds All others - 14 days.		x	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, L(+)/R(-) .		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per GCMS, 20 samples, batch, matrix, and level)?	x		
3.2	Do any method blanks have positive results? Action: If yes, positive sample results should be reported and qualified "B", if the concentration of the compound in the sample is less than or equal to 5 times (or 10 times for the common volatile lab contaminants - methylene chloride, acetone, and 2-butanone) the amount in the associated blank.	x		
3.3	Do any field equipment blanks/trip blanks have positive results? If Yes, use same rules above.			x
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, noted in the DV report.			x

Notes: acetone

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If no, use professional judgement to determine the effect on the data and note in the reviewer narrative.	x		
4.3	Has a continuing calibration standard been analyzed for every 12 hours of sample analysis per instrument?	x		
4.4	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 15% and %D < ± 20%		x	
	For initial Calibration: for %RSD > ± 15%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 20% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >20%, J(+).			
4.5	Do any SPCC compounds have an RRF < control limit? Control limits: >0.10 for chloromethane, 1,1-dichloroethane, & bromoform or >0.30 for chlorobenzene & 1,1,2,2-tetrachloroethane. If yes, L(+)/R(-).		x	

Notes: The second source for methyl acetate was analyzed after sample analyses, but passed at 89% - no action was taken.

5.0 GC/MS Instrument Performance Check		Yes	No	NA
5.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?	x		
5.2	Are BFB enchanced bar graph spectrum and mass/charge (m/z) listing provided for each 12-hour shift?	x		
5.3	Have all samples been analyzed within twelve hours of the BFB tune?	x		
	If twelve hours have elapsed according to the system clock, and the laboratory had analyzed standards, blanks, field samples or QC samples after twelve (12) hours, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
5.4	Have ion abundance criteria for BFB been met for each instrument used?	x		
	If the BFB criteria were not met prior to the analyses of the standards, blanks, field samples and QC samples, all standards, blanks, field samples and QC samples are rejected "R".			

Notes:

6.0 Surrogate Recovery							Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?						x		
6.2	Are surrogate recoveries within acceptance criteria (not to exceed 50-150%) for all samples and method blanks?						x		
6.3	If No in Section 6.2, are these sample(s) or method blank(s) reanalyzed?								x
	If any system monitoring compound(s) in the volatile fraction is out of specification, there should be a reanalysis to confirm that the non-compliance is because of sample matrix effects rather than laboratory deficiencies.								
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? DV report should indicate that extraction efficiency/ method accuracy cannot be verified.								x
		1 or more <10%	1 high/low	2 or 3 high/low	2 or 3 all low	2 or 3 all high			
	Positives	L	J	J	L	K			
	Non-detects	R	UJ	UJ	UL	NONE			
	Note: The B qualifier remains over surrogate flagging.								

Notes:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 50-150%?	x		
7.4	Are there any RPD outside the QC limits not to exceed 50%?	x		
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

8.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)		Yes	No	NA
8.1	Is the LCS/LCSD recovery form present?	x		
8.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
8.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 50-150%?	x		
	If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
8.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 50%?			x
	If Yes, J(+) only.			

Notes:

9.0 Internal Standard		Yes	No	NA
9.1	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration? If not, J(+)/UJ(-).	x		
	If extremely low area counts are reported, or performance exhibits a major abrupt drop-off, then a severe loss of sensitivity is indicated. Non-detect target compounds should then be qualified as unusable (R).			
9.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	x		
	The chromatographic profile for that sample must be examined to determine if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction. Positive results should not needed to be qualified as "R", if the mass spectral criteria are met.			

Notes:

10.0 Field Duplicate		Yes	No	NA
10.1	Was a field duplicate prepared and analyzed at the correct frequency (one per 20 samples, matrix, and level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
10.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

11.0 Tentatively Identified Compounds (TICs) and Detection Limit Verification		Yes	No	NA
11.1	Are any TICs detected in the field samples? If Yes, all TIC results should be flagged "NJ" (tentatively idenified, and approximate concentration).	x		
11.2	Do detection limits meet those required by the project QAPP and were they properly adjusted to reflect all sample dilutions and dry weight factors?	x		
11.3	Were sample concentrations above the highest standard run at a dilution? If not, for ion saturation flag "L", unsaturated results "J".			x

Notes:

12.0 Data Completeness		Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit 90%)	x		
	Number of samples: 19			
	Number of target compounds in each analysis: 50			
	Number of results rejected and not reported: 1			
	% Completeness = (12.1.1 x 12.1.2 - 12.1.3) x 100/(12.1.1 x 12.1.2)			
	% Completeness = 99.9%			

Notes:

DATA VALIDATION WORKSHEET

Semivolatile Organic Analysis

Reviewer: AS
Date: December-03
DV Level: II III IV
Review Document:
X NFG - Region III Modifications
X Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-2
Test Name: SVOC
Method No.: 8270C

1.0 Laboratory Deliverables

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	
1.4	Do sample preservation, collection and storage condition meet method requirement?		x	
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 20 ^{O}C), then flag all positive results with a "L" and all non-detects "UL".			
1.5	Do any soil samples contain more than 50% water?		x	
	If any sample analyzed as a soil, other than TCLP, contains % moisture greater than 50%, noted in the DV			

Notes: four coolers @ 3.3C, 0.7C, 1.9C, & 0.9C
37SB1B was cancelled by client.

2.0 Holding Times

		Yes	No	NA
2.1	Were sample preserved as specified in the method or project QAPP?	x		
2.2	Have any technical holding times, determined from date of sampling to date of analysis, been exceeded? If yes, L(+)/UL(-). For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, L(+)/R(-) .		x	

Notes: sampled on 10/2/03.
extracted: 89845-109 on 10/9/03, 90209-116 on 10/16/03, 90209-109 on 10/09/03, 90210-110 on 10/10/03, 89818-108 on 10/08/03
analyzed on 10/15/03-10/17/03

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x		
3.2	Do any preparation/instrument/reagent blanks have positive results? Action: If yes, positive sample results should be reported and qualified "B", if the concentration of the compound in the sample is less than or equal to 5 times (or 10 times for the common phthalate contaminants) the amount in the associated blank.	x		
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.	x		
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, noted in the Dv report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If no, use professional judgement to determine the effect on the data and note in the reviewer narrative.	x		
4.3	Has a continuing calibration standard been analyzed for every 12 hours of sample analysis per instrument?	x		
4.4	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: $r \geq 0.99$, %RSD $\leq$ 15%, ICV %D < 30%, and CCV %D $\leq$ 20%.		x	
	For initial Calibration: for %RSD > $\pm$ 15%, but < $\pm$ 50%, J(+) only. for %RSD > $\pm$ 50%, but < $\pm$ 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 20% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >20%, J(+).			
4.5	Do any SPCC compounds have an RRF < 0.05? (n-nitroso-di-n-propylamine, hexachlorocyclopentadiene, 2,4-dinitrophenol, & 4-nitrophenol) If yes, J(+)/R(-).		x	

Notes:

5.0 GC/MS Instrument Performance Check		Yes	No	NA
5.1	Are GC/MS Tuning and Mass Calibration forms present for decafluorotriphenylphosphine (DFTPP)?	X		
5.2	Are DFTPP enchanced bar graph spectrum and mass/charge (m/z) listing provided for each 12-hour shift?	X		
	If DFTPP was analyzed simultaneously with any calibration standard or blank, the instrument performance check (IPC) is rejected "R" as well as all associated data.			
5.3	Have all samples been analyzed within twelve hours of the DFTPP tune?	X		
	If twelve hours have elapsed according to the system clock, and the laboratory had analyzed standards, blanks, field samples or QC samples after twelve (12) hours, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
5.4	Have ion abundance criteria for DFTPP been met for each instrument used?	X		
	If the DFTPP criteria were not met prior to the analyses of the standards, blanks, field samples and QC samples, all standards, blanks, field samples and QC samples are rejected "R".			

Notes:

6.0 Surrogate Recovery		Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	X		
6.2	Are surrogate recoveries within acceptance criteria not to exceed 10-150% for all samples and method blanks?		x	
6.3	If No in Section 6.2, are these sample(s) or method blank(s) reanalyzed?	at dilution	x	
	If any two base/neutral or acid fraction are out of specification, or if any one base/neutral or acid extractable surrogate has a recovery of less than 10%, then there should be a reanalysis to confirm that the non-compliance is because of sample matrix effects rather than laboratory deficiencies.			
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? (recoveries may be diluted out.)		x	
	1 or more <10% / 2 or 3 high/low / 2 or 3 all low / 2 or 3 all high Positives: L / J / L / K Non-detects: R / UJ / UL / NONE			
	Note: The B qualifier remains over surrogate flagging.			

Notes:

DATA VALIDATION WORKSHEET

Polyaromatic Hydrocarbons

Reviewer: AS
Date: December-03
DV Level: II III IV

Review Document:

X Region III Modified for National Functional Guidelines
____ NFG for organic Data review (February 1994)
X Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-2
Test Name: PAH
Method No.: 8310-HPLC

1.0 Laboratory Deliverables

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. %		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes: four coolers @ 3.3C, 0.7C, 1.9C, & 0.9C
37SB1B was cancelled by client.

2.0 Holding Times

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?		see above	
	Action: If the temperature of the cooler was elevated (> 10 ^{O}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyses, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%	x		
	For initial Calibration: for %RSD > ± 20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?		x	
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?			x
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.			x
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 40-150%?	x		
	Are there any RPDs outside the QC limits not to exceed 60%?	x		
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

7.0 Laboratory Control Sample (LCS)

		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 40-150%?	x		
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?			x
	Action: If Yes, J(+) only.			

Notes:

8.0 Field Duplicate

		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

9.0 Compound Identification and Detection Limit Verification

		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.	x		
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.	x		
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	x		

Notes:

10.0 Data Completeness

			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		x		
	Number of samples:	18			
	Number of target compounds in each analysis:	16			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

DATA VALIDATION WORKSHEET

Reviewer: AS
Date: December-03
DV Level: II III IV
Review Document:
X Region III Modified for National Functional Guidelines
___ NFG for organic Data review (February 1994)
X Project QAPP/SAP

Explosives

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-2
Test Name: Explosives
Method No.: 8330-HPLC

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. %		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes: four coolers @ 3.3C, 0.7C, 1.9C, & 0.9C
37SB1B was cancelled by client.

2.0 Holding Times		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?		see above	
	Action: If the temperature of the cooler was elevated (> 10 ^{O}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyese, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%		x	
	For initial Calibration: for %RSD > ± 20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?	x		
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?			x
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.			x
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 40-150%?	x		
6.4	Are there any RPDs outside the QC limits not to exceed 60%?	x		
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

7.0 Laboratory Control Sample (LCS)		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 40-150%?		x	
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?			x
	Action: If Yes, J(+) only.			

Notes:

8.0 Field Duplicate		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.	X		
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.	X		
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	X		

Notes:

10.0 Data Completeness			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		X		
	Number of samples:	18			
	Number of target compounds in each analysis:	14			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

DATA VALIDATION WORKSHEET

Pesticides/PCBs

Reviewer: AS
Date: December-03
DV Level: II III IV
Review Document:
X SW-846 - 8081/8082
X NFG - Region III Modifications
___ CLP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-2
Test Name: PEST/PCB
Method No.: 8081A/8082

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Do any soil samples contain more than 50% water?		X	
	If any sample analyzed as a soil, other than TCLP, contains % moisture greater than 50%, noted in the DV report.			

Notes: four coolers @ 3.3C, 0.7C, 1.9C, & 0.9C
37SB1B was cancelled by client.

2.0 Preservation/ Holding Times		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?		see above	
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 20 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampleing to date of analysis, been exceeded? If yes, J(+)/UJ(-). For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		X	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, J(+)/R(-) .		X	

Notes: sampled on 10/2/03, extracted on 10/8-9/03, analyzed 10/10-30/03

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix)?	X		
3.2	Do any preparation/instrument/reagent blanks have positive results? Action: If yes, positive sample results should be reported and qualified "B", if the concentration of the compound in the sample is less than or equal to five times the amount in the associated blank.		X	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		X	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note it in the DV report.	X		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards included in the calibration curve? 1016 and 1260 need at least three peaks at five concentrations. The multi-component target compounds (the other Aroclors, Toxaphene, & Chlordane) must each be analyzed separately at a single concentration level during the initial calibration sequence.	X		
4.2	Has a continuing calibration standard been analyzed for every 12 hours or twenty samples?	X		
4.3	Are all calibration standard (IC and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r>0.99, %RSD < ± 20% and %D < ± 15%		X	
	For initial Calibration: for %RSD > ± 20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Do all standard retention times in the continuing calibration fall within the RT windows established during the initial calibration sequence? If No, the associated sample result should be carefully evaluated.	X		

Notes:

5.0 GC/ECD Instrument Performance Check for Pesticides		Yes	No	NA
5.1	Is the 4,4'-DDT breakdown </= to 15%? If No, for positive DDT results, DDT-L(+), DDD/DDE - NJ(+). For non detect DDT results, DDD/DDE - R(+).	x		
5.2	Is the endrin breakdown </= to 15%? If No, for positive endrin results, endrin-L(+), endrin aldehyde/ketone - NJ(+). For non-detect DDT results, endrin aldehyde/ketone - R(+).	x		

Notes:

6.0 Surrogate Recovery					Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?				x		
6.2	Do all surrogate retention times fall within the RT windows established during the initial calibration sequence? If No, the associated sample result should be carefully evaluated.				x		
6.3	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?				x		
6.4	If No in Section 6.3, are these sample(s) or method blank(s) reanalyzed?						x
6.5	If No in Section 6.4, is any sample dilution factor greater than 10? (recoveries may be diluted out.)						x
	# of outliers	Recovery	Sample result from column with non-conformance	Sample result from column without non-conformance			
	1 out	high/low	No action	No action			
	2 out	2 high same column	K	No action			
		2 low same column	L, UL	No action			
		mixed same column	J, UJ	No action			
		2 high diff columns	J	Not applicable			
		2 low diff columns	J, UJ	Not applicable			
		mixed diff columns	Professional judgement	Not applicable			
	3 out	All high	K	Not applicable			
		All low	L, UL	Not applicable			
		2 high, 1 low	K (2 high)	J (1 low 2nd column)			
		2 low, 1 high	L, UJ (2 low)	J (1 high 2nd column)			
		other mixed	J, UJ	Not applicable			
	4 out	All high	K	Not applicable			
		All low	L, UL	Not applicable			
		Mixed	J, UJ	Not applicable			
	If any recovery is >0% and <10% then L(+)/R(-).						
	If any recovery is 0% then R(+/-).						

Notes:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 30-150%?	pest	pcb	
7.4	Are there any RPDs outside the QC limits not to exceed 60%?	pest	pcb	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes: MS/MSD from SDG 36440-1

8.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)		Yes	No	NA
8.1	Is the LCS/LCSD recovery form present?	x		
8.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
8.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 30-150%?	aqueous pest	soil all & aqueous PCBs	
	If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
8.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?	x		
	If Yes, J(+) only.			

Notes:

9.0 Field Duplicate		Yes	No	NA
9.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
9.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes: QSB1A/SBD1 submitted in SDG 36440-2, BDL for pest and 0.053/0.051 for Aroclor 1254.

10.0 Compound Identification and Detection Limit Verification		Yes	No	NA
10.1	Is the percent difference calculated for the positive sample results on both columns < 40%? If No, J(+).	x		
10.2	Do detection limits meet those required by the project QAPP and were properly adjusted for dilution factors and moisture?	x		

Notes:

11.0 Pesticide Cleanup Checks		Yes	No	NA
11.1	Is Form IX PEST-1 present and complete for each lot of Florisil Cartridges used? (Florisil Cleanup is required for all Pest/PCB extracts to reduce matrix interference caused by polar compounds.)			x
	Every lot number of Florisil cartridges used for sample cleanup must be checked by spiking with 2,4,5-trichlorophenol and the midpoint concentration of Individual Standard Mixture A.			
11.2	Are all samples listed on the Pesticide Florisil cartridge Check Form?			
11.3	Are percent recoveries of pesticide and surrogate compounds within control limit, 80-120%(if the recovery of 2,4,5-trichlorophenol < 5%), for the florisil cartridge check? If No, the raw data should be examined for the presence of polar interferences and professional judgement should be used in qualifying the data.			

Notes:

Florisil cleanup was performed, no laboratory submission for these CLP descriptors was provided.

12.0 Data Completeness				Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit 90%)	Pest	PCB	x		
	Number of samples:	3	3			
	Number of target compounds in each analysis:	21	7			
	Number of results rejected and not reported:	0	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)					
	% Completeness =	100%	100%			

Notes:

DATA VALIDATION WORKSHEET

Herbicides

Reviewer: AS
Date: December-03
DV Level: II III IV

Review Document:

X Region III Modified for National Functional Guidelines
____ NFG for organic Data review (February 1994)
X Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-2
Test Name: Herbicides
Method No.: 8151A

1.0 Laboratory Deliverables

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. %		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes: four coolers @ 3.3C, 0.7C, 1.9C, & 0.9C
37SB1B was cancelled by client.

2.0 Holding Times

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?		see above	
	Action: If the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyese, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).	x		
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes: re-extraction for Dinoseb occured outside the 14 day extraction holding time, but less than 28 days
collected on 10/02/03, re-extracted on 10/17/03

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	X		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		X	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		X	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	X		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	X		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	X		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%	X		
	For initial Calibration: for %RSD > ± 20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	X		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	X		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 25-150% for all samples and method blanks?	X		
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?		X	
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.		X	
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 25-150%?	x		
6.4	Are there any RPDs outside the QC limits not to exceed 60%?	x		
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes: MS/MSD from SDG 36440-1

7.0 Laboratory Control Sample (LCS)

		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 25-150%?	x		
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?		x	
	Action: If Yes, J(+) only.			

Notes: original extraction Dinoseb LCS recovery low, re-extraction passed.

8.0 Field Duplicate

		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes: QSB1A and SDB-3 submitted in SDG 36440-2 were both non-detect.

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.	X		
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.	X		
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	X		

Notes:

10.0 Data Completeness			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		X		
	Number of samples:	3			
	Number of target compounds in each analysis:	10			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

DATA VALIDATION WORKSHEET
INORGANIC - ICP, CVAA, AND CYANIDE
REGION III - NATIONAL FUNCTIONAL GUIDELINES

SDG No.: 36440-2
Project No.: 15291974.30000

Project Name: Radford SSP
Reviewer: AS
Date: December-03

1.0 Chain of Custody/Sample Condition/Raw Data		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples which were analyzed?	x			x			x			x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x			x			x			x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x			x			x			x	
1.4	Does sample preservation, collection and storage meet method requirement? (For metal: water samples: with Nitric Acid to pH < 2, and soil/sediment samples: 4 ^{O}C $\pm$ 2 ^{O}C)		x			x			x			x	
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes. % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	x			x			x			x		

Note: four coolers @ 3.3C, 0.7C, 1.9C, & 0.9C
37SB1B was cancelled by client.

2.0 Holding Time		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, CN: 14 days, other metals: 6 months) Action:L(+)/UL(-). If the holding time is grossly exceeded (twice the holding time criteria), L(+)/R(-).		x			x			x			x	

Note:

3.0 Instrument Calibration		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? (ICP& ICPMS: blank + one standard & a RL standard OR 3 standards and a blank with one standard at the RL; CVAA: blank + five standards with one standard at the RL). If not, qualify with "R".	7+BLK			4+BLK			5+BLK			6+BLK		
3.2	Are the correlation coefficients > 0.99? Action: J(+)/UJ(-).	x			x			x			x		
3.3	Once per calibration, did a high and low distilled standard recovery within 85-115%? If no, follow 3.6.										x		
3.4	Was an initial calibration check standard (ICV) analyzed immediately after instrument system had been calibrated? Action: If no, all associated data are rejected "R".	x			x			x			x		
3.5	Was continuing calibration standard (CCS) analyzed at a minimum frequency of 10% (every 10 samples) during an analytical run and at the end of the analytical run? If not, document and flag based on professional judgement.	x			x			x			x		
3.6	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? FOR ICP 90%-110%, FOR Hg 80-120%, FOR CN 85-115%.	x			x			x			x		
	ICV and CCV: Action: L(+)/R(-) L(+)/UL(-) K(+) Mercury < 65% 65% - 79% > 120% Cyanide < 65% 65% - 84% > 115% Other Metals < 75% 75% - 89% > 110%												
3.7	For ICP & ICPMS, did the CRDL standard recover between 80-120%?	x					x	x			x		
	<50% 50%-79% >120% 2xCRDL>[sample]>IDL L(+)/R(-) L(+)/UL(-) K							passed within 70-130%			passed within 80-120%		

Note: batch 207811 has a new high point added to Al, Ba, Ca, Fe, Mg, Mn, & K, an elevated RL by 5

4.0 Blanks

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were method blank (MB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x			x			x			x		
4.2	Were calibration blanks (ICB and CCBs) analyzed immediately after each and every ICV and CCVs? Action: If no ICB was run, all associated data are rejected. If the frequency of the CCBs does not follow requirement, all associated data are qualified "J".	x			x			x			x		
4.3	Are there reported MB or ICB/CCBs values > RL?	x			x				x			x	
	Sample Results > RL												
	< 5X Blank Contamination B												
4.4	Are there negative blank results with the absolute value > RL?		x			x			x			x	
	Sample Results Non-detects > RL												
	< 5X absolute Blank Contamination UL L												
4.5	Are there reported field blank > ± RL?	x			x				x			x	
	Sample Results > RL												
	< 5X Blank Contamination B												

Note: _____

5.0 ICP Interference Check Sample (ICS)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1	Was ICS analyzed at beginning of each ICP run?	x			x								
5.2	Are the ICS AB recoveries within 80% - 120%?	x			x								
5.3	Are the results for unspiked analytes (in ICS A) < ± RL?	x			x								
5.4	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?			x			x						
	If not...												
	Action: Not Spiked Analytes: < -IDL L(+)/UL(-); > IDL K(+). Spiked analytes (ICS AB analytes): < 50% L(+)/R(-); 50% - 79% L(+)/UL(-); >120% K(+)												

Note: _____

6.0 Laboratory Control Sample (LCS)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	X			X			X			X		
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)		X			X			X			X	
	Action: Solid: < LCL L(+)/UL(-); > UCL K(+). Aqueous: < 50% L(+)/R(-); 50% - 79% L(+)/UL(-); > 120% K(+)												

Note: _____

7.0 Laboratory Duplicates (MSD)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), using professional judgement, analytes not associated with duplicate results.	X			X			X			X		
	For aqueous 6010B and Hg - RPD< 25%, aqueous CN - RPD < 20%, aqueous 6020 - RPD < 20%, and for soil - use laboratory generated limits for MS/MSD.												
7.2	Are all analyte duplicate results within control limits? If no, qualify all associated field samples J(+)/UJ(-) for the analyte with results that fall outside criteria.	X			X			X			X		

Note: _____

8.0 Spike Sample Analysis -Pre-Digestion/Post-Digestion

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
8.1	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, batch, matrix and level)? If not, J(+) with professional judgement.	x			x			x			x		
8.2	For all analytes with sample concentration > 4 x spike concentration, are spike recoveries within the control limit of 75-125% for aqueous and lab limits for soil?	x			x			x			x		
	%R > 125% 30%< %R < 74% < 30%												
	Positive K L L												
	Non-detect None UL R												
8.3	Where pre-digestion matrix spike analytes were outside the acceptable recovery limits(except Ag), was a post-digestion spike performed? Note any failures in DV report, but no data qualifying action is required.	x			x			x					x

Note: 37SB3B 6010B MS/MSD calcium 131%/115% (111%), Hg MS at 63% (73%) MSD passed at 99%, 6020 & CN passed.

37SB2A 6010B, 6020, Hg, & CN passed

9.0 Instrument Detection Limits (IDL)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1	Are all IDLs/RLs equal to or less than the reporting limits specified?	x			x			x			x		

Note:

10.0 ICP/AA Serial Dilutions (Not for Mercury Analysis)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	x			x								
10.2	Was a five-fold dilution performed?	x			x								
10.3	Did the serial dilution results agree within 10% for ICP analyte concentration > 5 X the RL for 6010 or > 20 X the RL for 6020 in the original sample? If no, J(+).	x				x							

Note: 6010B: 37SB2A - chromium 14.9%.

11.0 Field Duplicate Samples

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?	x			x			x			x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.												
11.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report		x			x							

Note: _____

12.0 Result Verification/ Internal Standards/ Tune

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?	x			x			x			x		
12.2	Were all dilution reflected in the positive results and detection limits?	x			x			x			x		
12.3	Were the Internal Standard recoveries within 30-120%	x			x								
12.4	Were the tunes run at a minimum of four times with RSD < 5% for analytes in solution?	x											
12.5	Were the tune mass calibrations < 0.1 amu from the true value?	x											
12.6	Was the resolution check peak width < 0.9 amu at 10% peak height?	x											

Note: _____

Several metals by 6010B and lead by 6020 were analyzed straight and then at dilution due to the presence of high target concentrations

13.0 Completeness Calculation

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
13.1	Is % completeness within the control limits? (Control limit 90%)	x			x			x			x		
13.1.1	Number of samples: _____												
13.1.2	Number of target compounds in each analysis: _____												
13.1.3	Number of results rejected and not reported: _____												
	% Completeness = (13.1.1 x 13.1.2 - 13.1.3) x 100/(13.1.1 x 13.1.2)												
	% Completeness = _____	100%			100%			100%			100%		

Note: _____

JM0188 Volatile Soil
Cart 7

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1045

000056

Project Number	Project Name
09604-317	RFAAP

Project Contact (Name and Phone Number): Darren Renne (804)965-9000

Samplers: Brett [illegible] / John Spangler

LAB: Tri-Matrix

AIRBILL No:

Courier:

ANALYSES

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, [illegible])	Dioxin/Furan(8290)	TAL Metals (Including Mercury)/CN	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	[illegible] HERB	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
* 37SB1 B	10/2/03 830	S		X	5	F	/	5	X	X	X			X		X	DISCARD						37SB2 A has sludge
37SB1 C	10/2/03 845	S		X	5	F	/	5	X	X	X			X		X							in it.
37SB2 A	10/2/03 930	S		X	5	F	/	5	X	X	X			X		X							Collected MS/MSD
37SB2 B	10/2/03 945	S		X	5	F	/	5	X	X	X			X		X							because of sludge.
37SB2 C	10/2/03 1000	S		X	5	F	/	5	X	X	X			X		X							matrix.
37SB3 A	10/2/03 1015	S		X	5	F	/	5	X	X	X			X		X							
37SB3 B	10/2/03 1030	S		X	5	F	/	5	X	X	X			X		X							
37SB3 B MS	10/2/03 1030	S		X	5	F	/	5	X	X	X			X		X							—
37SB3 B MSD	10/2/03 1030	S		X	5	F	/	5	X	X	X			X		X							—
37SB3 C	10/2/03 1045	S		X	5	F	/	5	X	X	X			X		X							
37SB2 A MS	10/2/03 930	S		X	5	F	/	5	X	X	X			X		X							—
37SB2 A MSD	10/2/03 930	S		X	5	F	/	5	X	X	X			X		X							—

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
Brett [illegible]	10/2/03 1800				
Relinquished by:	Date/time	Received by: (for lab) [illegible]	Date/Time 10/3/03 9:10	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

* DISCARD Per Client 10/3/03
WR 10/3/03

36440-2

TM0086 Cart. 7 Volatile Soil

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1072

Project Number	Project Name
07604-317	RFAAP

Project Contact (Name and Phone Number): Doreen Rennie (804) 765-9000

Samplers: Brett Fisher / John Spangler

LAB: Tri-Matrix

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	ANALYSES: TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, [redacted])	Dioxin/Furan(8290)	TAL Metals (Including Mercury) / CN	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	HERB	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
QSB1A	10/2/03 1300	S		X	S	F	/	7	X	X	X	X	X	X		X						X	
SBD3 QC	10/2/03 —	S		X	S	F	/	7	X	X	X	X	X	X		X						X	
QSB1B	10/2/03 1315	S		X	S	F	/	5	X	X	X			X		X							
QSB1C	10/2/03 1330	S		X	S	F	/	5	X	X	X			X		X							
QSB3A	10/2/03 1430	S		X	S	F	/	5	X	X	X			X		X							
QSB3B	10/2/03 1445	S		X	S	F	/	5	X	X	X			X		X							
QSB3C	10/2/03 1500	S		X	S	F	/	5	X	X	X			X		X							

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
[signature]	10/2/03 1800				
Relinquished by:	Date/time	Received by: (for lab) [signature]	Date/Time 10/3/03 9:10	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

36440-2

Volatile Soil Cart 7 TM0336

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1079

000058

Project Number	Project Name
09604317	RFAAP

Project Contact (Name and Phone Number): Darren Renne (804) 965 9000

Samplers: Brett Fisher / John Spagler

LAB:

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, [redacted])	Dioxin/Furan(8290)	TAL Metals (Including Mercury) /CN	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	Paint Filter (9095B)	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
QSB2A	10/2/03 1510	5		X	5	F	/	5	X	X	X			X		X							
QSB2B	10/2/03 1520	5		X	5	F	/	5	X	X	X			X		X							
QSB2C	10/2/03 1530	5		X	5	F	/	5	X	X	X			X		X							

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
[signature]	10/2/03 1800				
Relinquished by:	Date/time	Received by: (for lab) [signature]	Date/Time 10/3/03 9:10		

NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement

36440-2

TM036 Cart 8 LP
655-6-10 ~~537-R-12~~

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1156

Project Number	Project Name
97604.317	RFAAP

Project Contact (Name and Phone Number): Darren Rowe (804) 765 9000

Samplers: Brett Fisher / John Spangler

LAB: Tri-Matrix

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, [redacted])	Dioxin/Furan(8290)	TAL Metals (Including Mercury) /CN	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	Hardness	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
EQB1	10/2/03 1620	5		X	5	F	~~F~~	14	X	X	X	X	X	X		X						X	
Trip Blank	10/2/03							2	X														

↑ Assign a time of 1620 to TB -WR

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
[signature]	10/2/03 1800				
Relinquished by:	Date/time	Received by (for lab): [signature]	Date/Time 10/3/03 9:10	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

36440-2

9-8

DATA VALIDATION REPORT - Level III Review

SDG No.: 36440-3 **Fraction:** VOCs, SVOCs, PAHs, Explosives, Pesticides, PCBs, Herbicides, Metals, & Cyanide

Lab: TriMatrix **Project Name:** Radford_SSP

Reviewer: AS **Date:** January 2, 2004

This report presents the findings of a review of the referenced data. The report consists of this summary, copies of data reports with data qualifying flags applied (as required), the completed data validation checklist, supporting documentation, and an explanation of the data qualifying flags employed. The review performed is based on the USEPA Region III Modifications to the National Functional Guidelines for Organic and Inorganic Data Review as pertains to the specifics of the analytical methods employed and provisions of the approved project-specific Quality Assurance Project Plan (QAPP).

Major Anomalies: For the SVOC analyses, the initial analyses of samples 38SB1A, 38SB3A, and 38SB3B displayed internal standard area counts less than the lower control limit (i.e., 50%) for perylene-d_{10} at 16.8%, 6.2%, and 3.3%, respectively. The associated field sample results were non-detect and were flagged "R,i". The samples were re-analyzed at dilutions with acceptable internal standard area counts. The associated results from the dilutions should be used for data interpretation.

Minor Anomalies: For the VOC analyses, the method blank for batch 90050-114 contained acetone at 10 ug/Kg. The method blank for batch 90050-214 contained acetone at 20 ug/Kg. The method blank for batch 90050-115 contained acetone at 21 ug/Kg. The method blank for batch 89888-115 contained acetone at 13.0 ug/L and methylene chloride at 0.410 ug/L. Positive results less than ten times the blank concentration were flagged "B,z" in the associated samples.

The equipment blank EQB2 displayed positive detections for acetone at 2.2 ug/L and methylene chloride at 0.57 ug/L. The associated trip blank displayed a positive detection for methylene chloride at 1.1 ug/L. The equipment blank EQB3 displayed positive detections for acetone at 2.3 ug/L and methylene chloride at 0.67 ug/L. The associated trip blank displayed a positive detection for methylene chloride at 0.91 ug/L. The field blank detections for methylene chloride and acetone were previously qualified due to method blank detections. No further data qualifying action was required.

The continuing calibration analyzed on 10/14/03 at 0840 displayed percent differences greater than the control limit (i.e., 20%) with a negative bias for acetone at 27.7%, methylene chloride at 23.8%, and methyl acetate at 21.9%. The continuing calibration analyzed on 10/14/03 at 2100 displayed percent differences greater than the control limit with a negative bias for carbon disulfide at 21.5%, methyl acetate at 26.0%, 4-methyl-2-pentanone at 22.1%, and 2-hexanone at 24.3%. The continuing calibration analyzed on 10/15/03 at 0921 displayed percent differences greater than the control limit with a negative bias for dichlorodifluoromethane at 20.8%, carbon disulfide at 22.0%, methylene chloride at 24.2%, methyl acetate at 26.0%, and 1,4-dichlorobenzene at 21.2%. The continuing calibration analyzed on 10/15/03 at 0919 displayed a percent difference greater than the control limit with a negative bias for carbon disulfide at 27.5%. Non-detect associated field sample results were flagged "UJ,c"

while positive associated field sample results were flagged "J,c", unless previously qualified for a method blank detection for acetone.

The matrix spike pair for sample 68SB2A displayed percent recoveries less than the laboratory generated lower control limits for acetone (2%/35%), carbon disulfide (42%/37%), and chloroethane (78%). All associated acetone results were positive and primarily previously qualified as non-detect due to method blank detections. These poor matrix spike recoveries for acetone appear to be associated with laboratory contamination. Based on professional judgement, no further data qualifying action was taken based on the matrix spike recovery anomalies for acetone. The parent sample result for carbon disulfide was previously qualified for a low bias displayed in the continuing calibration percent difference and no further data qualifying action was taken. Since the matrix spike recovery was acceptable and the matrix spike duplicate recovery was only marginally low for chloroethane, no data qualifying action was taken. This matrix spike pair also displayed a relative percent difference greater than the laboratory generated control limit (i.e., 20%) for methyl acetate at 25% and a matrix spike duplicate recovery greater than the laboratory generated upper control limit (i.e., 122%) for methyl-tert-butyl ether at 132%. Methyl-tert-butyl ether and methyl acetate displayed a positive bias or imprecision while the parent sample results were non-detect, thus, no data qualifying action was taken.

For the SVOC analyses, the method blank for extraction batch 89818-108 displayed positive detections for bis(2-ethylhexyl)phthalate at 1.10 ug/L and diethylphthalate at 0.150 ug/L. The method blank for extraction batch 90209-109 displayed a positive detection for diethyl-phthalate at 16 ug/Kg. The method blank for extraction batch 90070-113 displayed positive detections for bis(2-ethylhexyl)phthalate at 1.20 ug/L and butylbenzylphthalate at 0.980 ug/L. The method blank for extraction batch 90482-114 displayed positive detections for bis(2-ethylhexyl)phthalate at 26 ug/Kg and di-n-butylphthalate at 11 ug/Kg. Positive associated field sample results less than ten times the blank concentrations were flagged "B,z".

The equipment blank EQB2 contained bis(2-ethylhexyl)phthalate at 1.1 ug/L, butyl benzyl phthalate at 0.96 ug/L, diethylphthalate at 0.12 ug/L, and several tentatively identified compounds (TICs). The equipment blank detections for bis(2-ethylhexyl) phthalate and diethylphthalate were previously flagged due to method blank detections and no further data qualifying action was taken. The equipment blank EQB3 contained 4-chloro-3-methylphenol at 0.14 ug/L, bis(2-ethylhexyl)phthalate at 1.4 ug/L, butyl benzyl phthalate at 1.0 ug/L, diethylphthalate at 0.11 ug/L, and several tentatively identified compounds (TICs). The equipment blank detections for bis(2-ethylhexyl) phthalate and butyl benzyl phthalate were previously flagged due to method blank detections and no further data qualifying action was taken. Positive results less than ten times the blank concentration for the remaining positive phthalates and less than five times the blank concentration of the TICs or 4-chloro-3-methylphenol were flagged "B,x" in the associated samples.

The continuing calibration analyzed on 10/16/03 at 2111 displayed percent differences greater than the control limit with a negative bias for atrazine at 38.6%, benzaldehyde at 34.4%, 4-chloroaniline at 21.9%, bis(2-ethylhexyl)phthalate at 27.9%, 3,3'-dichlorobenzidine at 20.6%, and di-n-octylphthalate at 24.9%. All associated non-detect field sample results were flagged "UJ,c" while positive field sample results were flagged "J,c", unless previously flagged for a matrix spike anomaly. This continuing calibration displayed percent differences greater than the control limit with a positive bias for 2,4-dinitrophenol at 25.6% and pentachlorophenol at 28.3%. All associated field sample results were non-detect, thus, no data qualifying action was required.

The continuing calibration analyzed on 10/17/03 at 1307 displayed percent differences greater than the control limit with a negative bias for benzaldehyde at 21.9% and with a positive bias for hexachlorocyclopentadiene at 21.4% and di-n-octylphthalate at 21.1%. The associated field sample results were non-detect for benzaldehyde and were flagged "UJ,c". The associated field sample results were non-detect for the other anomalous compounds while the continuing calibration displayed a positive bias, thus, no data qualifying action was required.

The continuing calibration analyzed on 10/18/03 at 0632 displayed percent differences greater than the control limit with a negative bias for benzaldehyde at 26.4% and 4-chloroaniline at 26.2% and with a positive bias for 2,4,5-trichlorophenol at 25.0%. The associated field sample results were non-detect for benzaldehyde and 4-chloroaniline and were flagged "UJ,c". The associated field sample results were non-detect for 2,4,5-trichlorophenol while the continuing calibration displayed a positive bias, thus, no data qualifying action was required.

The laboratory control spike pair for batch 89818-108 displayed recoveries less than the laboratory generated lower control limit (i.e., 50%) but greater than the QAPP lower control limit (i.e., 10%) for caprolactam (40%/37%). The laboratory control spike for batch 90209-109 displayed a recovery less than the laboratory generated lower control limit (i.e., 16%) but greater than the QAPP lower control limit (i.e., 10%) for 4-chloroaniline at 14%. The laboratory control spike pair for batch 90070-113 displayed recoveries less than the laboratory generated lower control limits but greater than the QAPP lower control limit (i.e., 10%) for 2,4-dinitrophenol (24%) and caprolactam (24%/27%). The associated field sample results were non-detect and were flagged "UJ,l", unless previously flagged for a negative bias in the continuing calibration.

The laboratory control spike duplicate for batch 89818-108 displayed recoveries greater than the laboratory generated upper control limits for benzo(g,h,i) perylene at 127% and pentachlorophenol at 122%. The laboratory control spike for batch 90209-109 displayed recoveries greater than the laboratory generated upper control limits for 2,4,5-trichlorophenol at 122%, 2,6-dinitrotoluene at 119%, benzo(b)fluoranthene at 121%, carbazole at 127%, diethylphthalate at 123%, dimethylphthalate at 117%, and fluorene at 117%. The laboratory control spike for batch 90482-114 displayed recoveries greater than the laboratory generated upper control limits for 2,4,5-trichlorophenol at 128%, 2,6-dinitrotoluene at 123%, 2-nitroaniline at 127%, 3,3'-dichlorobenzidine at 117%, acenaphthylene at 118%, benzo(b)fluoranthene at 125%, benzo(g,h,i)perylene at 130%, carbazole at 127%, dibenzo(a,h)anthracene at 126%, diethylphthalate at 119%, dimethylphthalate at 118%, fluorene at 121%, hexachlorocyclopentadiene at 115%, and indeno(1,2,3-cd)pyrene at 125%. Sample 68SB2A displayed positive detections for benzo(b)fluoranthene and indeno(1,2,3-cd)pyrene that were flagged "J,l". All other associated field sample results were non-detect or previously flagged for a method blank detection while the laboratory control spike displayed a positive bias. No data qualifying action was taken.

The matrix spike pair for sample 68SB2A displayed percent recoveries outside the laboratory generated control limits for 4-chloroaniline (16%/18%) and di-n-octylphthalate (125%/125%). This matrix spike pair also displayed relative percent differences greater than the laboratory generated control limits for 3-nitroaniline at 28% and di-n-butylphthalate at 20%. The parent sample result for 4-chloroaniline was non-detect and previously qualified for a continuing calibration anomaly. The parent sample result for di-n-butylphthalate was positive and previously qualified as non-detect due to blank contamination. The parent sample results for di-n-octylphthalate and 3-nitroaniline were non-detect while the matrix spike pair displayed a

positive bias or imprecision, respectively. Based on professional judgement, no data qualifying action was taken based on these matrix spike results.

The initial analysis of sample 38SB1A displayed two acid fraction surrogate recoveries less than the laboratory generated lower control limits for phenol-d_6 at 27% and 2,4,5-tribromophenol at 11%. The initial analysis of sample 38SB3A displayed two acid fraction surrogate recoveries less than the laboratory generated lower control limits for phenol-d_6 at 21% and 2,4,5-tribromophenol at 20%. The associated acid fraction constituents were non-detect and were flagged "UL,s". The acid fraction surrogate phenol-d_6 displayed a percent recovery less than the laboratory generated lower control limit (i.e., 38%) for sample 38SB3B at 29%. Sample SBD5 displayed a base/neutral fraction surrogate recovery less than the laboratory generated lower control limit (i.e., 50%) for 2-fluorobiphenyl at 47%. Since only one surrogate recovery was outside the control limits, no data qualifying action was required.

For the PAH analyses, the laboratory control spike for batch 90708-113 displayed a recovery less than the laboratory generated lower control limit (i.e., 87%) but greater than the project QAPP lower control limit (i.e., 40%) for fluoranthene at 77%. Positive associated field sample results were flagged "J,l" while non-detects were flagged "UJ,l".

The surrogate, 2-fluorobiphenyl, percent recoveries were less than the laboratory lower control limit (i.e., 49%) for SBD4 at 41%, 38SB2C at 48%, 38SB1A at 47%, 38SB1B at 21%, 38SB3B at 29%, 68SB2A at 33%, 68SB2B at 34%, 68SB2C at 31%, 68SB1A at 34%, 68SB1B at 34%, and 68SB1C at 31%. Positive associated field sample results were flagged "L,s" while non-detects were flagged "UL,s", unless previously qualified for laboratory control spike anomalies.

The matrix spike pair for sample 68SB2A displayed percent recoveries less than the laboratory generated lower control limits for all target compounds. The laboratory performed an analytical spike that displayed acceptable recoveries. The low recoveries may be attributable to extraction efficiency. Since most of the associated field sample results were qualified as biased low due to surrogate recovery anomalies, no further data qualifying action was taken.

For the explosive analyses, the continuing calibration analyzed on 10/21/03 at 2100 displayed a percent difference greater than the control limit (i.e., 15%) with a negative bias for 3-nitrotoluene at 16.0%. The continuing calibration analyzed on 10/22/03 at 0227 displayed a percent difference greater than the control limit with a negative bias for 3-nitrotoluene at 19.9%. The continuing calibration analyzed on 10/27/03 at 1217 displayed a percent difference greater than the control limit with a negative bias for RDX at 16.9%. The continuing calibration analyzed on 10/27/03 at 1244 displayed a percent difference greater than the control limit with a negative bias for 3-nitrotoluene at 17.2%. All associated sample results were non-detect and were flagged "UJ,c".

The matrix spike pair for sample 68SB2A displayed relative percent differences greater than the laboratory generated control limits (i.e., 40%) for 2-amino-4,6-dinitrotoluene at 42% and RDX at 44%. The parent sample results were non-detect for 2-amino-4,6-dinitrotoluene and RDX while the matrix spike pair results displayed imprecision, thus, no data qualifying action was taken.

For the pesticide analyses, the opening continuing calibration analyzed on 10/10/03 displayed percent differences greater than the control limit (i.e., 15%) with a positive bias on column one for delta BHC at 18.6%, 4,4'-DDD at 19.73%, endosulfan II at 15.76%, methoxychlor at

19.24%, and endosulfan sulfate at 15.16%. The closing continuing calibration displayed a percent difference greater than the control limit with a positive bias on column one for delta BHC at 15.11%. The associated field sample results were non-detect or did not confirm on the passing alternate analytical column. No data qualifying action was taken based on these anomalies.

The closing continuing calibration analyzed on 10/18/03 displayed percent differences greater than the control limit (i.e., 15%) with a positive bias on column one for delta BHC at 16.89%, 4,4'-DDD at 23.75%, 4,4'-DDT at 18.77%, methoxychlor at 28.37%, and endosulfan sulfate at 15.85%. This closing continuing calibration displayed percent differences greater than the control limit with a positive bias on column two for 4,4'-DDD at 17.38% and methoxychlor at 20.16%. The associated field sample results were non-detect on one or both columns while the continuing calibration displayed a positive bias. No data qualifying action was taken based on these anomalies.

The laboratory control spike pair for batch 90180-108 displayed recoveries greater than the laboratory generated upper control limits for a-chlordane (111%), endosulfan sulfate (145%), endrin aldehyde (139%), and methoxychlor (148%/133%). The associated field sample, EQB1, was non-detect for these compounds while the laboratory control spikes displayed a positive bias. No data qualifying action was taken based on these anomalies.

For the herbicide analyses, the laboratory control spike pair for batch 90447-109 displayed recoveries greater than the laboratory generated upper control limits for dicamba (130%), dichlorprop (109%), MCPA (98%), and MCPP (122%/106%). The associated field sample, EQB2, was non-detect for these constituents while the laboratory control spike displayed a positive bias. No data qualifying action was taken. The laboratory control spike for batch 90218-110 displayed a recovery less than the laboratory generated lower control limit (i.e., 50%) for dinoseb at 0% and a recovery greater than the laboratory generated upper control limit (i.e., 91%) for MCPP at 117%. The associated field sample results were non-detect for MCPP while the laboratory control spike displayed a positive bias, therefore, no data qualifying action was required. All dinoseb results from the original extraction were rejected and manually removed from the result forms by the reviewer. Only dinoseb results from the re-extraction used be used for data interpretation. The surrogate recoveries were greater than the upper laboratory generated control limit (i.e., 114%) for all samples of the re-extraction. Since the associated field sample results were non-detect, no data qualifying action was required.

For the metal analyses by 6020, the method blank for batch 89972-109 contained selenium at 0.0629 mg/Kg and silver at 0.00964 mg/Kg. The associated positive field sample results less than five times the blank concentration were flagged "B,p". The method blank for batch 89970-113 contained chromium at 0.58 ug/L. The associated field sample results for chromium were non-detect and no data qualifying action was required. The equipment blank EQB3 contained lead at 0.3 ug/L. The associated field sample results were positive and greater than five times the equipment blank concentration. No data qualifying action was required.

For the metal analyses by 6010B, the method blank for batch 89966-113 contained iron at 7.12 ug/L, potassium at 88 ug/L, and sodium at 421 ug/L. Positive results less than five times the blank concentration for iron and sodium were flagged "B,p" in the associated field samples EQB2 and EQB3. The field sample results for potassium were non-detect and no data qualifying action was required. The equipment blank EQB2 contained iron at 25 ug/L, sodium

at 180 ug/L, and zinc at 5.7 ug/L. The equipment blank EQB3 contained iron at 4.8 ug/L and sodium at 160 ug/L. The equipment blank results for iron and sodium were previously qualified due to method blank detections. All associated positive field sample results were less than five times the equipment blank concentration for zinc and were flagged "B,x".

The matrix spike performed on sample 68SB2A displayed a percent recovery greater than the laboratory generated upper control limit (i.e., 121%) for calcium at 127%. All associated positive field sample results were flagged "K,m". This matrix spike pair displayed percent recoveries less than the laboratory generated lower control limit (i.e., 65%) for barium (50%/37%). All associated field sample results were positive and were flagged "L,m". The serial dilution performed on sample 68SB2A displayed a percent difference greater than the control limit (i.e., 10%) for cobalt at 12.5%. All associated field sample results were positive and were flagged "J,s". The field duplicate pair (68SB2C and SBD5) displayed a relative percent difference greater than the control limit (i.e., 35%) for potassium at 36.1%. The positive results for potassium were flagged "J,f" in these two samples.

For the cyanide analyses, sample 38SB2C was analyzed outside the holding time (i.e., 14 days) on the 18th day. Since the holding time was not exceed by more than two times, the associated non-detect field sample result was flagged "UL,h".

Correctable Anomalies: The client cancelled the field samples 68SB2A matrix spike, 68SB2A matrix spike duplicate, and EQB3 for herbicide, pesticide, and polychlorinated biphenyl analyses.

Comments: Samples 38SB1A and 38SB3A were initially analyzed for SVOCs at a dilution factor of 10 due to non-target matrix interference during the concentration step of the extraction. Sample 38SB1A was analyzed at dilution due to analytical interference for herbicides. Due to the abundance of target compounds, most of the samples were analyzed at dilutions for the metals analyses. Therefore, the reporting limits for these constituents were elevated.

Field coolers were received at the laboratory with internal temperatures less than the lower control limit (i.e., 2°C) at 0.9°C and 1.1 °C. Since the sample aliquots were not frozen and the containers were intact, no data qualifying action was taken. A cooler containing the equipment blank EQB3 and trip blank associated with the equipment blank was received at the laboratory with an internal temperature greater than the upper control limit (i.e., 6°C) at 8.6 °C. Based on professional judgement no data qualifying action was required since this temperature did not exceed 10°C.

It should be noted that TIC results were flagged "NJ,t" in the associated samples. TIC results that were identified as unknown were manually lined out by the reviewer. The GIS-Key format is limited to 12 characters for a TIC CAS number. One or two SVOC TIC detections exceeded this limitation for 38SB2A, 38SB3C, 68SB2B, and 68SB1A. The laboratory reported the CAS number without the dashes. The reviewer manually entered the dashes for evaluation purposes on the hardcopy result forms included in this report.

No anomalies were encountered if a given fraction was not mentioned. Except for data flagged "R", all data are usable, as qualified, for their intended purpose based on the data reviewed.

Signed: Andrea Sansom

Andrea Sansom

Radford SSP

Submittal No.	Lab Sample ID	Field Sample ID	Matrix (Code)	Sample Date
36440-3	345184	EQB2	WQ	10/03/03
36440-3	345185	Trip Blank	WQ	10/03/03
36440-3	345186	38SB2A	SO	10/03/03
36440-3	345187	38SB2B	SO	10/03/03
36440-3	345188	SBD4	SO	10/03/03
36440-3	345189	38SB2C	SO	10/03/03
36440-3	345196	38SB1A	SO	10/03/03
36440-3	345197	38SB1B	SO	10/03/03
36440-3	345198	38SB1C	SO	10/03/03
36440-3	345199	38SB3A	SO	10/03/03
36440-3	345200	38SB3B	SO	10/03/03
36440-3	345201	38SB3C	SO	10/03/03
36440-3	345408	68SB2A	SO	10/06/03
36440-3	345409	68SB2B	SO	10/06/03
36440-3	345410	68SB2C	SO	10/06/03
36440-3	345411	SBD5	SO	10/06/03
36440-3	345412	68SB1A	SO	10/06/03
36440-3	345413	68SB1B	SO	10/06/03
36440-3	345414	68SB1C	SO	10/06/03
36440-3	345617	EQB3	WQ	10/07/03
36440-3	345618	Trip Blank	WQ	10/07/03

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**EQB2**	QC Batch:	89888 -115
Sample #:	**345184**	Anal. Batch:	207752
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Volatile Organics OLM4.2+ TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	1.0 U		1.0	0.142
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1.0 U		1.0	0.179
79-34-5	1,1,2,2-Tetrachloroethane	1.0 U		1.0	0.148
79-00-5	1,1,2-Trichloroethane	1.0 U		1.0	0.142
75-34-3	1,1-Dichloroethane	1.0 U		1.0	0.057
75-35-4	1,1-Dichloroethylene	1.0 U		1.0	0.133
106-93-4	1,2-Dibromoethane	1.0 U		1.0	0.171
96-12-8	1,2-Dibromo-3-chloropropane	5.0 U		5.0	0.270
95-50-1	1,2-Dichlorobenzene	1.0 U		1.0	0.164
107-06-2	1,2-Dichloroethane	1.0 U		1.0	0.111
156-59-2	cis-1,2-Dichloroethene	1.0 U		1.0	0.139
156-60-5	trans-1,2-Dichloroethene	1.0 U		1.0	0.143
78-87-5	1,2-Dichloropropane	1.0 U		1.0	0.255
87-61-6	1,2,3-Trichlorobenzene	1.0 U		1.0	0.228
120-82-1	1,2,4-Trichlorobenzene	1.0 U		1.0	0.189
541-73-1	1,3-Dichlorobenzene	1.0 U		1.0	0.160
106-46-7	1,4-Dichlorobenzene	1.0 U		1.0	0.124
78-93-3	Methyl Ethyl Ketone	20 U		20	0.417
591-78-6	2-Hexanone	20 U		20	0.455
108-10-1	4-Methyl-2-Pentanone	20 U		20	0.364
67-64-1	**Acetone**	**2.2 J**	B,Z	20	1.07
71-43-2	Benzene	1.0 U		1.0	0.022
74-97-5	Bromochloromethane	1.0 U		1.0	0.076
75-27-4	Dichlorobromomethane	1.0 U		1.0	0.431
75-25-2	Bromoform	1.0 U		1.0	0.110
74-83-9	Bromomethane	1.0 U		1.0	0.267
75-15-0	Carbon Disulfide	5.0 U	VJ,C	5.0	0.059
56-23-5	Carbon Tetrachloride	1.0 U		1.0	0.115
108-90-7	Chlorobenzene	1.0 U		1.0	0.157
75-00-3	Chloroethane	1.0 U		1.0	0.180
67-66-3	Chloroform	1.0 U		1.0	0.101

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Individual sample results relate only to the sample tested.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**EQB2**	QC Batch:	89888 -115
Sample #:	**345184**	Anal. Batch:	207752
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Volatile Organics OLM4.2+ TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	1.0 U		1.0	0.103
110-82-7	Cyclohexane	5.0 U		5.0	0.215
10061-01-5	cis-1,3-Dichloropropene	1.0 U		1.0	0.189
10061-02-6	trans-1,3-Dichloropropene	1.0 U		1.0	0.117
75-71-8	Dichlorodifluoromethane	1.0 U		1.0	0.120
124-48-1	Chlorodibromomethane	1.0 U		1.0	0.108
100-41-4	Ethylbenzene	1.0 U		1.0	0.195
98-82-8	Isopropylbenzene	1.0 U		1.0	0.090
79-20-9	Methyl Acetate	10 U		10	0.231
108-87-2	Methylcyclohexane	5.0 U		5.0	0.168
1634-04-4	Methyl(tert)butyl Ether	1.0 U		1.0	0.077
75-09-2	**Methylene Chloride**	**0.57 J**	B,Z	4.0	0.117
100-42-5	Styrene	1.0 U		1.0	0.137
127-18-4	Tetrachloroethene	1.0 U		1.0	0.193
108-88-3	Toluene	1.0 U		1.0	0.214
79-01-6	Trichloroethene	1.0 U		1.0	0.211
75-69-4	Trichlorofluoromethane	1.0 U		1.0	0.051
75-01-4	Vinyl Chloride	1.0 U		1.0	0.119
1330-20-7	Xylene (Total)	3.0 U		3.0	0.160

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**EQB2**	QC Batch:	89888 -115
Sample #:	**345184**	Anal. Batch:	207752
Matrix:	QC Water	Percent Solids:	n/a
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/L)**	**Qualifier**

No compound was detected.

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**Trip Blank**	QC Batch:	89888 -115
Sample #:	**345185**	Anal. Batch:	207752
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Volatile Organics OLM4.2+ TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	1.0 U		1.0	0.142
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1.0 U		1.0	0.179
79-34-5	1,1,2,2-Tetrachloroethane	1.0 U		1.0	0.148
79-00-5	1,1,2-Trichloroethane	1.0 U		1.0	0.142
75-34-3	1,1-Dichloroethane	1.0 U		1.0	0.057
75-35-4	1,1-Dichloroethylene	1.0 U		1.0	0.133
106-93-4	1,2-Dibromoethane	1.0 U		1.0	0.171
96-12-8	1,2-Dibromo-3-chloropropane	5.0 U		5.0	0.270
95-50-1	1,2-Dichlorobenzene	1.0 U		1.0	0.164
107-06-2	1,2-Dichloroethane	1.0 U		1.0	0.111
156-59-2	cis-1,2-Dichloroethene	1.0 U		1.0	0.139
156-60-5	trans-1,2-Dichloroethene	1.0 U		1.0	0.143
78-87-5	1,2-Dichloropropane	1.0 U		1.0	0.255
87-61-6	1,2,3-Trichlorobenzene	1.0 U		1.0	0.228
120-82-1	1,2,4-Trichlorobenzene	1.0 U		1.0	0.189
541-73-1	1,3-Dichlorobenzene	1.0 U		1.0	0.160
106-46-7	1,4-Dichlorobenzene	1.0 U		1.0	0.124
78-93-3	Methyl Ethyl Ketone	20 U		20	0.417
591-78-6	2-Hexanone	20 U		20	0.455
108-10-1	4-Methyl-2-Pentanone	20 U		20	0.364
67-64-1	Acetone	20 U		20	1.07
71-43-2	Benzene	1.0 U		1.0	0.022
74-97-5	Bromochloromethane	1.0 U		1.0	0.076
75-27-4	Dichlorobromomethane	1.0 U		1.0	0.431
75-25-2	Bromoform	1.0 U		1.0	0.110
74-83-9	Bromomethane	1.0 U		1.0	0.267
75-15-0	Carbon Disulfide	5.0 U	UJ,c	5.0	0.059
56-23-5	Carbon Tetrachloride	1.0 U		1.0	0.115
108-90-7	Chlorobenzene	1.0 U		1.0	0.157
75-00-3	Chloroethane	1.0 U		1.0	0.180
67-66-3	Chloroform	1.0 U		1.0	0.101

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**Trip Blank**	QC Batch:	89888 -115
Sample #:	**345185**	Anal. Batch:	207752
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Volatile Organics OLM4.2+ TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	1.0 U		1.0	0.103
110-82-7	Cyclohexane	5.0 U		5.0	0.215
10061-01-5	cis-1,3-Dichloropropene	1.0 U		1.0	0.189
10061-02-6	trans-1,3-Dichloropropene	1.0 U		1.0	0.117
75-71-8	Dichlorodifluoromethane	1.0 U		1.0	0.120
124-48-1	Chlorodibromomethane	1.0 U		1.0	0.108
100-41-4	Ethylbenzene	1.0 U		1.0	0.195
98-82-8	Isopropylbenzene	1.0 U		1.0	0.090
79-20-9	Methyl Acetate	10 U		10	0.231
108-87-2	Methylcyclohexane	5.0 U		5.0	0.168
1634-04-4	Methyl(tert)butyl Ether	1.0 U		1.0	0.077
75-09-2	**Methylene Chloride**	**1.1 J**	B,Z	4.0	0.117
100-42-5	Styrene	1.0 U		1.0	0.137
127-18-4	Tetrachloroethene	1.0 U		1.0	0.193
108-88-3	Toluene	1.0 U		1.0	0.214
79-01-6	Trichloroethene	1.0 U		1.0	0.211
75-69-4	Trichlorofluoromethane	1.0 U		1.0	0.051
75-01-4	Vinyl Chloride	1.0 U		1.0	0.119
1330-20-7	Xylene (Total)	3.0 U		3.0	0.160

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**Trip Blank**	QC Batch:	89888 -115
Sample #:	**345185**	Anal. Batch:	207752
Matrix:	QC Water	Percent Solids:	n/a
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/L)**	**Qualifier**

No compound was detected.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 08:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**38SB2A**	QC Batch:	90050 -114
Sample #:	**345186**	Anal. Batch:	208007
Matrix:	Soil	Percent Solids:	86
Unit:	ug/kg dry	Dilution Factor:	1.16

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	5.8 U		5.8	0.494
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.8 U		5.8	0.880
79-34-5	1,1,2,2-Tetrachloroethane	5.8 U		5.8	0.757
79-00-5	1,1,2-Trichloroethane	5.8 U		5.8	0.688
75-34-3	1,1-Dichloroethane	5.8 U		5.8	0.840
75-35-4	1,1-Dichloroethylene	5.8 U		5.8	0.850
106-93-4	1,2-Dibromoethane	5.8 U		5.8	0.795
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.41
95-50-1	1,2-Dichlorobenzene	5.8 U		5.8	0.561
107-06-2	1,2-Dichloroethane	5.8 U		5.8	0.500
156-59-2	cis-1,2-Dichloroethene	5.8 U		5.8	0.824
156-60-5	trans-1,2-Dichloroethene	5.8 U		5.8	0.815
78-87-5	1,2-Dichloropropane	5.8 U		5.8	0.680
87-61-6	1,2,3-Trichlorobenzene	5.8 U		5.8	0.631
120-82-1	1,2,4-Trichlorobenzene	5.8 U		5.8	0.476
541-73-1	1,3-Dichlorobenzene	5.8 U		5.8	0.311
106-46-7	1,4-Dichlorobenzene	5.8 U		5.8	0.824
78-93-3	**Methyl Ethyl Ketone**	**26**		24	5.80
591-78-6	2-Hexanone	12 U		12	2.62
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.69
67-64-1	**Acetone**	**200**	J,C	24	5.80
71-43-2	Benzene	5.8 U		5.8	0.611
74-97-5	Bromochloromethane	5.8 U		5.8	0.883
75-27-4	Dichlorobromomethane	5.8 U		5.8	0.581
75-25-2	Bromoform	5.8 U		5.8	0.670
74-83-9	Bromomethane	5.8 U		5.8	1.74
75-15-0	Carbon Disulfide	5.8 U		5.8	1.68
56-23-5	Carbon Tetrachloride	5.8 U		5.8	0.541
108-90-7	Chlorobenzene	5.8 U		5.8	0.767
75-00-3	Chloroethane	5.8 U		5.8	1.57
67-66-3	Chloroform	5.8 U		5.8	0.517

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 08:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**38SB2A**	QC Batch:	90050 -114
Sample #:	**345186**	Anal. Batch:	208007
Matrix:	Soil	Percent Solids:	86
Unit:	ug/kg dry	Dilution Factor:	1.16

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	5.8 U		5.8	0.967
110-82-7	Cyclohexane	12 U		12	0.367
10061-01-5	cis-1,3-Dichloropropene	5.8 U		5.8	0.570
10061-02-6	trans-1,3-Dichloropropene	5.8 U		5.8	0.604
75-71-8	Dichlorodifluoromethane	5.8 U		5.8	0.775
124-48-1	Chlorodibromomethane	5.8 U		5.8	0.600
100-41-4	Ethylbenzene	5.8 U		5.8	0.491
98-82-8	Isopropylbenzene	5.8 U		5.8	0.633
79-20-9	Methyl Acetate	24 U	UJ,c	24	4.03
108-87-2	Methylcyclohexane	12 U		12	0.980
1634-04-4	Methyl(tert)butyl Ether	5.8 U		5.8	0.744
75-09-2	Methylene Chloride	24 U	UJ,c	24	3.26
100-42-5	Styrene	5.8 U		5.8	0.513
127-18-4	Tetrachloroethene	5.8 U		5.8	0.711
108-88-3	**Toluene**	**3.0 J**		5.8	0.538
79-01-6	Trichloroethene	5.8 U		5.8	0.785
75-69-4	Trichlorofluoromethane	5.8 U		5.8	0.862
75-01-4	Vinyl Chloride	5.8 U		5.8	0.429
1330-20-7	Xylene (Total)	5.8 U		5.8	0.488

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 08:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**38SB2A**	QC Batch:	90050 -114
Sample #:	**345186**	Anal. Batch:	208007
Matrix:	Soil	Percent Solids:	86
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
4-Isopropyltoluene	99-87-6	4.4	Q	NJ,+
7,7-Dimethyl-2-methylene-bicyclo[2.2.1]heptane	471-84-1	11	E	NJ,+
Camphene	79-92-5	13	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 09:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**38SB2B**	QC Batch:	90050 -114
Sample #:	**345187**	Anal. Batch:	208007
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.18

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	5.9 U		5.9	0.503
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.9 U		5.9	0.896
79-34-5	1,1,2,2-Tetrachloroethane	5.9 U		5.9	0.771
79-00-5	1,1,2-Trichloroethane	5.9 U		5.9	0.700
75-34-3	1,1-Dichloroethane	5.9 U		5.9	0.854
75-35-4	1,1-Dichloroethylene	5.9 U		5.9	0.865
106-93-4	1,2-Dibromoethane	5.9 U		5.9	0.808
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.45
95-50-1	1,2-Dichlorobenzene	5.9 U		5.9	0.571
107-06-2	1,2-Dichloroethane	5.9 U		5.9	0.509
156-59-2	cis-1,2-Dichloroethene	5.9 U		5.9	0.838
156-60-5	trans-1,2-Dichloroethene	5.9 U		5.9	0.830
78-87-5	1,2-Dichloropropane	5.9 U		5.9	0.691
87-61-6	1,2,3-Trichlorobenzene	5.9 U		5.9	0.642
120-82-1	1,2,4-Trichlorobenzene	5.9 U		5.9	0.484
541-73-1	1,3-Dichlorobenzene	5.9 U		5.9	0.316
106-46-7	1,4-Dichlorobenzene	5.9 U		5.9	0.838
78-93-3	Methyl Ethyl Ketone	24 U		24	5.90
591-78-6	2-Hexanone	12 U		12	2.67
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.72
67-64-1	**Acetone**	**34**	B,Z	24	5.90
71-43-2	Benzene	5.9 U		5.9	0.622
74-97-5	Bromochloromethane	5.9 U		5.9	0.898
75-27-4	Dichlorobromomethane	5.9 U		5.9	0.591
75-25-2	Bromoform	5.9 U		5.9	0.682
74-83-9	Bromomethane	5.9 U		5.9	1.77
75-15-0	Carbon Disulfide	5.9 U		5.9	1.71
56-23-5	Carbon Tetrachloride	5.9 U		5.9	0.550
108-90-7	Chlorobenzene	5.9 U		5.9	0.780
75-00-3	Chloroethane	5.9 U		5.9	1.59
67-66-3	Chloroform	5.9 U		5.9	0.526

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 09:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**38SB2B**	QC Batch:	90050 -114
Sample #:	**345187**	Anal. Batch:	208007
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.18

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	5.9 U		5.9	0.984
110-82-7	Cyclohexane	12 U		12	0.373
10061-01-5	cis-1,3-Dichloropropene	5.9 U		5.9	0.579
10061-02-6	trans-1,3-Dichloropropene	5.9 U		5.9	0.615
75-71-8	Dichlorodifluoromethane	5.9 U		5.9	0.788
124-48-1	Chlorodibromomethane	5.9 U		5.9	0.610
100-41-4	Ethylbenzene	5.9 U		5.9	0.499
98-82-8	Isopropylbenzene	5.9 U		5.9	0.644
79-20-9	Methyl Acetate	24 U	VJ,C	24	4.09
108-87-2	Methylcyclohexane	12 U		12	0.997
1634-04-4	Methyl(tert)butyl Ether	5.9 U		5.9	0.756
75-09-2	Methylene Chloride	24 U	VJ,C	24	3.32
100-42-5	Styrene	5.9 U		5.9	0.522
127-18-4	Tetrachloroethene	5.9 U		5.9	0.723
108-88-3	Toluene	5.9 U		5.9	0.548
79-01-6	Trichloroethene	5.9 U		5.9	0.799
75-69-4	Trichlorofluoromethane	5.9 U		5.9	0.877
75-01-4	Vinyl Chloride	5.9 U		5.9	0.437
1330-20-7	Xylene (Total)	5.9 U		5.9	0.497

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 09:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**38SB2B**	QC Batch:	90050 -114
Sample #:	**345187**	Anal. Batch:	208007
Matrix:	Soil	Percent Solids:	85
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD4**	QC Batch:	90050 -114
Sample #:	**345188**	Anal. Batch:	208007
Matrix:	Soil	Percent Solids:	81
Unit:	ug/kg dry	Dilution Factor:	1.23

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.2 U		6.2	0.524
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.2 U		6.2	0.934
79-34-5	1,1,2,2-Tetrachloroethane	6.2 U		6.2	0.803
79-00-5	1,1,2-Trichloroethane	6.2 U		6.2	0.729
75-34-3	1,1-Dichloroethane	6.2 U		6.2	0.891
75-35-4	1,1-Dichloroethylene	6.2 U		6.2	0.902
106-93-4	1,2-Dibromoethane	6.2 U		6.2	0.843
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.56
95-50-1	1,2-Dichlorobenzene	6.2 U		6.2	0.595
107-06-2	1,2-Dichloroethane	6.2 U		6.2	0.530
156-59-2	**cis-1,2-Dichloroethene**	**19**		6.2	0.873
156-60-5	trans-1,2-Dichloroethene	6.2 U		6.2	0.865
78-87-5	1,2-Dichloropropane	6.2 U		6.2	0.721
87-61-6	1,2,3-Trichlorobenzene	6.2 U		6.2	0.669
120-82-1	1,2,4-Trichlorobenzene	6.2 U		6.2	0.504
541-73-1	1,3-Dichlorobenzene	6.2 U		6.2	0.330
106-46-7	1,4-Dichlorobenzene	6.2 U		6.2	0.873
78-93-3	Methyl Ethyl Ketone	24 U		24	6.15
591-78-6	2-Hexanone	12 U		12	2.78
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.80
67-64-1	**Acetone**	**38**	B,Z	24	6.15
71-43-2	Benzene	6.2 U		6.2	0.648
74-97-5	Bromochloromethane	6.2 U		6.2	0.936
75-27-4	Dichlorobromomethane	6.2 U		6.2	0.616
75-25-2	Bromoform	6.2 U		6.2	0.711
74-83-9	Bromomethane	6.2 U		6.2	1.85
75-15-0	Carbon Disulfide	6.2 U		6.2	1.78
56-23-5	Carbon Tetrachloride	6.2 U		6.2	0.573
108-90-7	Chlorobenzene	6.2 U		6.2	0.813
75-00-3	Chloroethane	6.2 U		6.2	1.66
67-66-3	Chloroform	6.2 U		6.2	0.549

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD4**	QC Batch:	90050 -114
Sample #:	**345188**	Anal. Batch:	208007
Matrix:	Soil	Percent Solids:	81
Unit:	ug/kg dry	Dilution Factor:	1.23

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.2 U		6.2	1.03
110-82-7	Cyclohexane	12 U		12	0.389
10061-01-5	cis-1,3-Dichloropropene	6.2 U		6.2	0.604
10061-02-6	trans-1,3-Dichloropropene	6.2 U		6.2	0.641
75-71-8	Dichlorodifluoromethane	6.2 U		6.2	0.822
124-48-1	Chlorodibromomethane	6.2 U		6.2	0.636
100-41-4	Ethylbenzene	6.2 U		6.2	0.520
98-82-8	Isopropylbenzene	6.2 U		6.2	0.672
79-20-9	Methyl Acetate	24 U	UJ,C	24	4.27
108-87-2	Methylcyclohexane	12 U		12	1.04
1634-04-4	Methyl(tert)butyl Ether	6.2 U		6.2	0.788
75-09-2	Methylene Chloride	24 U	UJ,C	24	3.46
100-42-5	Styrene	6.2 U		6.2	0.544
127-18-4	Tetrachloroethene	6.2 U		6.2	0.754
108-88-3	**Toluene**	**0.69 J**		6.2	0.571
79-01-6	Trichloroethene	6.2 U		6.2	0.833
75-69-4	Trichlorofluoromethane	6.2 U		6.2	0.914
75-01-4	Vinyl Chloride	6.2 U		6.2	0.455
1330-20-7	Xylene (Total)	6.2 U		6.2	0.518

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD4**	QC Batch:	90050 -114
Sample #:	**345188**	Anal. Batch:	208007
Matrix:	Soil	Percent Solids:	81
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 09:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**38SB2C**	QC Batch:	90050 -114
Sample #:	**345189**	Anal. Batch:	208007
Matrix:	Soil	Percent Solids:	93
Unit:	ug/kg dry	Dilution Factor:	1.08

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	5.4 U		5.4	0.460
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.4 U		5.4	0.820
79-34-5	1,1,2,2-Tetrachloroethane	5.4 U		5.4	0.705
79-00-5	1,1,2-Trichloroethane	5.4 U		5.4	0.640
75-34-3	1,1-Dichloroethane	5.4 U		5.4	0.782
75-35-4	1,1-Dichloroethylene	5.4 U		5.4	0.792
106-93-4	1,2-Dibromoethane	5.4 U		5.4	0.740
96-12-8	1,2-Dibromo-3-chloropropane	11 U		11	2.25
95-50-1	1,2-Dichlorobenzene	5.4 U		5.4	0.523
107-06-2	1,2-Dichloroethane	5.4 U		5.4	0.465
156-59-2	cis-1,2-Dichloroethene	5.4 U		5.4	0.767
156-60-5	trans-1,2-Dichloroethene	5.4 U		5.4	0.759
78-87-5	1,2-Dichloropropane	5.4 U		5.4	0.633
87-61-6	1,2,3-Trichlorobenzene	5.4 U		5.4	0.588
120-82-1	1,2,4-Trichlorobenzene	5.4 U		5.4	0.443
541-73-1	1,3-Dichlorobenzene	5.4 U		5.4	0.289
106-46-7	1,4-Dichlorobenzene	5.4 U		5.4	0.767
78-93-3	Methyl Ethyl Ketone	22 U		22	5.40
591-78-6	2-Hexanone	11 U		11	2.44
108-10-1	4-Methyl-2-Pentanone	11 U		11	1.58
67-64-1	**Acetone**	**28**	B,Z	22	5.40
71-43-2	Benzene	5.4 U		5.4	0.569
74-97-5	Bromochloromethane	5.4 U		5.4	0.822
75-27-4	Dichlorobromomethane	5.4 U		5.4	0.541
75-25-2	Bromoform	5.4 U		5.4	0.624
74-83-9	Bromomethane	5.4 U		5.4	1.62
75-15-0	Carbon Disulfide	5.4 U		5.4	1.57
56-23-5	Carbon Tetrachloride	5.4 U		5.4	0.503
108-90-7	Chlorobenzene	5.4 U		5.4	0.714
75-00-3	Chloroethane	5.4 U		5.4	1.46
67-66-3	Chloroform	5.4 U		5.4	0.482

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 09:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**38SB2C**	QC Batch:	90050 -114
Sample #:	**345189**	Anal. Batch:	208007
Matrix:	Soil	Percent Solids:	93
Unit:	ug/kg dry	Dilution Factor:	1.08

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	5.4 U		5.4	0.901
110-82-7	Cyclohexane	11 U		11	0.341
10061-01-5	cis-1,3-Dichloropropene	5.4 U		5.4	0.530
10061-02-6	trans-1,3-Dichloropropene	5.4 U		5.4	0.563
75-71-8	Dichlorodifluoromethane	5.4 U		5.4	0.721
124-48-1	Chlorodibromomethane	5.4 U		5.4	0.558
100-41-4	Ethylbenzene	5.4 U		5.4	0.457
98-82-8	Isopropylbenzene	5.4 U		5.4	0.590
79-20-9	Methyl Acetate	22 U	UJ/C	22	3.75
108-87-2	Methylcyclohexane	11 U		11	0.913
1634-04-4	Methyl(tert)butyl Ether	5.4 U		5.4	0.692
75-09-2	Methylene Chloride	22 U	UJ/C	22	3.03
100-42-5	Styrene	5.4 U		5.4	0.477
127-18-4	Tetrachloroethene	5.4 U		5.4	0.662
108-88-3	Toluene	5.4 U		5.4	0.501
79-01-6	Trichloroethene	5.4 U		5.4	0.731
75-69-4	Trichlorofluoromethane	5.4 U		5.4	0.802
75-01-4	Vinyl Chloride	5.4 U		5.4	0.400
1330-20-7	Xylene (Total)	5.4 U		5.4	0.455

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 09:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**38SB2C**	QC Batch:	90050 -114
Sample #:	**345189**	Anal. Batch:	208007
Matrix:	Soil	Percent Solids:	93
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 10:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**38SB1A**	QC Batch:	90050 -114
Sample #:	**345196**	Anal. Batch:	208007
Matrix:	Soil	Percent Solids:	70
Unit:	ug/kg dry	Dilution Factor:	1.43

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	7.1 U		7.1	0.609
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	7.1 U		7.1	1.09
79-34-5	1,1,2,2-Tetrachloroethane	7.1 U		7.1	0.934
79-00-5	1,1,2-Trichloroethane	7.1 U		7.1	0.848
75-34-3	1,1-Dichloroethane	7.1 U		7.1	1.04
75-35-4	1,1-Dichloroethylene	7.1 U		7.1	1.05
106-93-4	1,2-Dibromoethane	7.1 U		7.1	0.980
96-12-8	1,2-Dibromo-3-chloropropane	14 U		14	2.97
95-50-1	1,2-Dichlorobenzene	7.1 U		7.1	0.692
107-06-2	1,2-Dichloroethane	7.1 U		7.1	0.616
156-59-2	cis-1,2-Dichloroethene	7.1 U		7.1	1.02
156-60-5	trans-1,2-Dichloroethene	7.1 U		7.1	1.01
78-87-5	1,2-Dichloropropane	7.1 U		7.1	0.838
87-61-6	1,2,3-Trichlorobenzene	7.1 U		7.1	0.778
120-82-1	1,2,4-Trichlorobenzene	7.1 U		7.1	0.586
541-73-1	1,3-Dichlorobenzene	7.1 U		7.1	0.383
106-46-7	1,4-Dichlorobenzene	7.1 U		7.1	1.02
78-93-3	Methyl Ethyl Ketone	28 U		28	7.15
591-78-6	2-Hexanone	14 U		14	3.23
108-10-1	4-Methyl-2-Pentanone	14 U		14	2.09
67-64-1	**Acetone**	**100**	B,2	28	7.15
71-43-2	Benzene	7.1 U		7.1	0.754
74-97-5	Bromochloromethane	7.1 U		7.1	1.09
75-27-4	Dichlorobromomethane	7.1 U		7.1	0.716
75-25-2	Bromoform	7.1 U		7.1	0.827
74-83-9	Bromomethane	7.1 U		7.1	2.15
75-15-0	Carbon Disulfide	7.1 U		7.1	2.07
56-23-5	Carbon Tetrachloride	7.1 U		7.1	0.666
108-90-7	Chlorobenzene	7.1 U		7.1	0.945
75-00-3	Chloroethane	7.1 U		7.1	1.93
67-66-3	Chloroform	7.1 U		7.1	0.638

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 10:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**38SB1A**	QC Batch:	90050 -114
Sample #:	**345196**	Anal. Batch:	208007
Matrix:	Soil	Percent Solids:	70
Unit:	ug/kg dry	Dilution Factor:	1.43

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	7.1 U		7.1	1.19
110-82-7	Cyclohexane	14 U		14	0.452
10061-01-5	cis-1,3-Dichloropropene	7.1 U		7.1	0.702
10061-02-6	trans-1,3-Dichloropropene	7.1 U		7.1	0.745
75-71-8	Dichlorodifluoromethane	7.1 U		7.1	0.955
124-48-1	Chlorodibromomethane	7.1 U		7.1	0.739
100-41-4	Ethylbenzene	7.1 U		7.1	0.605
98-82-8	Isopropylbenzene	7.1 U		7.1	0.781
79-20-9	Methyl Acetate	28 U	UJ,C	28	4.96
108-87-2	Methylcyclohexane	14 U		14	1.21
1634-04-4	Methyl(tert)butyl Ether	7.1 U		7.1	0.917
75-09-2	Methylene Chloride	28 U	UJ,C	28	4.02
100-42-5	Styrene	7.1 U		7.1	0.632
127-18-4	Tetrachloroethene	7.1 U		7.1	0.877
108-88-3	Toluene	7.1 U		7.1	0.664
79-01-6	Trichloroethene	7.1 U		7.1	0.968
75-69-4	Trichlorofluoromethane	7.1 U		7.1	1.06
75-01-4	Vinyl Chloride	7.1 U		7.1	0.529
1330-20-7	Xylene (Total)	7.1 U		7.1	0.602

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 10:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**38SB1A**	QC Batch:	90050 -114
Sample #:	**345196**	Anal. Batch:	208007
Matrix:	Soil	Percent Solids:	70
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
Camphene	79-92-5	10	E NJ,+
Hexanal	66-25-1	8.8	E NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**38SB1B**	QC Batch:	90050 -214
Sample #:	**345197**	Anal. Batch:	208009
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.22

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.1 U		6.1	0.520
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.1 U		6.1	0.926
79-34-5	1,1,2,2-Tetrachloroethane	6.1 U		6.1	0.797
79-00-5	1,1,2-Trichloroethane	6.1 U		6.1	0.723
75-34-3	1,1-Dichloroethane	6.1 U		6.1	0.883
75-35-4	1,1-Dichloroethylene	6.1 U		6.1	0.894
106-93-4	1,2-Dibromoethane	6.1 U		6.1	0.836
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.54
95-50-1	1,2-Dichlorobenzene	6.1 U		6.1	0.590
107-06-2	1,2-Dichloroethane	6.1 U		6.1	0.526
156-59-2	cis-1,2-Dichloroethene	6.1 U		6.1	0.866
156-60-5	trans-1,2-Dichloroethene	6.1 U		6.1	0.858
78-87-5	1,2-Dichloropropane	6.1 U		6.1	0.715
87-61-6	1,2,3-Trichlorobenzene	6.1 U		6.1	0.664
120-82-1	1,2,4-Trichlorobenzene	6.1 U		6.1	0.500
541-73-1	1,3-Dichlorobenzene	6.1 U		6.1	0.327
106-46-7	1,4-Dichlorobenzene	6.1 U		6.1	0.866
78-93-3	**Methyl Ethyl Ketone**	**23 J**		24	6.10
591-78-6	2-Hexanone	12 U	UJ,c	12	2.76
108-10-1	4-Methyl-2-Pentanone	12 U	UJ,c	12	1.78
67-64-1	**Acetone**	**96**	B,z	24	6.10
71-43-2	Benzene	6.1 U		6.1	0.643
74-97-5	Bromochloromethane	6.1 U		6.1	0.928
75-27-4	Dichlorobromomethane	6.1 U		6.1	0.611
75-25-2	Bromoform	6.1 U		6.1	0.705
74-83-9	Bromomethane	6.1 U		6.1	1.83
75-15-0	Carbon Disulfide	6.1 U	UJ,c	6.1	1.77
56-23-5	Carbon Tetrachloride	6.1 U		6.1	0.569
108-90-7	Chlorobenzene	6.1 U		6.1	0.806
75-00-3	Chloroethane	6.1 U		6.1	1.65
67-66-3	Chloroform	6.1 U		6.1	0.544

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**38SB1B**	QC Batch:	90050 -214
Sample #:	**345197**	Anal. Batch:	208009
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.22

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.1 U		6.1	1.02
110-82-7	Cyclohexane	12 U		12	0.386
10061-01-5	cis-1,3-Dichloropropene	6.1 U		6.1	0.599
10061-02-6	trans-1,3-Dichloropropene	6.1 U		6.1	0.636
75-71-8	Dichlorodifluoromethane	6.1 U		6.1	0.815
124-48-1	Chlorodibromomethane	6.1 U		6.1	0.631
100-41-4	Ethylbenzene	6.1 U		6.1	0.516
98-82-8	Isopropylbenzene	6.1 U		6.1	0.666
79-20-9	Methyl Acetate	24 U	UJ,C	24	4.23
108-87-2	Methylcyclohexane	12 U		12	1.03
1634-04-4	Methyl(tert)butyl Ether	6.1 U		6.1	0.782
75-09-2	Methylene Chloride	24 U		24	3.43
100-42-5	Styrene	6.1 U		6.1	0.539
127-18-4	Tetrachloroethene	6.1 U		6.1	0.748
108-88-3	Toluene	6.1 U		6.1	0.566
79-01-6	Trichloroethene	6.1 U		6.1	0.826
75-69-4	Trichlorofluoromethane	6.1 U		6.1	0.906
75-01-4	Vinyl Chloride	6.1 U		6.1	0.451
1330-20-7	Xylene (Total)	6.1 U		6.1	0.514

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**38SB1B**	QC Batch:	90050 -214
Sample #:	**345197**	Anal. Batch:	208009
Matrix:	Soil	Percent Solids:	82
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 11:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**38SB1C**	QC Batch:	90050 -115
Sample #:	**345198**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.28

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.4 U		6.4	0.545
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.4 U		6.4	0.972
79-34-5	1,1,2,2-Tetrachloroethane	6.4 U		6.4	0.836
79-00-5	1,1,2-Trichloroethane	6.4 U		6.4	0.759
75-34-3	1,1-Dichloroethane	6.4 U		6.4	0.927
75-35-4	1,1-Dichloroethylene	6.4 U		6.4	0.938
106-93-4	1,2-Dibromoethane	6.4 U		6.4	0.877
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	2.66
95-50-1	1,2-Dichlorobenzene	6.4 U		6.4	0.620
107-06-2	1,2-Dichloroethane	6.4 U		6.4	0.552
156-59-2	cis-1,2-Dichloroethene	6.4 U		6.4	0.909
156-60-5	trans-1,2-Dichloroethene	6.4 U		6.4	0.900
78-87-5	1,2-Dichloropropane	6.4 U		6.4	0.750
87-61-6	1,2,3-Trichlorobenzene	6.4 U		6.4	0.696
120-82-1	1,2,4-Trichlorobenzene	6.4 U		6.4	0.525
541-73-1	1,3-Dichlorobenzene	6.4 U		6.4	0.343
106-46-7	1,4-Dichlorobenzene	6.4 U	UJ,c	6.4	0.909
78-93-3	**Methyl Ethyl Ketone**	**20 J**		26	6.40
591-78-6	2-Hexanone	13 U		13	2.89
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.87
67-64-1	**Acetone**	**59**	B,z	26	6.40
71-43-2	Benzene	6.4 U		6.4	0.675
74-97-5	Bromochloromethane	6.4 U		6.4	0.974
75-27-4	Dichlorobromomethane	6.4 U		6.4	0.641
75-25-2	Bromoform	6.4 U		6.4	0.740
74-83-9	Bromomethane	6.4 U		6.4	1.92
75-15-0	Carbon Disulfide	6.4 U	UJ,c	6.4	1.86
56-23-5	Carbon Tetrachloride	6.4 U		6.4	0.596
108-90-7	Chlorobenzene	6.4 U		6.4	0.846
75-00-3	Chloroethane	6.4 U		6.4	1.73
67-66-3	Chloroform	6.4 U		6.4	0.571

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 11:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**38SB1C**	QC Batch:	90050 -115
Sample #:	**345198**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.28

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.4 U		6.4	1.07
110-82-7	Cyclohexane	13 U		13	0.404
10061-01-5	cis-1,3-Dichloropropene	6.4 U		6.4	0.628
10061-02-6	trans-1,3-Dichloropropene	6.4 U		6.4	0.667
75-71-8	Dichlorodifluoromethane	6.4 U	UJ,C	6.4	0.855
124-48-1	Chlorodibromomethane	6.4 U		6.4	0.662
100-41-4	Ethylbenzene	6.4 U		6.4	0.541
98-82-8	Isopropylbenzene	6.4 U		6.4	0.699
79-20-9	Methyl Acetate	26 U	UJ,C	26	4.44
108-87-2	Methylcyclohexane	13 U		13	1.08
1634-04-4	Methyl(tert)butyl Ether	6.4 U		6.4	0.820
75-09-2	Methylene Chloride	26 U	UJ,C	26	3.60
100-42-5	Styrene	6.4 U		6.4	0.566
127-18-4	Tetrachloroethene	6.4 U		6.4	0.785
108-88-3	Toluene	6.4 U		6.4	0.594
79-01-6	Trichloroethene	6.4 U		6.4	0.867
75-69-4	Trichlorofluoromethane	6.4 U		6.4	0.951
75-01-4	Vinyl Chloride	6.4 U		6.4	0.474
1330-20-7	Xylene (Total)	6.4 U		6.4	0.539

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 11:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**38SB1C**	QC Batch:	90050 -115
Sample #:	**345198**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	78
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**38SB3A**	QC Batch:	90050 -115
Sample #:	**345199**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	56
Unit:	ug/kg dry	Dilution Factor:	1.78

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	8.9 U		8.9	0.758
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	8.9 U		8.9	1.35
79-34-5	1,1,2,2-Tetrachloroethane	8.9 U		8.9	1.16
79-00-5	1,1,2-Trichloroethane	8.9 U		8.9	1.06
75-34-3	1,1-Dichloroethane	8.9 U		8.9	1.29
75-35-4	1,1-Dichloroethylene	8.9 U		8.9	1.30
106-93-4	1,2-Dibromoethane	8.9 U		8.9	1.22
96-12-8	1,2-Dibromo-3-chloropropane	18 U		18	3.70
95-50-1	1,2-Dichlorobenzene	8.9 U		8.9	0.862
107-06-2	1,2-Dichloroethane	8.9 U		8.9	0.767
156-59-2	cis-1,2-Dichloroethene	8.9 U		8.9	1.26
156-60-5	trans-1,2-Dichloroethene	8.9 U		8.9	1.25
78-87-5	1,2-Dichloropropane	8.9 U		8.9	1.04
87-61-6	1,2,3-Trichlorobenzene	8.9 U		8.9	0.968
120-82-1	1,2,4-Trichlorobenzene	8.9 U		8.9	0.730
541-73-1	1,3-Dichlorobenzene	8.9 U		8.9	0.477
106-46-7	1,4-Dichlorobenzene	8.9 U	UJ,C	8.9	1.26
78-93-3	Methyl Ethyl Ketone	36 U		36	8.90
591-78-6	2-Hexanone	18 U		18	4.02
108-10-1	4-Methyl-2-Pentanone	18 U		18	2.60
67-64-1	**Acetone**	**130**	B,Z	36	8.90
71-43-2	Benzene	8.9 U		8.9	0.938
74-97-5	Bromochloromethane	8.9 U		8.9	1.35
75-27-4	Dichlorobromomethane	8.9 U		8.9	0.892
75-25-2	Bromoform	8.9 U		8.9	1.03
74-83-9	Bromomethane	8.9 U		8.9	2.67
75-15-0	Carbon Disulfide	8.9 U	UJ,C	8.9	2.58
56-23-5	Carbon Tetrachloride	8.9 U		8.9	0.829
108-90-7	Chlorobenzene	8.9 U		8.9	1.18
75-00-3	Chloroethane	8.9 U		8.9	2.40
67-66-3	Chloroform	8.9 U		8.9	0.794

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**38SB3A**	QC Batch:	90050 -115
Sample #:	**345199**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	56
Unit:	ug/kg dry	Dilution Factor:	1.78

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	8.9 U		8.9	1.48
110-82-7	Cyclohexane	18 U		18	0.562
10061-01-5	cis-1,3-Dichloropropene	8.9 U		8.9	0.874
10061-02-6	trans-1,3-Dichloropropene	8.9 U		8.9	0.927
75-71-8	Dichlorodifluoromethane	8.9 U	UJ,C	8.9	1.19
124-48-1	Chlorodibromomethane	8.9 U		8.9	0.920
100-41-4	Ethylbenzene	8.9 U		8.9	0.753
98-82-8	Isopropylbenzene	8.9 U		8.9	0.972
79-20-9	Methyl Acetate	36 U	UJ,C	36	6.18
108-87-2	Methylcyclohexane	18 U		18	1.50
1634-04-4	Methyl(tert)butyl Ether	8.9 U		8.9	1.14
75-09-2	Methylene Chloride	36 U	UJ,C	36	5.00
100-42-5	Styrene	8.9 U		8.9	0.787
127-18-4	Tetrachloroethene	8.9 U		8.9	1.09
108-88-3	Toluene	8.9 U		8.9	0.826
79-01-6	Trichloroethene	8.9 U		8.9	1.21
75-69-4	Trichlorofluoromethane	8.9 U		8.9	1.32
75-01-4	Vinyl Chloride	8.9 U		8.9	0.659
1330-20-7	Xylene (Total)	8.9 U		8.9	0.749

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**38SB3A**	QC Batch:	90050 -115
Sample #:	**345199**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	56
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**38SB3B**	QC Batch:	90050 -115
Sample #:	**345200**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.32

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.6 U		6.6	0.562
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.6 U		6.6	1.00
79-34-5	1,1,2,2-Tetrachloroethane	6.6 U		6.6	0.862
79-00-5	1,1,2-Trichloroethane	6.6 U		6.6	0.783
75-34-3	1,1-Dichloroethane	6.6 U		6.6	0.956
75-35-4	1,1-Dichloroethylene	6.6 U		6.6	0.968
106-93-4	1,2-Dibromoethane	6.6 U		6.6	0.904
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	2.75
95-50-1	1,2-Dichlorobenzene	6.6 U		6.6	0.639
107-06-2	1,2-Dichloroethane	6.6 U		6.6	0.569
156-59-2	cis-1,2-Dichloroethene	6.6 U		6.6	0.937
156-60-5	trans-1,2-Dichloroethene	6.6 U		6.6	0.928
78-87-5	1,2-Dichloropropane	6.6 U		6.6	0.774
87-61-6	1,2,3-Trichlorobenzene	6.6 U		6.6	0.718
120-82-1	1,2,4-Trichlorobenzene	6.6 U		6.6	0.541
541-73-1	1,3-Dichlorobenzene	6.6 U		6.6	0.354
106-46-7	1,4-Dichlorobenzene	6.6 U	UJ,c	6.6	0.937
78-93-3	**Methyl Ethyl Ketone**	**26**		26	6.60
591-78-6	2-Hexanone	13 U		13	2.98
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.93
67-64-1	**Acetone**	**110**	B,z	26	6.60
71-43-2	Benzene	6.6 U		6.6	0.696
74-97-5	Bromochloromethane	6.6 U		6.6	1.00
75-27-4	Dichlorobromomethane	6.6 U		6.6	0.661
75-25-2	Bromoform	6.6 U		6.6	0.763
74-83-9	Bromomethane	6.6 U		6.6	1.98
75-15-0	Carbon Disulfide	6.6 U	UJ,c	6.6	1.91
56-23-5	Carbon Tetrachloride	6.6 U		6.6	0.615
108-90-7	Chlorobenzene	6.6 U		6.6	0.873
75-00-3	Chloroethane	6.6 U		6.6	1.78
67-66-3	Chloroform	6.6 U		6.6	0.589

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**38SB3B**	QC Batch:	90050 -115
Sample #:	**345200**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.32

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.6 U		6.6	1.10
110-82-7	Cyclohexane	13 U		13	0.417
10061-01-5	cis-1,3-Dichloropropene	6.6 U		6.6	0.648
10061-02-6	trans-1,3-Dichloropropene	6.6 U		6.6	0.688
75-71-8	Dichlorodifluoromethane	6.6 U	UJ,c	6.6	0.882
124-48-1	Chlorodibromomethane	6.6 U		6.6	0.682
100-41-4	Ethylbenzene	6.6 U		6.6	0.558
98-82-8	Isopropylbenzene	6.6 U		6.6	0.721
79-20-9	Methyl Acetate	26 U	UJ,c	26	4.58
108-87-2	Methylcyclohexane	13 U		13	1.12
1634-04-4	Methyl(tert)butyl Ether	6.6 U		6.6	0.846
75-09-2	Methylene Chloride	26 U	UJ,c	26	3.71
100-42-5	Styrene	6.6 U		6.6	0.583
127-18-4	Tetrachloroethene	6.6 U		6.6	0.809
108-88-3	Toluene	6.6 U		6.6	0.612
79-01-6	Trichloroethene	6.6 U		6.6	0.894
75-69-4	Trichlorofluoromethane	6.6 U		6.6	0.981
75-01-4	Vinyl Chloride	6.6 U		6.6	0.488
1330-20-7	Xylene (Total)	6.6 U		6.6	0.556

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TriMatrix Laboratories, Inc

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**38SB3B**	QC Batch:	90050 -115
Sample #:	**345200**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	76
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
Hexanal	66-25-1	5.6	E NJ/A

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**38SB3C**	QC Batch:	90050 -115
Sample #:	**345201**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.25

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.2 U		6.2	0.533
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.2 U		6.2	0.949
79-34-5	1,1,2,2-Tetrachloroethane	6.2 U		6.2	0.816
79-00-5	1,1,2-Trichloroethane	6.2 U		6.2	0.741
75-34-3	1,1-Dichloroethane	6.2 U		6.2	0.905
75-35-4	1,1-Dichloroethylene	6.2 U		6.2	0.916
106-93-4	1,2-Dibromoethane	6.2 U		6.2	0.856
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.60
95-50-1	1,2-Dichlorobenzene	6.2 U		6.2	0.605
107-06-2	1,2-Dichloroethane	6.2 U		6.2	0.539
156-59-2	cis-1,2-Dichloroethene	6.2 U		6.2	0.888
156-60-5	trans-1,2-Dichloroethene	6.2 U		6.2	0.879
78-87-5	1,2-Dichloropropane	6.2 U		6.2	0.733
87-61-6	1,2,3-Trichlorobenzene	6.2 U		6.2	0.680
120-82-1	1,2,4-Trichlorobenzene	6.2 U		6.2	0.513
541-73-1	1,3-Dichlorobenzene	6.2 U		6.2	0.335
106-46-7	1,4-Dichlorobenzene	6.2 U	UJ,C	6.2	0.888
78-93-3	**Methyl Ethyl Ketone**	**28**		24	6.25
591-78-6	2-Hexanone	12 U		12	2.83
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.83
67-64-1	**Acetone**	**110**	B,Z	24	6.25
71-43-2	Benzene	6.2 U		6.2	0.659
74-97-5	Bromochloromethane	6.2 U		6.2	0.951
75-27-4	Dichlorobromomethane	6.2 U		6.2	0.626
75-25-2	Bromoform	6.2 U		6.2	0.723
74-83-9	Bromomethane	6.2 U		6.2	1.88
75-15-0	Carbon Disulfide	6.2 U		6.2	1.81
56-23-5	Carbon Tetrachloride	6.2 U		6.2	0.583
108-90-7	Chlorobenzene	6.2 U		6.2	0.826
75-00-3	Chloroethane	6.2 U		6.2	1.69
67-66-3	Chloroform	6.2 U		6.2	0.558

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**38SB3C**	QC Batch:	90050 -115
Sample #:	**345201**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.25

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.2 U		6.2	1.04
110-82-7	Cyclohexane	12 U		12	0.395
10061-01-5	cis-1,3-Dichloropropene	6.2 U		6.2	0.614
10061-02-6	trans-1,3-Dichloropropene	6.2 U		6.2	0.651
75-71-8	Dichlorodifluoromethane	6.2 U	UJ,C	6.2	0.835
124-48-1	Chlorodibromomethane	6.2 U		6.2	0.646
100-41-4	Ethylbenzene	6.2 U		6.2	0.529
98-82-8	Isopropylbenzene	6.2 U		6.2	0.683
79-20-9	Methyl Acetate	24 U	UJ,C	24	4.34
108-87-2	Methylcyclohexane	12 U		12	1.06
1634-04-4	Methyl(tert)butyl Ether	6.2 U		6.2	0.801
75-09-2	Methylene Chloride	24 U	UJ,C	24	3.51
100-42-5	Styrene	6.2 U		6.2	0.553
127-18-4	Tetrachloroethene	6.2 U		6.2	0.766
108-88-3	Toluene	6.2 U		6.2	0.580
79-01-6	Trichloroethene	6.2 U		6.2	0.846
75-69-4	Trichlorofluoromethane	6.2 U		6.2	0.929
75-01-4	Vinyl Chloride	6.2 U		6.2	0.463
1330-20-7	Xylene (Total)	6.2 U		6.2	0.526

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**38SB3C**	QC Batch:	90050 -115
Sample #:	**345201**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	80
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 13:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**68SB2A**	QC Batch:	90050 -115
Sample #:	**345408**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.28

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.4 U		6.4	0.545
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.4 U		6.4	0.972
79-34-5	1,1,2,2-Tetrachloroethane	6.4 U		6.4	0.836
79-00-5	1,1,2-Trichloroethane	6.4 U		6.4	0.759
75-34-3	1,1-Dichloroethane	6.4 U		6.4	0.927
75-35-4	1,1-Dichloroethylene	6.4 U		6.4	0.938
106-93-4	1,2-Dibromoethane	6.4 U		6.4	0.877
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	2.66
95-50-1	1,2-Dichlorobenzene	6.4 U		6.4	0.620
107-06-2	1,2-Dichloroethane	6.4 U		6.4	0.552
156-59-2	cis-1,2-Dichloroethene	6.4 U		6.4	0.909
156-60-5	*trans-1,2-Dichloroethene	6.4 U		6.4	0.900
78-87-5	1,2-Dichloropropane	6.4 U		6.4	0.750
87-61-6	1,2,3-Trichlorobenzene	6.4 U		6.4	0.696
120-82-1	1,2,4-Trichlorobenzene	6.4 U		6.4	0.525
541-73-1	1,3-Dichlorobenzene	6.4 U		6.4	0.343
106-46-7	1,4-Dichlorobenzene	6.4 U	UJ,C	6.4	0.909
78-93-3	**Methyl Ethyl Ketone**	**30**		26	6.40
591-78-6	2-Hexanone	13 U		13	2.89
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.87
67-64-1	***Acetone**	**100**	B,Z	26	6.40
71-43-2	Benzene	6.4 U		6.4	0.675
74-97-5	Bromochloromethane	6.4 U		6.4	0.974
75-27-4	Dichlorobromomethane	6.4 U		6.4	0.641
75-25-2	Bromoform	6.4 U		6.4	0.740
74-83-9	Bromomethane	6.4 U		6.4	1.92
75-15-0	*Carbon Disulfide	6.4 U	UJ,C	6.4	1.86
56-23-5	Carbon Tetrachloride	6.4 U		6.4	0.596
108-90-7	Chlorobenzene	6.4 U		6.4	0.846
75-00-3	*Chloroethane	6.4 U		6.4	1.73
67-66-3	Chloroform	6.4 U		6.4	0.571

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 13:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**68SB2A**	QC Batch:	90050 -115
Sample #:	**345408**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.28

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.4 U		6.4	1.07
110-82-7	Cyclohexane	13 U		13	0.404
10061-01-5	cis-1,3-Dichloropropene	6.4 U		6.4	0.628
10061-02-6	trans-1,3-Dichloropropene	6.4 U		6.4	0.667
75-71-8	Dichlorodifluoromethane	6.4 U	UJ,C	6.4	0.855
124-48-1	Chlorodibromomethane	6.4 U		6.4	0.662
100-41-4	Ethylbenzene	6.4 U		6.4	0.541
98-82-8	Isopropylbenzene	6.4 U		6.4	0.699
79-20-9	Methyl Acetate	26 U	UJ,C	26	4.44
108-87-2	Methylcyclohexane	13 U		13	1.08
1634-04-4	*Methyl(tert)butyl Ether	6.4 U		6.4	0.820
75-09-2	Methylene Chloride	26 U	UJ,C	26	3.60
100-42-5	Styrene	6.4 U		6.4	0.566
127-18-4	Tetrachloroethene	6.4 U		6.4	0.785
108-88-3	Toluene	6.4 U		6.4	0.594
79-01-6	Trichloroethene	6.4 U		6.4	0.867
75-69-4	Trichlorofluoromethane	6.4 U		6.4	0.951
75-01-4	Vinyl Chloride	6.4 U		6.4	0.474
1330-20-7	Xylene (Total)	6.4 U		6.4	0.539

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 13:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**68SB2A**	QC Batch:	90050 -115
Sample #:	**345408**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	78
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 13:30
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**68SB2B**	QC Batch:	90050 -115
Sample #:	**345409**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.37

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.8 U		6.8	0.584
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.8 U		6.8	1.04
79-34-5	1,1,2,2-Tetrachloroethane	6.8 U		6.8	0.895
79-00-5	1,1,2-Trichloroethane	6.8 U		6.8	0.812
75-34-3	1,1-Dichloroethane	6.8 U		6.8	0.992
75-35-4	1,1-Dichloroethylene	6.8 U		6.8	1.00
106-93-4	1,2-Dibromoethane	6.8 U		6.8	0.938
96-12-8	1,2-Dibromo-3-chloropropane	14 U		14	2.85
95-50-1	1,2-Dichlorobenzene	6.8 U		6.8	0.663
107-06-2	1,2-Dichloroethane	6.8 U		6.8	0.590
156-59-2	cis-1,2-Dichloroethene	6.8 U		6.8	0.973
156-60-5	trans-1,2-Dichloroethene	6.8 U		6.8	0.963
78-87-5	1,2-Dichloropropane	6.8 U		6.8	0.803
87-61-6	1,2,3-Trichlorobenzene	6.8 U		6.8	0.745
120-82-1	1,2,4-Trichlorobenzene	6.8 U		6.8	0.562
541-73-1	1,3-Dichlorobenzene	6.8 U		6.8	0.367
106-46-7	1,4-Dichlorobenzene	6.8 U	VJ,C	6.8	0.973
78-93-3	**Methyl Ethyl Ketone**	**24 J**		28	6.85
591-78-6	2-Hexanone	14 U		14	3.10
108-10-1	4-Methyl-2-Pentanone	14 U		14	2.00
67-64-1	**Acetone**	**55**	B,Z	28	6.85
71-43-2	Benzene	6.8 U		6.8	0.722
74-97-5	Bromochloromethane	6.8 U		6.8	1.04
75-27-4	Dichlorobromomethane	6.8 U		6.8	0.686
75-25-2	Bromoform	6.8 U		6.8	0.792
74-83-9	Bromomethane	6.8 U		6.8	2.06
75-15-0	Carbon Disulfide	6.8 U	VJ,C	6.8	1.99
56-23-5	Carbon Tetrachloride	6.8 U		6.8	0.638
108-90-7	Chlorobenzene	6.8 U		6.8	0.906
75-00-3	Chloroethane	6.8 U		6.8	1.85
67-66-3	Chloroform	6.8 U		6.8	0.611

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 13:30
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**68SB2B**	QC Batch:	90050 -115
Sample #:	**345409**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.37

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.8 U		6.8	1.14
110-82-7	Cyclohexane	14 U		14	0.433
10061-01-5	cis-1,3-Dichloropropene	6.8 U		6.8	0.673
10061-02-6	trans-1,3-Dichloropropene	6.8 U		6.8	0.714
75-71-8	Dichlorodifluoromethane	6.8 U	UJ,c	6.8	0.915
124-48-1	Chlorodibromomethane	6.8 U		6.8	0.708
100-41-4	Ethylbenzene	6.8 U		6.8	0.580
98-82-8	Isopropylbenzene	6.8 U		6.8	0.748
79-20-9	Methyl Acetate	28 U	UJ,c	28	4.75
108-87-2	Methylcyclohexane	14 U		14	1.16
1634-04-4	Methyl(tert)butyl Ether	6.8 U		6.8	0.878
75-09-2	Methylene Chloride	28 U	UJ,c	28	3.85
100-42-5	Styrene	6.8 U		6.8	0.606
127-18-4	Tetrachloroethene	6.8 U		6.8	0.840
108-88-3	Toluene	6.8 U		6.8	0.636
79-01-6	Trichloroethene	6.8 U		6.8	0.927
75-69-4	Trichlorofluoromethane	6.8 U		6.8	1.02
75-01-4	Vinyl Chloride	6.8 U		6.8	0.507
1330-20-7	Xylene (Total)	6.8 U		6.8	0.577

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 13:30
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**68SB2B**	QC Batch:	90050 -115
Sample #:	**345409**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	73
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 13:45
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**68SB2C**	QC Batch:	90050 -115
Sample #:	**345410**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.41

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	7.0 U		7.0	0.601
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	7.0 U		7.0	1.07
79-34-5	1,1,2,2-Tetrachloroethane	7.0 U		7.0	0.921
79-00-5	1,1,2-Trichloroethane	7.0 U		7.0	0.836
75-34-3	1,1-Dichloroethane	7.0 U		7.0	1.02
75-35-4	1,1-Dichloroethylene	7.0 U		7.0	1.03
106-93-4	1,2-Dibromoethane	7.0 U		7.0	0.966
96-12-8	1,2-Dibromo-3-chloropropane	14 U		14	2.93
95-50-1	1,2-Dichlorobenzene	7.0 U		7.0	0.682
107-06-2	1,2-Dichloroethane	7.0 U		7.0	0.608
156-59-2	cis-1,2-Dichloroethene	7.0 U		7.0	1.00
156-60-5	trans-1,2-Dichloroethene	7.0 U		7.0	0.991
78-87-5	1,2-Dichloropropane	7.0 U		7.0	0.826
87-61-6	1,2,3-Trichlorobenzene	7.0 U		7.0	0.767
120-82-1	1,2,4-Trichlorobenzene	7.0 U		7.0	0.578
541-73-1	1,3-Dichlorobenzene	7.0 U		7.0	0.378
106-46-7	1,4-Dichlorobenzene	7.0 U	UJ,c	7.0	1.00
78-93-3	Methyl Ethyl Ketone	28 U		28	7.05
591-78-6	2-Hexanone	14 U		14	3.19
108-10-1	4-Methyl-2-Pentanone	14 U		14	2.06
67-64-1	**Acetone**	**52**	B,z	28	7.05
71-43-2	Benzene	7.0 U		7.0	0.743
74-97-5	Bromochloromethane	7.0 U		7.0	1.07
75-27-4	Dichlorobromomethane	7.0 U		7.0	0.706
75-25-2	Bromoform	7.0 U		7.0	0.815
74-83-9	Bromomethane	7.0 U		7.0	2.12
75-15-0	Carbon Disulfide	7.0 U	UJ,c	7.0	2.04
56-23-5	Carbon Tetrachloride	7.0 U		7.0	0.657
108-90-7	Chlorobenzene	7.0 U		7.0	0.932
75-00-3	Chloroethane	7.0 U		7.0	1.90
67-66-3	Chloroform	7.0 U		7.0	0.629

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 13:45
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**68SB2C**	QC Batch:	90050 -115
Sample #:	**345410**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.41

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	7.0 U		7.0	1.18
110-82-7	Cyclohexane	14 U		14	0.446
10061-01-5	cis-1,3-Dichloropropene	7.0 U		7.0	0.692
10061-02-6	trans-1,3-Dichloropropene	7.0 U		7.0	0.735
75-71-8	Dichlorodifluoromethane	7.0 U	UJ,C	7.0	0.942
124-48-1	Chlorodibromomethane	7.0 U		7.0	0.729
100-41-4	Ethylbenzene	7.0 U		7.0	0.596
98-82-8	Isopropylbenzene	7.0 U		7.0	0.770
79-20-9	Methyl Acetate	28 U	UJ,C	28	4.89
108-87-2	Methylcyclohexane	14 U		14	1.19
1634-04-4	Methyl(tert)butyl Ether	7.0 U		7.0	0.904
75-09-2	Methylene Chloride	28 U	UJ,C	28	3.96
100-42-5	Styrene	7.0 U		7.0	0.623
127-18-4	Tetrachloroethene	7.0 U		7.0	0.864
108-88-3	Toluene	7.0 U		7.0	0.654
79-01-6	Trichloroethene	7.0 U		7.0	0.955
75-69-4	Trichlorofluoromethane	7.0 U		7.0	1.05
75-01-4	Vinyl Chloride	7.0 U		7.0	0.522
1330-20-7	Xylene (Total)	7.0 U		7.0	0.594

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 13:45
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**68SB2C**	QC Batch:	90050 -115
Sample #:	**345410**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	71
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD5**	QC Batch:	90050 -115
Sample #:	**345411**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.32

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.6 U		6.6	0.562
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.6 U		6.6	1.00
79-34-5	1,1,2,2-Tetrachloroethane	6.6 U		6.6	0.862
79-00-5	1,1,2-Trichloroethane	6.6 U		6.6	0.783
75-34-3	1,1-Dichloroethane	6.6 U		6.6	0.956
75-35-4	1,1-Dichloroethylene	6.6 U		6.6	0.968
106-93-4	1,2-Dibromoethane	6.6 U		6.6	0.904
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	2.75
95-50-1	1,2-Dichlorobenzene	6.6 U		6.6	0.639
107-06-2	1,2-Dichloroethane	6.6 U		6.6	0.569
156-59-2	cis-1,2-Dichloroethene	6.6 U		6.6	0.937
156-60-5	trans-1,2-Dichloroethene	6.6 U		6.6	0.928
78-87-5	1,2-Dichloropropane	6.6 U		6.6	0.774
87-61-6	1,2,3-Trichlorobenzene	6.6 U		6.6	0.718
120-82-1	1,2,4-Trichlorobenzene	6.6 U		6.6	0.541
541-73-1	1,3-Dichlorobenzene	6.6 U		6.6	0.354
106-46-7	1,4-Dichlorobenzene	6.6 U	UJ,C	6.6	0.937
78-93-3	Methyl Ethyl Ketone	26 U		26	6.60
591-78-6	2-Hexanone	13 U		13	2.98
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.93
67-64-1	**Acetone**	**43**	B,Z	26	6.60
71-43-2	Benzene	6.6 U		6.6	0.696
74-97-5	Bromochloromethane	6.6 U		6.6	1.00
75-27-4	Dichlorobromomethane	6.6 U		6.6	0.661
75-25-2	Bromoform	6.6 U		6.6	0.763
74-83-9	Bromomethane	6.6 U		6.6	1.98
75-15-0	Carbon Disulfide	6.6 U	UJ,C	6.6	1.91
56-23-5	Carbon Tetrachloride	6.6 U		6.6	0.615
108-90-7	Chlorobenzene	6.6 U		6.6	0.873
75-00-3	Chloroethane	6.6 U		6.6	1.78
67-66-3	Chloroform	6.6 U		6.6	0.589

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD5**	QC Batch:	90050 -115
Sample #:	**345411**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.32

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.6 U		6.6	1.10
110-82-7	Cyclohexane	13 U		13	0.417
10061-01-5	cis-1,3-Dichloropropene	6.6 U		6.6	0.648
10061-02-6	trans-1,3-Dichloropropene	6.6 U		6.6	0.688
75-71-8	Dichlorodifluoromethane	6.6 U	UJ,C	6.6	0.882
124-48-1	Chlorodibromomethane	6.6 U		6.6	0.682
100-41-4	Ethylbenzene	6.6 U		6.6	0.558
98-82-8	Isopropylbenzene	6.6 U		6.6	0.721
79-20-9	Methyl Acetate	26 U	UJ,C	26	4.58
108-87-2	Methylcyclohexane	13 U		13	1.12
1634-04-4	Methyl(tert)butyl Ether	6.6 U		6.6	0.846
75-09-2	Methylene Chloride	26 U	UJ,C	26	3.71
100-42-5	Styrene	6.6 U		6.6	0.583
127-18-4	Tetrachloroethene	6.6 U		6.6	0.809
108-88-3	Toluene	6.6 U		6.6	0.612
79-01-6	Trichloroethene	6.6 U		6.6	0.894
75-69-4	Trichlorofluoromethane	6.6 U		6.6	0.981
75-01-4	Vinyl Chloride	6.6 U		6.6	0.488
1330-20-7	Xylene (Total)	6.6 U		6.6	0.556

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD5**	QC Batch:	90050 -115
Sample #:	**345411**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	76
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**68SB1A**	QC Batch:	90050 -115
Sample #:	**345412**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.28

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.4 U		6.4	0.545
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.4 U		6.4	0.972
79-34-5	1,1,2,2-Tetrachloroethane	6.4 U		6.4	0.836
79-00-5	1,1,2-Trichloroethane	6.4 U		6.4	0.759
75-34-3	1,1-Dichloroethane	6.4 U		6.4	0.927
75-35-4	1,1-Dichloroethylene	6.4 U		6.4	0.938
106-93-4	1,2-Dibromoethane	6.4 U		6.4	0.877
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	2.66
95-50-1	1,2-Dichlorobenzene	6.4 U		6.4	0.620
107-06-2	1,2-Dichloroethane	6.4 U		6.4	0.552
156-59-2	cis-1,2-Dichloroethene	6.4 U		6.4	0.909
156-60-5	trans-1,2-Dichloroethene	6.4 U		6.4	0.900
78-87-5	1,2-Dichloropropane	6.4 U		6.4	0.750
87-61-6	1,2,3-Trichlorobenzene	6.4 U		6.4	0.696
120-82-1	1,2,4-Trichlorobenzene	6.4 U		6.4	0.525
541-73-1	1,3-Dichlorobenzene	6.4 U		6.4	0.343
106-46-7	1,4-Dichlorobenzene	6.4 U	UJ,C	6.4	0.909
78-93-3	**Methyl Ethyl Ketone**	**30**		26	6.40
591-78-6	2-Hexanone	13 U		13	2.89
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.87
67-64-1	**Acetone**	**79**	B,Z	26	6.40
71-43-2	Benzene	6.4 U		6.4	0.675
74-97-5	Bromochloromethane	6.4 U		6.4	0.974
75-27-4	Dichlorobromomethane	6.4 U		6.4	0.641
75-25-2	Bromoform	6.4 U		6.4	0.740
74-83-9	Bromomethane	6.4 U		6.4	1.92
75-15-0	Carbon Disulfide	6.4 U	UJ,C	6.4	1.86
56-23-5	Carbon Tetrachloride	6.4 U		6.4	0.596
108-90-7	Chlorobenzene	6.4 U		6.4	0.846
75-00-3	Chloroethane	6.4 U		6.4	1.73
67-66-3	Chloroform	6.4 U		6.4	0.571

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**68SB1A**	QC Batch:	90050 -115
Sample #:	**345412**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.28

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.4 U		6.4	1.07
110-82-7	Cyclohexane	13 U		13	0.404
10061-01-5	cis-1,3-Dichloropropene	6.4 U		6.4	0.628
10061-02-6	trans-1,3-Dichloropropene	6.4 U		6.4	0.667
75-71-8	Dichlorodifluoromethane	6.4 U	UJ,C	6.4	0.855
124-48-1	Chlorodibromomethane	6.4 U		6.4	0.662
100-41-4	Ethylbenzene	6.4 U		6.4	0.541
98-82-8	Isopropylbenzene	6.4 U		6.4	0.699
79-20-9	Methyl Acetate	26 U	UJ,C	26	4.44
108-87-2	Methylcyclohexane	13 U		13	1.08
1634-04-4	Methyl(tert)butyl Ether	6.4 U		6.4	0.820
75-09-2	Methylene Chloride	26 U	UJ,C	26	3.60
100-42-5	Styrene	6.4 U		6.4	0.566
127-18-4	Tetrachloroethene	6.4 U		6.4	0.785
108-88-3	Toluene	6.4 U		6.4	0.594
79-01-6	Trichloroethene	6.4 U		6.4	0.867
75-69-4	Trichlorofluoromethane	6.4 U		6.4	0.951
75-01-4	Vinyl Chloride	6.4 U		6.4	0.474
1330-20-7	Xylene (Total)	6.4 U		6.4	0.539

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**68SB1A**	QC Batch:	90050 -115
Sample #:	**345412**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	78
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**68SB1B**	QC Batch:	90050 -115
Sample #:	**345413**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	72
Unit:	ug/kg dry	Dilution Factor:	1.39

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.9 U		6.9	0.592
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.9 U		6.9	1.06
79-34-5	1,1,2,2-Tetrachloroethane	6.9 U		6.9	0.908
79-00-5	1,1,2-Trichloroethane	6.9 U		6.9	0.824
75-34-3	1,1-Dichloroethane	6.9 U		6.9	1.01
75-35-4	1,1-Dichloroethylene	6.9 U		6.9	1.02
106-93-4	1,2-Dibromoethane	6.9 U		6.9	0.952
96-12-8	1,2-Dibromo-3-chloropropane	14 U		14	2.89
95-50-1	1,2-Dichlorobenzene	6.9 U		6.9	0.673
107-06-2	1,2-Dichloroethane	6.9 U		6.9	0.599
156-59-2	cis-1,2-Dichloroethene	6.9 U		6.9	0.987
156-60-5	trans-1,2-Dichloroethene	6.9 U		6.9	0.977
78-87-5	1,2-Dichloropropane	6.9 U		6.9	0.815
87-61-6	1,2,3-Trichlorobenzene	6.9 U		6.9	0.756
120-82-1	1,2,4-Trichlorobenzene	6.9 U		6.9	0.570
541-73-1	1,3-Dichlorobenzene	6.9 U		6.9	0.373
106-46-7	1,4-Dichlorobenzene	6.9 U	UJ,C	6.9	0.987
78-93-3	**Methyl Ethyl Ketone**	**24 J**		28	6.95
591-78-6	2-Hexanone	14 U		14	3.14
108-10-1	4-Methyl-2-Pentanone	14 U		14	2.03
67-64-1	**Acetone**	**51**	B,2	28	6.95
71-43-2	Benzene	6.9 U		6.9	0.733
74-97-5	Bromochloromethane	6.9 U		6.9	1.06
75-27-4	Dichlorobromomethane	6.9 U		6.9	0.696
75-25-2	Bromoform	6.9 U		6.9	0.803
74-83-9	Bromomethane	6.9 U		6.9	2.09
75-15-0	Carbon Disulfide	6.9 U	UJ,C	6.9	2.02
56-23-5	Carbon Tetrachloride	6.9 U		6.9	0.648
108-90-7	Chlorobenzene	6.9 U		6.9	0.919
75-00-3	Chloroethane	6.9 U		6.9	1.88
67-66-3	Chloroform	6.9 U		6.9	0.620

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**68SB1B**	QC Batch:	90050 -115
Sample #:	**345413**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	72
Unit:	ug/kg dry	Dilution Factor:	1.39

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.9 U		6.9	1.16
110-82-7	Cyclohexane	14 U		14	0.439
10061-01-5	cis-1,3-Dichloropropene	6.9 U		6.9	0.682
10061-02-6	trans-1,3-Dichloropropene	6.9 U		6.9	0.724
75-71-8	Dichlorodifluoromethane	6.9 U	VJ,c	6.9	0.929
124-48-1	Chlorodibromomethane	6.9 U		6.9	0.719
100-41-4	Ethylbenzene	6.9 U		6.9	0.588
98-82-8	Isopropylbenzene	6.9 U		6.9	0.759
79-20-9	Methyl Acetate	28 U	VJ,c	28	4.82
108-87-2	Methylcyclohexane	14 U		14	1.17
1634-04-4	Methyl(tert)butyl Ether	6.9 U		6.9	0.891
75-09-2	Methylene Chloride	28 U	VJ,c	28	3.91
100-42-5	Styrene	6.9 U		6.9	0.614
127-18-4	Tetrachloroethene	6.9 U		6.9	0.852
108-88-3	Toluene	6.9 U		6.9	0.645
79-01-6	Trichloroethene	6.9 U		6.9	0.941
75-69-4	Trichlorofluoromethane	6.9 U		6.9	1.03
75-01-4	Vinyl Chloride	6.9 U		6.9	0.514
1330-20-7	Xylene (Total)	6.9 U		6.9	0.585

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**68SB1B**	QC Batch:	90050 -115
Sample #:	**345413**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	72
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**68SB1C**	QC Batch:	90050 -115
Sample #:	**345414**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.33

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.7 U		6.7	0.567
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.7 U		6.7	1.01
79-34-5	1,1,2,2-Tetrachloroethane	6.7 U		6.7	0.868
79-00-5	1,1,2-Trichloroethane	6.7 U		6.7	0.789
75-34-3	1,1-Dichloroethane	6.7 U		6.7	0.963
75-35-4	1,1-Dichloroethylene	6.7 U		6.7	0.975
106-93-4	1,2-Dibromoethane	6.7 U		6.7	0.911
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	2.77
95-50-1	1,2-Dichlorobenzene	6.7 U		6.7	0.644
107-06-2	1,2-Dichloroethane	6.7 U		6.7	0.573
156-59-2	cis-1,2-Dichloroethene	6.7 U		6.7	0.944
156-60-5	trans-1,2-Dichloroethene	6.7 U		6.7	0.935
78-87-5	1,2-Dichloropropane	6.7 U		6.7	0.779
87-61-6	1,2,3-Trichlorobenzene	6.7 U		6.7	0.724
120-82-1	1,2,4-Trichlorobenzene	6.7 U		6.7	0.545
541-73-1	1,3-Dichlorobenzene	6.7 U		6.7	0.356
106-46-7	1,4-Dichlorobenzene	6.7 U	UJ,C	6.7	0.944
78-93-3	Methyl Ethyl Ketone	26 U		26	6.65
591-78-6	2-Hexanone	13 U		13	3.01
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.94
67-64-1	**Acetone**	**42**	B,Z	26	6.65
71-43-2	Benzene	6.7 U		6.7	0.701
74-97-5	Bromochloromethane	6.7 U		6.7	1.01
75-27-4	Dichlorobromomethane	6.7 U		6.7	0.666
75-25-2	Bromoform	6.7 U		6.7	0.769
74-83-9	Bromomethane	6.7 U		6.7	2.00
75-15-0	Carbon Disulfide	6.7 U	UJ,C	6.7	1.93
56-23-5	Carbon Tetrachloride	6.7 U		6.7	0.620
108-90-7	Chlorobenzene	6.7 U		6.7	0.879
75-00-3	Chloroethane	6.7 U		6.7	1.80
67-66-3	Chloroform	6.7 U		6.7	0.593

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**68SB1C**	QC Batch:	90050 -115
Sample #:	**345414**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.33

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.7 U		6.7	1.11
110-82-7	Cyclohexane	13 U		13	0.420
10061-01-5	cis-1,3-Dichloropropene	6.7 U		6.7	0.653
10061-02-6	trans-1,3-Dichloropropene	6.7 U		6.7	0.693
75-71-8	Dichlorodifluoromethane	6.7 U	UJ,C	6.7	0.888
124-48-1	Chlorodibromomethane	6.7 U		6.7	0.688
100-41-4	Ethylbenzene	6.7 U		6.7	0.563
98-82-8	Isopropylbenzene	6.7 U		6.7	0.726
79-20-9	Methyl Acetate	26 U	UJ,C	26	4.62
108-87-2	Methylcyclohexane	13 U		13	1.12
1634-04-4	Methyl(tert)butyl Ether	6.7 U		6.7	0.853
75-09-2	Methylene Chloride	26 U	UJ,C	26	3.74
100-42-5	Styrene	6.7 U		6.7	0.588
127-18-4	Tetrachloroethene	6.7 U		6.7	0.815
108-88-3	Toluene	6.7 U		6.7	0.617
79-01-6	Trichloroethene	6.7 U		6.7	0.900
75-69-4	Trichlorofluoromethane	6.7 U		6.7	0.988
75-01-4	Vinyl Chloride	6.7 U		6.7	0.492
1330-20-7	Xylene (Total)	6.7 U		6.7	0.560

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**68SB1C**	QC Batch:	90050 -115
Sample #:	**345414**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	75
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**EQB3**	QC Batch:	89888 -115
Sample #:	**345617**	Anal. Batch:	207752
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Volatile Organics OLM4.2+ TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	1.0 U		1.0	0.142
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1.0 U		1.0	0.179
79-34-5	1,1,2,2-Tetrachloroethane	1.0 U		1.0	0.148
79-00-5	1,1,2-Trichloroethane	1.0 U		1.0	0.142
75-34-3	1,1-Dichloroethane	1.0 U		1.0	0.057
75-35-4	1,1-Dichloroethylene	1.0 U		1.0	0.133
106-93-4	1,2-Dibromoethane	1.0 U		1.0	0.171
96-12-8	1,2-Dibromo-3-chloropropane	5.0 U		5.0	0.270
95-50-1	1,2-Dichlorobenzene	1.0 U		1.0	0.164
107-06-2	1,2-Dichloroethane	1.0 U		1.0	0.111
156-59-2	cis-1,2-Dichloroethene	1.0 U		1.0	0.139
156-60-5	trans-1,2-Dichloroethene	1.0 U		1.0	0.143
78-87-5	1,2-Dichloropropane	1.0 U		1.0	0.255
87-61-6	1,2,3-Trichlorobenzene	1.0 U		1.0	0.228
120-82-1	1,2,4-Trichlorobenzene	1.0 U		1.0	0.189
541-73-1	1,3-Dichlorobenzene	1.0 U		1.0	0.160
106-46-7	1,4-Dichlorobenzene	1.0 U		1.0	0.124
78-93-3	Methyl Ethyl Ketone	20 U		20	0.417
591-78-6	2-Hexanone	20 U		20	0.455
108-10-1	4-Methyl-2-Pentanone	20 U		20	0.364
67-64-1	**Acetone**	**2.3 J**	B,Z	20	1.07
71-43-2	Benzene	1.0 U		1.0	0.022
74-97-5	Bromochloromethane	1.0 U		1.0	0.076
75-27-4	Dichlorobromomethane	1.0 U		1.0	0.431
75-25-2	Bromoform	1.0 U		1.0	0.110
74-83-9	Bromomethane	1.0 U		1.0	0.267
75-15-0	Carbon Disulfide	5.0 U	UJ,C	5.0	0.059
56-23-5	Carbon Tetrachloride	1.0 U		1.0	0.115
108-90-7	Chlorobenzene	1.0 U		1.0	0.157
75-00-3	Chloroethane	1.0 U		1.0	0.180
67-66-3	Chloroform	1.0 U		1.0	0.101

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**EQB3**	QC Batch:	89888 -115
Sample #:	**345617**	Anal. Batch:	207752
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Volatile Organics OLM4.2+ TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	1.0 U		1.0	0.103
110-82-7	Cyclohexane	5.0 U		5.0	0.215
10061-01-5	cis-1,3-Dichloropropene	1.0 U		1.0	0.189
10061-02-6	trans-1,3-Dichloropropene	1.0 U		1.0	0.117
75-71-8	Dichlorodifluoromethane	1.0 U		1.0	0.120
124-48-1	Chlorodibromomethane	1.0 U		1.0	0.108
100-41-4	Ethylbenzene	1.0 U		1.0	0.195
98-82-8	Isopropylbenzene	1.0 U		1.0	0.090
79-20-9	Methyl Acetate	10 U		10	0.231
108-87-2	Methylcyclohexane	5.0 U		5.0	0.168
1634-04-4	Methyl(tert)butyl Ether	1.0 U		1.0	0.077
75-09-2	**Methylene Chloride**	**0.67 J**	B,Z	4.0	0.117
100-42-5	Styrene	1.0 U		1.0	0.137
127-18-4	Tetrachloroethene	1.0 U		1.0	0.193
108-88-3	Toluene	1.0 U		1.0	0.214
79-01-6	Trichloroethene	1.0 U		1.0	0.211
75-69-4	Trichlorofluoromethane	1.0 U		1.0	0.051
75-01-4	Vinyl Chloride	1.0 U		1.0	0.119
1330-20-7	Xylene (Total)	3.0 U		3.0	0.160

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**EQB3**	QC Batch:	89888 -115
Sample #:	**345617**	Anal. Batch:	207752
Matrix:	QC Water	Percent Solids:	n/a
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/L)**	**Qualifier**

No compound was detected.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**Trip Blank**	QC Batch:	89888 -115
Sample #:	**345618**	Anal. Batch:	207752
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Volatile Organics OLM4.2+ TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	1.0 U		1.0	0.142
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1.0 U		1.0	0.179
79-34-5	1,1,2,2-Tetrachloroethane	1.0 U		1.0	0.148
79-00-5	1,1,2-Trichloroethane	1.0 U		1.0	0.142
75-34-3	1,1-Dichloroethane	1.0 U		1.0	0.057
75-35-4	1,1-Dichloroethylene	1.0 U		1.0	0.133
106-93-4	1,2-Dibromoethane	1.0 U		1.0	0.171
96-12-8	1,2-Dibromo-3-chloropropane	5.0 U		5.0	0.270
95-50-1	1,2-Dichlorobenzene	1.0 U		1.0	0.164
107-06-2	1,2-Dichloroethane	1.0 U		1.0	0.111
156-59-2	cis-1,2-Dichloroethene	1.0 U		1.0	0.139
156-60-5	trans-1,2-Dichloroethene	1.0 U		1.0	0.143
78-87-5	1,2-Dichloropropane	1.0 U		1.0	0.255
87-61-6	1,2,3-Trichlorobenzene	1.0 U		1.0	0.228
120-82-1	1,2,4-Trichlorobenzene	1.0 U		1.0	0.189
541-73-1	1,3-Dichlorobenzene	1.0 U		1.0	0.160
106-46-7	1,4-Dichlorobenzene	1.0 U		1.0	0.124
78-93-3	Methyl Ethyl Ketone	20 U		20	0.417
591-78-6	2-Hexanone	20 U		20	0.455
108-10-1	4-Methyl-2-Pentanone	20 U		20	0.364
67-64-1	Acetone	20 U		20	1.07
71-43-2	Benzene	1.0 U		1.0	0.022
74-97-5	Bromochloromethane	1.0 U		1.0	0.076
75-27-4	Dichlorobromomethane	1.0 U		1.0	0.431
75-25-2	Bromoform	1.0 U		1.0	0.110
74-83-9	Bromomethane	1.0 U		1.0	0.267
75-15-0	Carbon Disulfide	5.0 U	UJ,C	5.0	0.059
56-23-5	Carbon Tetrachloride	1.0 U		1.0	0.115
108-90-7	Chlorobenzene	1.0 U		1.0	0.157
75-00-3	Chloroethane	1.0 U		1.0	0.180
67-66-3	Chloroform	1.0 U		1.0	0.101

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**Trip Blank**	QC Batch:	89888 -115
Sample #:	**345618**	Anal. Batch:	207752
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Volatile Organics OLM4.2+ TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	1.0 U		1.0	0.103
110-82-7	Cyclohexane	5.0 U		5.0	0.215
10061-01-5	cis-1,3-Dichloropropene	1.0 U		1.0	0.189
10061-02-6	trans-1,3-Dichloropropene	1.0 U		1.0	0.117
75-71-8	Dichlorodifluoromethane	1.0 U		1.0	0.120
124-48-1	Chlorodibromomethane	1.0 U		1.0	0.108
100-41-4	Ethylbenzene	1.0 U		1.0	0.195
98-82-8	Isopropylbenzene	1.0 U		1.0	0.090
79-20-9	Methyl Acetate	10 U		10	0.231
108-87-2	Methylcyclohexane	5.0 U		5.0	0.168
1634-04-4	Methyl(tert)butyl Ether	1.0 U		1.0	0.077
75-09-2	**Methylene Chloride**	**0.91 J**	B,Z	4.0	0.117
100-42-5	Styrene	1.0 U		1.0	0.137
127-18-4	Tetrachloroethene	1.0 U		1.0	0.193
108-88-3	Toluene	1.0 U		1.0	0.214
79-01-6	Trichloroethene	1.0 U		1.0	0.211
75-69-4	Trichlorofluoromethane	1.0 U		1.0	0.051
75-01-4	Vinyl Chloride	1.0 U		1.0	0.119
1330-20-7	Xylene (Total)	3.0 U		3.0	0.160

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**Trip Blank**	QC Batch:	89888 -115
Sample #:	**345618**	Anal. Batch:	207752
Matrix:	QC Water	Percent Solids:	n/a
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/L)**	**Qualifier**

No compound was detected.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/08/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3510C
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**EQB2**	QC Batch:	89818 -108
Sample #:	**345184**	Anal. Batch:	207854
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	5.0 U	5.0	0.013
95-94-3	1,2,4,5-Tetrachloro-benzene	5.0 U	5.0	0.775
108-60-1	Bis (2-Chloroisopropyl)-Ether	5.0 U	5.0	0.014
95-95-4	2,4,5-Trichlorophenol	5.0 U	5.0	0.014
88-06-2	2,4,6-Trichlorophenol	5.0 U	5.0	0.015
120-83-2	2,4-Dichlorophenol	5.0 U	5.0	0.018
105-67-9	2,4-Dimethylphenol	5.0 U	5.0	0.198
51-28-5	2,4-Dinitrophenol	10 U	10	1.24
121-14-2	2,4-Dinitrotoluene	5.0 U	5.0	0.007
606-20-2	2,6-Dinitrotoluene	5.0 U	5.0	0.052
91-58-7	2-Chloronaphthalene	5.0 U	5.0	0.005
95-57-8	2-Chlorophenol	5.0 U	5.0	0.011
91-57-6	2-Methylnaphthalene	5.0 U	5.0	0.084
95-48-7	2-Methylphenol	5.0 U	5.0	0.007
88-74-4	2-Nitroaniline	5.0 U	5.0	0.010
88-75-5	2-Nitrophenol	5.0 U	5.0	0.011
91-94-1	3,3'-Dichlorobenzidine	5.0 U	5.0	0.058
99-09-2	3-Nitroaniline	5.0 U	5.0	0.032
534-52-1	4,6-Dinitro-2-Methylphenol	5.0 U	5.0	0.054
101-55-3	4-Bromophenyl Phenylether	5.0 U	5.0	0.019
59-50-7	4-Chloro-3-Methylphenol	5.0 U	5.0	0.018
106-47-8	4-Chloroaniline	5.0 U	5.0	0.011
7005-72-3	4-Chlorophenylphenyl-Ether	5.0 U	5.0	0.015
106-44-5	4-Methylphenol	5.0 U	5.0	0.014
100-01-6	4-Nitroaniline	5.0 U	5.0	0.070
100-02-7	4-Nitrophenol	10 U	10	0.134
83-32-9	Acenaphthene	5.0 U	5.0	0.008
208-96-8	Acenaphthylene	5.0 U	5.0	0.007
98-86-2	Acetophenone	5.0 U	5.0	0.011

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/08/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3510C
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**EQB2**	QC Batch:	89818 -108
Sample #:	**345184**	Anal. Batch:	207854
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	5.0 U		5.0	0.014
1912-24-9	Atrazine	5.0 U		5.0	0.018
100-52-7	Benzaldehyde	5.0 U	UJ,c	5.0	0.616
56-55-3	Benzo (a) Anthracene	5.0 U		5.0	0.022
50-32-8	Benzo (a) Pyrene	5.0 U		5.0	0.025
205-99-2	Benzo (b) Fluoranthene	5.0 U		5.0	0.019
191-24-2	Benzo (g,h,i,) Perylene	5.0 U		5.0	0.046
207-08-9	Benzo (k) Fluoranthene	5.0 U		5.0	0.064
111-91-1	Bis (2-Chloroethoxy)-Methane	5.0 U		5.0	0.013
111-44-4	Bis (2-Chloroethyl) Ether	5.0 U		5.0	0.012
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**1.1 J**	B,z	5.0	0.149
85-68-7	**Butyl Benzyl Phthalate**	**0.96 J**		5.0	0.015
105-60-2	Caprolactam	5.0 U	UJ,l	5.0	0.024
86-74-8	Carbazole	5.0 U		5.0	0.015
218-01-9	Chrysene	5.0 U		5.0	0.025
53-70-3	Dibenzo (a,h) Anthracene	5.0 U		5.0	0.025
132-64-9	Dibenzofuran	5.0 U		5.0	0.014
84-66-2	**Diethylphthalate**	**0.12 J**	B,z	5.0	0.074
131-11-3	Dimethylphthalate	5.0 U		5.0	0.013
84-74-2	Di-n-Butylphthalate	5.0 U		5.0	1.60
117-84-0	Di-n-Octylphthalate	5.0 U		5.0	0.162
206-44-0	Fluoranthene	5.0 U		5.0	0.024
86-73-7	Fluorene	5.0 U		5.0	0.012
118-74-1	Hexachlorobenzene	5.0 U		5.0	0.011
87-68-3	Hexachlorobutadiene	5.0 U		5.0	0.019
77-47-4	Hexachlorocyclopentadiene	5.0 U		5.0	0.016
67-72-1	Hexachloroethane	5.0 U		5.0	0.023
193-39-5	Indeno (1,2,3-cd) Pyrene	5.0 U		5.0	0.033
78-59-1	Isophorone	5.0 U		5.0	0.017
91-20-3	Naphthalene	5.0 U		5.0	0.006
98-95-3	Nitrobenzene	5.0 U		5.0	0.012

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/08/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3510C
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**EQB2**	QC Batch:	89818 -108
Sample #:	**345184**	Anal. Batch:	207854
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	5.0 U	5.0	0.017
86-30-6	N-Nitroso-di-Phenylamine	5.0 U	5.0	0.019
87-86-5	Pentachlorophenol	10 U	10	0.075
85-01-8	Phenanthrene	5.0 U	5.0	0.016
108-95-2	Phenol	5.0 U	5.0	0.006
129-00-0	Pyrene	5.0 U	5.0	0.033

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/08/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**EQB2**	QC Batch:	89818 -108
Sample #:	**345184**	Anal. Batch:	207854
Matrix:	QC Water	Percent Solids:	n/a
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/L)**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	6.54	E	NJ,+
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	0.61	E	NJ,+
Eicosane	112-95-8	0.74	E	NJ,+
Stearic Acid	57-11-4	0.52	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 08:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB2A**	QC Batch:	90209 -109
Sample #:	**345186**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	86
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	200 U		200	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	200 U		200	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	200 U		200	1.58
95-95-4	2,4,5-Trichlorophenol	200 U		200	4.01
88-06-2	2,4,6-Trichlorophenol	200 U		200	3.14
120-83-2	2,4-Dichlorophenol	200 U		200	4.22
105-67-9	2,4-Dimethylphenol	200 U		200	9.53
51-28-5	2,4-Dinitrophenol	380 U		380	3.84
121-14-2	2,4-Dinitrotoluene	200 U		200	3.78
606-20-2	2,6-Dinitrotoluene	200 U		200	33.2
91-58-7	2-Chloronaphthalene	200 U		200	2.76
95-57-8	2-Chlorophenol	200 U		200	2.41
91-57-6	2-Methylnaphthalene	200 U		200	3.29
95-48-7	2-Methylphenol	200 U		200	5.81
88-74-4	2-Nitroaniline	200 U		200	5.52
88-75-5	2-Nitrophenol	200 U		200	2.04
91-94-1	3,3'-Dichlorobenzidine	200 U		200	80.0
99-09-2	3-Nitroaniline	200 U		200	40.0
534-52-1	4,6-Dinitro-2-Methylphenol	170 U		200	5.41
101-55-3	4-Bromophenyl Phenylether	200 U		200	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**25 J**	B,X U5,1	200	6.25
106-47-8	4-Chloroaniline	200 U		200	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	200 U		200	3.92
106-44-5	4-Methylphenol	200 U		200	7.64
100-01-6	4-Nitroaniline	200 U		200	8.70
100-02-7	4-Nitrophenol	380 U		380	3.40
83-32-9	Acenaphthene	200 U		200	2.06
208-96-8	Acenaphthylene	200 U		200	1.80
98-86-2	Acetophenone	200 U		200	2.28

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 08:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB2A**	QC Batch:	90209 -109
Sample #:	**345186**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	86
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	200 U		200	5.54
1912-24-9	Atrazine	200 U		200	8.26
100-52-7	Benzaldehyde	200 U	UJ,C	200	4.86
56-55-3	Benzo (a) Anthracene	200 U		200	16.0
50-32-8	Benzo (a) Pyrene	200 U		200	6.85
205-99-2	Benzo (b) Fluoranthene	200 U		200	11.7
191-24-2	Benzo (g,h,i,) Perylene	200 U		200	10.5
207-08-9	Benzo (k) Fluoranthene	200 U		200	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	200 U		200	3.77
111-44-4	Bis (2-Chloroethyl) Ether	200 U		200	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**46 J**		200	2.48
85-68-7	**Butyl Benzyl Phthalate**	**52 J**	B,X	200	5.38
105-60-2	Caprolactam	380 U		380	7.66
86-74-8	Carbazole	200 U		200	7.32
218-01-9	Chrysene	200 U		200	12.2
53-70-3	Dibenzo (a,h) Anthracene	200 U		200	7.08
132-64-9	Dibenzofuran	200 U		200	3.79
84-66-2	**Diethylphthalate**	**4.0 J**	B,Z	200	2.28
131-11-3	Dimethylphthalate	200 U		200	3.97
84-74-2	**Di-n-Butylphthalate**	**42 J**		200	4.58
117-84-0	Di-n-Octylphthalate	200 U		200	3.72
206-44-0	Fluoranthene	200 U		200	2.82
86-73-7	Fluorene	200 U		200	2.02
118-74-1	Hexachlorobenzene	200 U		200	3.01
87-68-3	Hexachlorobutadiene	200 U		200	4.64
77-47-4	Hexachlorocyclopentadiene	200 U		200	2.38
67-72-1	Hexachloroethane	200 U		200	2.80
193-39-5	Indeno (1,2,3-cd) Pyrene	200 U		200	4.70
78-59-1	Isophorone	200 U		200	2.08
91-20-3	Naphthalene	200 U		200	3.30
98-95-3	Nitrobenzene	200 U		200	3.84

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 08:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB2A**	QC Batch:	90209 -109
Sample #:	**345186**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	86
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	200 U	200	3.95
86-30-6	N-Nitroso-di-Phenylamine	200 U	200	5.70
87-86-5	Pentachlorophenol	380 U	380	5.27
85-01-8	Phenanthrene	200 U	200	2.76
108-95-2	Phenol	200 U	200	4.75
129-00-0	Pyrene	200 U	200	1.78

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 08:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB2A**	QC Batch:	90209 -109
Sample #:	**345186**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	86
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (mg/kg dr**	**Qualifier**		Result µg/kg dr
(Z)-9-Octadecenamide	301-02-0	0.16	E	B,X	160
1,2,3,4,4a,9,10,10a-Octa-1-phenanthrene carboxylic acid	1740-19-8	0.29	E	NJ,+	290
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	0.045	E	B,X	45
1,5,9-Undecatriene, 2,6,10-trimethyl-, (Z)-	62951-96-6	0.048	E	NJ,+	48
13-Tertadecen-1-ol acetate	1000130798 (100013-0798)	0.13	E	NJ,+	130
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	0.086	E	NJ,+	86
Bicyclo[3.1.1]hept-2-ene, 2,6,6-trimethyl-,(n)-	2437-95-8	0.13	E	NJ,+	130
Cyclotetradecane	295-17-0	0.055	E	NJ,+	55
Erucylamide	112-84-5	0.57	E	B,X	570
Heneicosane	629-94-7	0.072	E	NJ,+	72
Stearic Acid	57-11-4	0.10	E	B,X	100

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 09:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB2B**	QC Batch:	90209 -109
Sample #:	**345187**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	200 U		200	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	200 U		200	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	200 U		200	1.58
95-95-4	2,4,5-Trichlorophenol	200 U		200	4.01
88-06-2	2,4,6-Trichlorophenol	200 U		200	3.14
120-83-2	2,4-Dichlorophenol	200 U		200	4.22
105-67-9	2,4-Dimethylphenol	200 U		200	9.53
51-28-5	2,4-Dinitrophenol	390 U		390	3.84
121-14-2	2,4-Dinitrotoluene	200 U		200	3.78
606-20-2	2,6-Dinitrotoluene	200 U		200	33.2
91-58-7	2-Chloronaphthalene	200 U		200	2.76
95-57-8	2-Chlorophenol	200 U		200	2.41
91-57-6	2-Methylnaphthalene	200 U		200	3.29
95-48-7	2-Methylphenol	200 U		200	5.81
88-74-4	2-Nitroaniline	200 U		200	5.52
88-75-5	2-Nitrophenol	200 U		200	2.04
91-94-1	3,3'-Dichlorobenzidine	200 U		200	80.0
99-09-2	3-Nitroaniline	200 U		200	40.0
534-52-1	4,6-Dinitro-2-Methylphenol	200 U		200	5.41
101-55-3	4-Bromophenyl Phenylether	200 U		200	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**17 J**	BX	200	6.25
106-47-8	4-Chloroaniline	200 U	UJ,1	200	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	200 U		200	3.92
106-44-5	4-Methylphenol	200 U		200	7.64
100-01-6	4-Nitroaniline	200 U		200	8.70
100-02-7	4-Nitrophenol	390 U		390	3.40
83-32-9	Acenaphthene	200 U		200	2.06
208-96-8	Acenaphthylene	200 U		200	1.80
98-86-2	Acetophenone	200 U		200	2.28

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 09:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB2B**	QC Batch:	90209 -109
Sample #:	**345187**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	200 U		200	5.54
1912-24-9	Atrazine	200 U		200	8.26
100-52-7	Benzaldehyde	200 U	UJ,c	200	4.86
56-55-3	Benzo (a) Anthracene	200 U		200	16.0
50-32-8	Benzo (a) Pyrene	200 U		200	6.85
205-99-2	Benzo (b) Fluoranthene	200 U		200	11.7
191-24-2	Benzo (g,h,i,) Perylene	200 U		200	10.5
207-08-9	Benzo (k) Fluoranthene	200 U		200	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	200 U		200	3.77
111-44-4	Bis (2-Chloroethyl) Ether	200 U		200	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**50 J**		200	2.48
85-68-7	Butyl Benzyl Phthalate	200 U		200	5.38
105-60-2	Caprolactam	390 U		390	7.66
86-74-8	Carbazole	200 U		200	7.32
218-01-9	Chrysene	200 U		200	12.2
53-70-3	Dibenzo (a,h) Anthracene	200 U		200	7.08
132-64-9	Dibenzofuran	200 U		200	3.79
84-66-2	**Diethylphthalate**	**4.0 J**	B,2	200	2.28
131-11-3	Dimethylphthalate	200 U		200	3.97
84-74-2	**Di-n-Butylphthalate**	**23 J**		200	4.58
117-84-0	Di-n-Octylphthalate	200 U		200	3.72
206-44-0	Fluoranthene	200 U		200	2.82
86-73-7	Fluorene	200 U		200	2.02
118-74-1	Hexachlorobenzene	200 U		200	3.01
87-68-3	Hexachlorobutadiene	200 U		200	4.64
77-47-4	Hexachlorocyclopentadiene	200 U		200	2.38
67-72-1	Hexachloroethane	200 U		200	2.80
193-39-5	Indeno (1,2,3-cd) Pyrene	200 U		200	4.70
78-59-1	Isophorone	200 U		200	2.08
91-20-3	Naphthalene	200 U		200	3.30
98-95-3	Nitrobenzene	200 U		200	3.84

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 09:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB2B**	QC Batch:	90209 -109
Sample #:	**345187**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	200 U	200	3.95
86-30-6	N-Nitroso-di-Phenylamine	200 U	200	5.70
87-86-5	Pentachlorophenol	390 U	390	5.27
85-01-8	Phenanthrene	200 U	200	2.76
108-95-2	Phenol	200 U	200	4.75
129-00-0	Pyrene	200 U	200	1.78

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 09:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB2B**	QC Batch:	90209 -109
Sample #:	**345187**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	85
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	120	E	B,X
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	34	E	B,X
1-HEXACOSANOL	506-52-5	63	E	NJ,+
2-Ethyl-1-Hexanol	104-76-7	23	E	NJ,+
Erucylamide	112-84-5	530	E	B,X

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD4**	QC Batch:	90209 -109
Sample #:	**345188**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	81
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	210 U		210	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	210 U		210	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	210 U		210	1.58
95-95-4	2,4,5-Trichlorophenol	210 U		210	4.01
88-06-2	2,4,6-Trichlorophenol	210 U		210	3.14
120-83-2	2,4-Dichlorophenol	210 U		210	4.22
105-67-9	2,4-Dimethylphenol	210 U		210	9.53
51-28-5	2,4-Dinitrophenol	410 U		410	3.84
121-14-2	2,4-Dinitrotoluene	210 U		210	3.78
606-20-2	2,6-Dinitrotoluene	210 U		210	33.2
91-58-7	2-Chloronaphthalene	210 U		210	2.76
95-57-8	2-Chlorophenol	210 U		210	2.41
91-57-6	2-Methylnaphthalene	210 U		210	3.29
95-48-7	2-Methylphenol	210 U		210	5.81
88-74-4	2-Nitroaniline	210 U		210	5.52
88-75-5	2-Nitrophenol	210 U		210	2.04
91-94-1	3,3'-Dichlorobenzidine	210 U		210	80.0
99-09-2	3-Nitroaniline	210 U		210	40.0
534-52-1	4,6-Dinitro-2-Methylphenol	210 U		210	5.41
101-55-3	4-Bromophenyl Phenylether	210 U		210	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**13 J**	B,X	210	6.25
106-47-8	4-Chloroaniline	210 U	UJ,1	210	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	210 U		210	3.92
106-44-5	4-Methylphenol	210 U		210	7.64
100-01-6	4-Nitroaniline	210 U		210	8.70
100-02-7	4-Nitrophenol	410 U		410	3.40
83-32-9	Acenaphthene	210 U		210	2.06
208-96-8	Acenaphthylene	210 U		210	1.80
98-86-2	Acetophenone	210 U		210	2.28

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TriMatrix Laboratories, Inc

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD4**	QC Batch:	90209 -109
Sample #:	**345188**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	81
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	210 U		210	5.54
1912-24-9	Atrazine	210 U		210	8.26
100-52-7	Benzaldehyde	210 U	VJ,c	210	4.86
56-55-3	Benzo (a) Anthracene	210 U		210	16.0
50-32-8	Benzo (a) Pyrene	210 U		210	6.85
205-99-2	Benzo (b) Fluoranthene	210 U		210	11.7
191-24-2	Benzo (g,h,i,) Perylene	210 U		210	10.5
207-08-9	Benzo (k) Fluoranthene	210 U		210	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	210 U		210	3.77
111-44-4	Bis (2-Chloroethyl) Ether	210 U		210	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**45 J**		210	2.48
85-68-7	Butyl Benzyl Phthalate	210 U		210	5.38
105-60-2	**Caprolactam**	**110 J**		410	7.66
86-74-8	Carbazole	210 U		210	7.32
218-01-9	Chrysene	210 U		210	12.2
53-70-3	Dibenzo (a,h) Anthracene	210 U		210	7.08
132-64-9	Dibenzofuran	210 U		210	3.79
84-66-2	**Diethylphthalate**	**3.0 J**	B,z	210	2.28
131-11-3	Dimethylphthalate	210 U		210	3.97
84-74-2	**Di-n-Butylphthalate**	**22 J**		210	4.58
117-84-0	Di-n-Octylphthalate	210 U		210	3.72
206-44-0	Fluoranthene	210 U		210	2.82
86-73-7	Fluorene	210 U		210	2.02
118-74-1	Hexachlorobenzene	210 U		210	3.01
87-68-3	Hexachlorobutadiene	210 U		210	4.64
77-47-4	Hexachlorocyclopentadiene	210 U		210	2.38
67-72-1	Hexachloroethane	210 U		210	2.80
193-39-5	Indeno (1,2,3-cd) Pyrene	210 U		210	4.70
78-59-1	Isophorone	210 U		210	2.08
91-20-3	Naphthalene	210 U		210	3.30
98-95-3	Nitrobenzene	210 U		210	3.84

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD4**	QC Batch:	90209 -109
Sample #:	**345188**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	81
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	210 U	210	3.95
86-30-6	N-Nitroso-di-Phenylamine	210 U	210	5.70
87-86-5	Pentachlorophenol	410 U	410	5.27
85-01-8	Phenanthrene	210 U	210	2.76
108-95-2	Phenol	210 U	210	4.75
129-00-0	Pyrene	210 U	210	1.78

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD4**	QC Batch:	90209 -109
Sample #:	**345188**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	81
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(M) 1-Eicosanol	629-96-9	47	E	NJ,+
(Z)-9-Octadecenamide	301-02-0	110	E	B,X
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	30	E	B,X
Erucylamide	112-84-5	480	E	B,X

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 09:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB2C**	QC Batch:	90209 -109
Sample #:	**345189**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	93
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	180 U		180	2.71
95-94-3	1,2,4,5-Tetrachloro-benzene	180 U		180	31.6
108-60-1	Bis (2-Chloroisopropyl)-Ether	180 U		180	1.45
95-95-4	2,4,5-Trichlorophenol	180 U		180	3.67
88-06-2	2,4,6-Trichlorophenol	180 U		180	2.88
120-83-2	2,4-Dichlorophenol	180 U		180	3.87
105-67-9	2,4-Dimethylphenol	180 U		180	8.73
51-28-5	2,4-Dinitrophenol	350 U		350	3.52
121-14-2	2,4-Dinitrotoluene	180 U		180	3.47
606-20-2	2,6-Dinitrotoluene	180 U		180	30.5
91-58-7	2-Chloronaphthalene	180 U		180	2.53
95-57-8	2-Chlorophenol	180 U		180	2.21
91-57-6	2-Methylnaphthalene	180 U		180	3.01
95-48-7	2-Methylphenol	180 U		180	5.32
88-74-4	2-Nitroaniline	180 U		180	5.06
88-75-5	2-Nitrophenol	180 U		180	1.87
91-94-1	3,3'-Dichlorobenzidine	180 U		180	73.4
99-09-2	3-Nitroaniline	180 U		180	36.6
534-52-1	4,6-Dinitro-2-Methylphenol	180 U		180	4.96
101-55-3	4-Bromophenyl Phenylether	180 U		180	3.72
59-50-7	**4-Chloro-3-Methylphenol**	**13 J**	BX	180	5.73
106-47-8	4-Chloroaniline	180 U	VJ,1	180	1.39
7005-72-3	4-Chlorophenylphenyl-Ether	180 U		180	3.60
106-44-5	4-Methylphenol	180 U		180	7.01
100-01-6	4-Nitroaniline	180 U		180	7.98
100-02-7	4-Nitrophenol	350 U		350	3.11
83-32-9	Acenaphthene	180 U		180	1.89
208-96-8	Acenaphthylene	180 U		180	1.65
98-86-2	Acetophenone	180 U		180	2.09

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 09:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB2C**	QC Batch:	90209 -109
Sample #:	**345189**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	93
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	180 U		180	5.08
1912-24-9	Atrazine	180 U		180	7.57
100-52-7	Benzaldehyde	180 U	UJ,c	180	4.46
56-55-3	Benzo (a) Anthracene	180 U		180	14.6
50-32-8	Benzo (a) Pyrene	180 U		180	6.28
205-99-2	Benzo (b) Fluoranthene	180 U		180	10.7
191-24-2	Benzo (g,h,i,) Perylene	180 U		180	9.59
207-08-9	Benzo (k) Fluoranthene	180 U		180	14.7
111-91-1	Bis (2-Chloroethoxy)-Methane	180 U		180	3.45
111-44-4	Bis (2-Chloroethyl) Ether	180 U		180	1.90
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**52 J**		180	2.28
85-68-7	Butyl Benzyl Phthalate	180 U		180	4.93
105-60-2	**Caprolactam**	**85 J**		350	7.02
86-74-8	Carbazole	180 U		180	6.71
218-01-9	Chrysene	180 U		180	11.2
53-70-3	Dibenzo (a,h) Anthracene	180 U		180	6.49
132-64-9	Dibenzofuran	180 U		180	3.48
84-66-2	**Diethylphthalate**	**3.0 J**	B,z	180	2.09
131-11-3	Dimethylphthalate	180 U		180	3.64
84-74-2	**Di-n-Butylphthalate**	**24 J**		180	4.20
117-84-0	Di-n-Octylphthalate	180 U		180	3.41
206-44-0	Fluoranthene	180 U		180	2.59
86-73-7	Fluorene	180 U		180	1.85
118-74-1	Hexachlorobenzene	180 U		180	2.76
87-68-3	Hexachlorobutadiene	180 U		180	4.26
77-47-4	Hexachlorocyclopentadiene	180 U		180	2.18
67-72-1	Hexachloroethane	180 U		180	2.57
193-39-5	Indeno (1,2,3-cd) Pyrene	180 U		180	4.31
78-59-1	Isophorone	180 U		180	1.90
91-20-3	Naphthalene	180 U		180	3.03
98-95-3	Nitrobenzene	180 U		180	3.52

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 09:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB2C**	QC Batch:	90209 -109
Sample #:	**345189**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	93
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	180 U	180	3.62
86-30-6	N-Nitroso-di-Phenylamine	180 U	180	5.23
87-86-5	Pentachlorophenol	350 U	350	4.83
85-01-8	Phenanthrene	180 U	180	2.53
108-95-2	Phenol	180 U	180	4.36
129-00-0	Pyrene	180 U	180	1.63

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 09:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB2C**	QC Batch:	90209 -109
Sample #:	**345189**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	93
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	130	E	B,X
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	31	E	B,X
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	70	E	NJ,+
2-Ethyl-1-Hexanol	104-76-7	52	E	NJ,+
Erucylamide	112-84-5	630	E	B,X

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 10:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB1A**	QC Batch:	90209 -109
Sample #:	**345196**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	70
Unit:	ug/kg dry	Dilution Factor:	14

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	2400 U		2400	34.4
95-94-3	1,2,4,5-Tetrachloro-benzene	2400 U		2400	402
108-60-1	Bis (2-Chloroisopropyl)-Ether	2400 U		2400	18.5
95-95-4	2,4,5-Trichlorophenol	2400 U	UL,S	2400	46.8
88-06-2	2,4,6-Trichlorophenol	2400 U	UL,S	2400	36.7
120-83-2	2,4-Dichlorophenol	2400 U	UL,S	2400	49.3
105-67-9	2,4-Dimethylphenol	2400 U	UL,S	2400	111
51-28-5	2,4-Dinitrophenol	4700 U	UL,S	4700	44.8
121-14-2	**2,4-Dinitrotoluene**	**120 J**		2400	44.1
606-20-2	2,6-Dinitrotoluene	2400 U		2400	388
91-58-7	2-Chloronaphthalene	2400 U		2400	32.2
95-57-8	2-Chlorophenol	2400 U	UL,S	2400	28.1
91-57-6	2-Methylnaphthalene	2400 U		2400	38.4
95-48-7	2-Methylphenol	2400 U	UL,S	2400	67.8
88-74-4	2-Nitroaniline	2400 U		2400	64.4
88-75-5	2-Nitrophenol	2400 U	UL,S	2400	23.8
91-94-1	3,3'-Dichlorobenzidine	2400 U	UJ,C	2400	934
99-09-2	3-Nitroaniline	2400 U		2400	466
534-52-1	4,6-Dinitro-2-Methylphenol	2400 U	UL,S	2400	63.1
101-55-3	4-Bromophenyl Phenylether	2400 U		2400	47.3
59-50-7	4-Chloro-3-Methylphenol	2400 U	UL,S	2400	72.9
106-47-8	4-Chloroaniline	2400 U	UJ,C	2400	17.6
7005-72-3	4-Chlorophenylphenyl-Ether	2400 U		2400	45.8
106-44-5	4-Methylphenol	2400 U	UL,S	2400	89.2
100-01-6	4-Nitroaniline	2400 U		2400	102
100-02-7	4-Nitrophenol	4700 U	UL,S	4700	39.6
83-32-9	Acenaphthene	2400 U		2400	24.1
208-96-8	Acenaphthylene	2400 U		2400	21.0
98-86-2	Acetophenone	2400 U		2400	26.6

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 10:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB1A**	QC Batch:	90209 -109
Sample #:	**345196**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	70
Unit:	ug/kg dry	Dilution Factor:	14

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL	
120-12-7	Anthracene	2400 U		2400	64.7	
1912-24-9	Atrazine	2400 U	UJ,C	2400	96.3	
100-52-7	Benzaldehyde	2400 U	UJ,C	2400	56.7	
56-55-3	Benzo (a) Anthracene	2400 U		2400	186	
~~50-32-8~~	~~*Benzo (a) Pyrene~~	~~2400 UR~~	~~R,i~~	~~2400~~	~~79.9~~	see dilution
~~205-99-2~~	~~*Benzo (b) Fluoranthene~~	~~2400 UR~~	~~R,i~~	~~2400~~	~~137~~	*5
~~191-24-2~~	~~*Benzo (g,h,i,) Perylene~~	~~2400 UR~~	~~R,i~~	~~2400~~	~~122~~	
~~207-08-9~~	~~*Benzo (k) Fluoranthene~~	~~2400 UR~~	~~R,i~~	~~2400~~	~~188~~	1/14/03
111-91-1	Bis (2-Chloroethoxy)-Methane	2400 U		2400	44.0	
111-44-4	Bis (2-Chloroethyl) Ether	2400 U		2400	24.2	
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**1100 J**	J,C	2400	29.0	
85-68-7	Butyl Benzyl Phthalate	2400 U		2400	62.7	
105-60-2	Caprolactam	4700 U		4700	89.3	
86-74-8	Carbazole	2400 U		2400	85.4	
218-01-9	Chrysene	2400 U		2400	143	
~~53-70-3~~	~~*Dibenzo (a,h) Anthracene~~	~~2400 UR~~	~~R,i~~	~~2400~~	~~82.6~~	see dilution *5 1/14/03
132-64-9	Dibenzofuran	2400 U		2400	44.2	
84-66-2	Diethylphthalate	2400 U		2400	26.6	
131-11-3	Dimethylphthalate	2400 U		2400	46.3	
84-74-2	**Di-n-Butylphthalate**	**14000**		2400	53.5	
117-84-0	Di-n-Octylphthalate	2400 U	UJ,C	2400	43.4	
206-44-0	**Fluoranthene**	**80 J**		2400	32.9	
86-73-7	Fluorene	2400 U		2400	23.5	
118-74-1	Hexachlorobenzene	2400 U		2400	35.1	
87-68-3	Hexachlorobutadiene	2400 U		2400	54.2	
77-47-4	Hexachlorocyclopentadiene	2400 U		2400	27.7	
67-72-1	Hexachloroethane	2400 U		2400	32.7	
~~193-39-5~~	~~*Indeno (1,2,3-cd) Pyrene~~	~~2400 UR~~	~~R,i~~	~~2400~~	~~54.9~~	see dilution *5 1/14/03
78-59-1	Isophorone	2400 U		2400	24.2	
91-20-3	Naphthalene	2400 U		2400	38.5	
98-95-3	Nitrobenzene	2400 U		2400	44.8	

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 10:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB1A**	QC Batch:	90209 -109
Sample #:	**345196**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	70
Unit:	ug/kg dry	Dilution Factor:	14

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	2400 U		2400	46.1
86-30-6	**N-Nitroso-di-Phenylamine**	**150 J**		2400	66.5
87-86-5	Pentachlorophenol	4700 U	UL,S	4700	61.5
85-01-8	**Phenanthrene**	**40 J**		2400	32.2
108-95-2	Phenol	2400 U	UL,S	2400	55.4
129-00-0	**Pyrene**	**50 J**		2400	20.7

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 10:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB1A**	QC Batch:	90209 -109
Sample #:	**345196**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	70
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 10:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB1A**	QC Batch:	90209 -109
Sample #:	**345196DL**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	70
Unit:	ug/kg dry	Dilution Factor:	71

use DF 10 results 1/14/04

CAS Number	Semivolatile Organics *OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	12000 U		12000	175
95-94-3	1,2,4,5-Tetrachloro-benzene	12000 U		12000	2040
108-60-1	Bis (2-Chloroisopropyl)-Ether	12000 U		12000	93.7
95-95-4	2,4,5-Trichlorophenol	12000 U		12000	237
88-06-2	2,4,6-Trichlorophenol	12000 U		12000	186
120-83-2	2,4-Dichlorophenol	12000 U		12000	250
105-67-9	2,4-Dimethylphenol	12000 U		12000	564
51-28-5	2,4-Dinitrophenol	24000 U		24000	227
121-14-2	2,4-Dinitrotoluene	12000 U		12000	224
606-20-2	2,6-Dinitrotoluene	12000 U		12000	1970
91-58-7	2-Chloronaphthalene	12000 U		12000	163
95-57-8	2-Chlorophenol	12000 U		12000	143
91-57-6	2-Methylnaphthalene	12000 U		12000	195
95-48-7	2-Methylphenol	12000 U		12000	344
88-74-4	2-Nitroaniline	12000 U		12000	327
88-75-5	2-Nitrophenol	12000 U		12000	121
91-94-1	3,3'-Dichlorobenzidine	12000 U		12000	4740
99-09-2	3-Nitroaniline	12000 U		12000	2360
534-52-1	4,6-Dinitro-2-Methylphenol	12000 U		12000	320
101-55-3	4-Bromophenyl Phenylether	12000 U		12000	240
59-50-7	4-Chloro-3-Methylphenol	12000 U		12000	370
106-47-8	4-Chloroaniline	12000 U	UJ,c	12000	89.5
7005-72-3	4-Chlorophenylphenyl-Ether	12000 U		12000	232
106-44-5	4-Methylphenol	12000 U		12000	452
100-01-6	4-Nitroaniline	12000 U		12000	515
100-02-7	4-Nitrophenol	24000 U		24000	201
83-32-9	Acenaphthene	12000 U		12000	122
208-96-8	Acenaphthylene	12000 U		12000	107
98-86-2	Acetophenone	12000 U		12000	135

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 10:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB1A**	QC Batch:	90209 -109
Sample #:	**345196DL**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	70
Unit:	ug/kg dry	Dilution Factor:	71

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
120-12-7	Anthracene	12000 U	12000	328
1912-24-9	Atrazine	12000 U	12000	488
100-52-7	Benzaldehyde	12000 U UJ,e	12000	288
56-55-3	Benzo (a) Anthracene	12000 U	12000	944
50-32-8	Benzo (a) Pyrene	12000 U	12000	405
205-99-2	Benzo (b) Fluoranthene	12000 U	12000	693
191-24-2	Benzo (g,h,i,) Perylene	12000 U	12000	619
207-08-9	Benzo (k) Fluoranthene	12000 U	12000	951
111-91-1	Bis (2-Chloroethoxy)-Methane	12000 U	12000	223
111-44-4	Bis (2-Chloroethyl) Ether	12000 U	12000	123
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**2500 J**	12000	147
85-68-7	Butyl Benzyl Phthalate	12000 U	12000	318
105-60-2	Caprolactam	24000 U	24000	453
86-74-8	Carbazole	12000 U	12000	433
218-01-9	Chrysene	12000 U	12000	724
53-70-3	Dibenzo (a,h) Anthracene	12000 U	12000	419
132-64-9	Dibenzofuran	12000 U	12000	224
84-66-2	Diethylphthalate	12000 U	12000	135
131-11-3	Dimethylphthalate	12000 U	12000	235
84-74-2	**Di-n-Butylphthalate**	**13000**	12000	271
117-84-0	Di-n-Octylphthalate	12000 U	12000	220
206-44-0	Fluoranthene	12000 U	12000	167
86-73-7	Fluorene	12000 U	12000	119
118-74-1	Hexachlorobenzene	12000 U	12000	178
87-68-3	Hexachlorobutadiene	12000 U	12000	275
77-47-4	Hexachlorocyclopentadiene	12000 U	12000	141
67-72-1	Hexachloroethane	12000 U	12000	166
193-39-5	Indeno (1,2,3-cd) Pyrene	12000 U	12000	278
78-59-1	Isophorone	12000 U	12000	123
91-20-3	Naphthalene	12000 U	12000	195
98-95-3	Nitrobenzene	12000 U	12000	227

* only use these results AS 1/14/03

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 10:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB1A**	QC Batch:	90209 -109
Sample #:	**345196DL**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	70
Unit:	ug/kg dry	Dilution Factor:	71

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	12000 U	12000	234
86-30-6	N-Nitroso-di-Phenylamine	12000 U	12000	337
87-86-5	Pentachlorophenol	24000 U	24000	312
85-01-8	Phenanthrene	12000 U	12000	163
108-95-2	Phenol	12000 U	12000	281
129-00-0	Pyrene	12000 U	12000	105

Use DF10 results 1/14/04

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB1B**	QC Batch:	90210 -110
Sample #:	**345197**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	210 U		210	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	210 U		210	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	210 U		210	1.58
95-95-4	2,4,5-Trichlorophenol	210 U		210	4.01
88-06-2	2,4,6-Trichlorophenol	210 U		210	3.14
120-83-2	2,4-Dichlorophenol	210 U		210	4.22
105-67-9	2,4-Dimethylphenol	210 U		210	9.53
51-28-5	2,4-Dinitrophenol	400 U		400	3.84
121-14-2	2,4-Dinitrotoluene	210 U		210	3.78
606-20-2	2,6-Dinitrotoluene	210 U		210	33.2
91-58-7	2-Chloronaphthalene	210 U		210	2.76
95-57-8	2-Chlorophenol	210 U		210	2.41
91-57-6	2-Methylnaphthalene	210 U		210	3.29
95-48-7	2-Methylphenol	210 U		210	5.81
88-74-4	2-Nitroaniline	210 U		210	5.52
88-75-5	2-Nitrophenol	210 U		210	2.04
91-94-1	3,3'-Dichlorobenzidine	210 U	UJ,C	210	80.0
99-09-2	3-Nitroaniline	210 U		210	40.0
534-52-1	4,6-Dinitro-2-Methylphenol	210 U		210	5.41
101-55-3	4-Bromophenyl Phenylether	210 U		210	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**18 J**	B,X	210	6.25
106-47-8	4-Chloroaniline	210 U	UJ,C	210	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	210 U		210	3.92
106-44-5	4-Methylphenol	210 U		210	7.64
100-01-6	4-Nitroaniline	210 U		210	8.70
100-02-7	4-Nitrophenol	400 U		400	3.40
83-32-9	Acenaphthene	210 U		210	2.06
208-96-8	Acenaphthylene	210 U		210	1.80
98-86-2	Acetophenone	210 U		210	2.28

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB1B**	QC Batch:	90210 -110
Sample #:	**345197**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	210 U		210	5.54
1912-24-9	Atrazine	210 U	UJ,c	210	8.26
100-52-7	Benzaldehyde	210 U	UJ,c	210	4.86
56-55-3	Benzo (a) Anthracene	210 U		210	16.0
50-32-8	Benzo (a) Pyrene	210 U		210	6.85
205-99-2	Benzo (b) Fluoranthene	210 U		210	11.7
191-24-2	Benzo (g,h,i,) Perylene	210 U		210	10.5
207-08-9	Benzo (k) Fluoranthene	210 U		210	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	210 U		210	3.77
111-44-4	Bis (2-Chloroethyl) Ether	210 U		210	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**49 J**	J,c	210	2.48
85-68-7	Butyl Benzyl Phthalate	210 U		210	5.38
105-60-2	Caprolactam	400 U		400	7.66
86-74-8	Carbazole	210 U		210	7.32
218-01-9	Chrysene	210 U		210	12.2
53-70-3	Dibenzo (a,h) Anthracene	210 U		210	7.08
132-64-9	Dibenzofuran	210 U		210	3.79
84-66-2	**Diethylphthalate**	**6.0 J**	B,X	210	2.28
131-11-3	Dimethylphthalate	210 U		210	3.97
84-74-2	**Di-n-Butylphthalate**	**100 J**		210	4.58
117-84-0	Di-n-Octylphthalate	210 U	UJ,c	210	3.72
206-44-0	Fluoranthene	210 U		210	2.82
86-73-7	Fluorene	210 U		210	2.02
118-74-1	Hexachlorobenzene	210 U		210	3.01
87-68-3	Hexachlorobutadiene	210 U		210	4.64
77-47-4	Hexachlorocyclopentadiene	210 U		210	2.38
67-72-1	Hexachloroethane	210 U		210	2.80
193-39-5	Indeno (1,2,3-cd) Pyrene	210 U		210	4.70
78-59-1	Isophorone	210 U		210	2.08
91-20-3	Naphthalene	210 U		210	3.30
98-95-3	Nitrobenzene	210 U		210	3.84

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB1B**	QC Batch:	90210 -110
Sample #:	**345197**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	210 U	210	3.95
86-30-6	N-Nitroso-di-Phenylamine	210 U	210	5.70
87-86-5	Pentachlorophenol	400 U	400	5.27
85-01-8	Phenanthrene	210 U	210	2.76
108-95-2	Phenol	210 U	210	4.75
129-00-0	Pyrene	210 U	210	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB1B**	QC Batch:	90210 -110
Sample #:	**345197**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	82
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	32	E	B, X
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	50	E	B, X
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	87	E	NJ, I

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 11:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB1C**	QC Batch:	90210 -110
Sample #:	**345198**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U		220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U		220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U		220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U		220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U		220	3.41
120-83-2	2,4-Dichlorophenol	220 U		220	4.58
105-67-9	2,4-Dimethylphenol	220 U		220	10.3
51-28-5	2,4-Dinitrophenol	420 U		420	4.16
121-14-2	2,4-Dinitrotoluene	220 U		220	4.10
606-20-2	2,6-Dinitrotoluene	220 U		220	36.0
91-58-7	2-Chloronaphthalene	220 U		220	2.99
95-57-8	2-Chlorophenol	220 U		220	2.61
91-57-6	2-Methylnaphthalene	220 U		220	3.56
95-48-7	2-Methylphenol	220 U		220	6.29
88-74-4	2-Nitroaniline	220 U		220	5.98
88-75-5	2-Nitrophenol	220 U		220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U	UJ,C	220	86.7
99-09-2	3-Nitroaniline	220 U		220	43.3
534-52-1	4,6-Dinitro-2-Methylphenol	220 U		220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U		220	4.39
59-50-7	**4-Chloro-3-Methylphenol**	**14 J**	B,X	220	6.77
106-47-8	4-Chloroaniline	220 U	UJ,C	220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U		220	4.25
106-44-5	4-Methylphenol	220 U		220	8.28
100-01-6	4-Nitroaniline	220 U		220	9.43
100-02-7	4-Nitrophenol	420 U		420	3.68
83-32-9	Acenaphthene	220 U		220	2.24
208-96-8	Acenaphthylene	220 U		220	1.95
98-86-2	Acetophenone	220 U		220	2.47

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 11:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB1C**	QC Batch:	90210 -110
Sample #:	**345198**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	220 U		220	6.01
1912-24-9	Atrazine	220 U	UJ,C	220	8.94
100-52-7	Benzaldehyde	220 U	UJ,C	220	5.27
56-55-3	Benzo (a) Anthracene	220 U		220	17.3
50-32-8	Benzo (a) Pyrene	220 U		220	7.42
205-99-2	Benzo (b) Fluoranthene	220 U		220	12.7
191-24-2	Benzo (g,h,i,) Perylene	220 U		220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**53 J**	J,C	220	2.69
85-68-7	Butyl Benzyl Phthalate	220 U		220	5.82
105-60-2	Caprolactam	420 U		420	8.29
86-74-8	Carbazole	220 U		220	7.93
218-01-9	Chrysene	220 U		220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U		220	7.67
132-64-9	Dibenzofuran	220 U		220	4.11
84-66-2	**Diethylphthalate**	**4.0 J**	B,X	220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**140 J**		220	4.97
117-84-0	Di-n-Octylphthalate	220 U	UJ,C	220	4.03
206-44-0	Fluoranthene	220 U		220	3.06
86-73-7	Fluorene	220 U		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U		220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	Indeno (1,2,3-cd) Pyrene	220 U		220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	Naphthalene	220 U		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 11:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB1C**	QC Batch:	90210 -110
Sample #:	**345198**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	N-Nitroso-di-Phenylamine	220 U	220	6.18
87-86-5	Pentachlorophenol	420 U	420	5.71
85-01-8	Phenanthrene	220 U	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	Pyrene	220 U	220	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 11:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB1C**	QC Batch:	90210 -110
Sample #:	**345198**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	78
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	47	E	B,X
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	87	E	NJ,+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~930~~	~~E~~	

1/14/2004

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB3A**	QC Batch:	90210 -110
Sample #:	**345199**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	56
Unit:	ug/kg dry	Dilution Factor:	18

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	3000 U		3000	44.3
95-94-3	1,2,4,5-Tetrachloro-benzene	3000 U		3000	517
108-60-1	Bis (2-Chloroisopropyl)-Ether	3000 U		3000	23.8
95-95-4	2,4,5-Trichlorophenol	3000 U	UL,S	3000	60.1
88-06-2	2,4,6-Trichlorophenol	3000 U	UL,S	3000	47.2
120-83-2	2,4-Dichlorophenol	3000 U	UL,S	3000	63.4
105-67-9	2,4-Dimethylphenol	3000 U	UL,S	3000	143
51-28-5	2,4-Dinitrophenol	5900 U	UL,S	5900	57.6
121-14-2	2,4-Dinitrotoluene	3000 U		3000	56.7
606-20-2	2,6-Dinitrotoluene	3000 U		3000	499
91-58-7	2-Chloronaphthalene	3000 U		3000	41.4
95-57-8	2-Chlorophenol	3000 U	UL,S	3000	36.2
91-57-6	2-Methylnaphthalene	3000 U		3000	49.3
95-48-7	2-Methylphenol	3000 U	UL,S	3000	87.1
88-74-4	2-Nitroaniline	3000 U		3000	82.8
88-75-5	2-Nitrophenol	3000 U	UL,S	3000	30.6
91-94-1	3,3'-Dichlorobenzidine	3000 U	UJ,C	3000	1200
99-09-2	3-Nitroaniline	3000 U		3000	599
534-52-1	4,6-Dinitro-2-Methylphenol	3000 U	UL,S	3000	81.2
101-55-3	4-Bromophenyl Phenylether	3000 U		3000	60.8
59-50-7	4-Chloro-3-Methylphenol	3000 U	UL,S	3000	93.8
106-47-8	4-Chloroaniline	3000 U	UJ,C	3000	22.7
7005-72-3	4-Chlorophenylphenyl-Ether	3000 U		3000	58.9
106-44-5	4-Methylphenol	3000 U	UL,S	3000	115
100-01-6	4-Nitroaniline	3000 U		3000	131
100-02-7	4-Nitrophenol	5900 U	UL,S	5900	50.9
83-32-9	Acenaphthene	3000 U		3000	31.0
208-96-8	Acenaphthylene	3000 U		3000	27.0
98-86-2	Acetophenone	3000 U		3000	34.2

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB3A**	QC Batch:	90210 -110
Sample #:	**345199**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	56
Unit:	ug/kg dry	Dilution Factor:	18

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL	
120-12-7	Anthracene	3000 U	3000	83.2	
1912-24-9	Atrazine	3000 U UJ,c	3000	124	
100-52-7	Benzaldehyde	3000 U UJ,c	3000	72.9	
56-55-3	Benzo (a) Anthracene	3000 U	3000	239	
~~50-32-8~~	~~*Benzo (a) Pyrene~~	~~3000 UR~~ R,i	~~3000~~	~~103~~	see dilution
~~205-99-2~~	~~*Benzo (b) Fluoranthene~~	~~3000 UR~~ R,i	~~3000~~	~~176~~	~~1/14/04~~
~~191-24-2~~	~~*Benzo (g,h,i,) Perylene~~	~~3000 UR~~ R,i	~~3000~~	~~157~~	
~~207-08-9~~	~~*Benzo (k) Fluoranthene~~	~~3000 UR~~ R,i	~~3000~~	~~241~~	
111-91-1	Bis (2-Chloroethoxy)-Methane	3000 U	3000	56.5	
111-44-4	Bis (2-Chloroethyl) Ether	3000 U	3000	31.1	
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**1300 J** J,c	3000	37.3	
85-68-7	Butyl Benzyl Phthalate	3000 U	3000	80.6	
105-60-2	Caprolactam	5900 U	5900	115	
86-74-8	Carbazole	3000 U	3000	110	
218-01-9	Chrysene	3000 U	3000	184	
~~53-70-3~~	~~*Dibenzo (a,h) Anthracene~~	~~3000 UR~~ R,i	~~3000~~	~~106~~	see dilution
132-64-9	Dibenzofuran	3000 U	3000	56.9	~~1/14/04~~
84-66-2	Diethylphthalate	3000 U	3000	34.2	
131-11-3	Dimethylphthalate	3000 U	3000	59.6	
84-74-2	**Di-n-Butylphthalate**	**8600**	3000	68.8	
117-84-0	Di-n-Octylphthalate	3000 U UJ,c	3000	55.8	
206-44-0	**Fluoranthene**	**170 J**	3000	42.3	
86-73-7	Fluorene	3000 U	3000	30.2	
118-74-1	Hexachlorobenzene	3000 U	3000	45.2	
87-68-3	Hexachlorobutadiene	3000 U	3000	69.7	
77-47-4	Hexachlorocyclopentadiene	3000 U	3000	35.6	
67-72-1	Hexachloroethane	3000 U	3000	42.0	
~~193-39-5~~	~~*Indeno (1,2,3 cd) Pyrene~~	~~3000 UR~~ R,i	~~3000~~	~~70.6~~	see dilution
78-59-1	Isophorone	3000 U	3000	31.1	~~1/14/04~~
91-20-3	Naphthalene	3000 U	3000	49.5	
98-95-3	Nitrobenzene	3000 U	3000	57.6	

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB3A**	QC Batch:	90210 -110
Sample #:	**345199**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	56
Unit:	ug/kg dry	Dilution Factor:	18

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	3000 U		3000	59.2
86-30-6	**N-Nitroso-di-Phenylamine**	**160 J**		3000	85.5
87-86-5	Pentachlorophenol	5900 U	UL,S	5900	79.0
85-01-8	**Phenanthrene**	**110 J**		3000	41.4
108-95-2	Phenol	3000 U	UL,S	3000	71.3
129-00-0	**Pyrene**	**90 J**		3000	26.6

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB3A**	QC Batch:	90210 -110
Sample #:	**345199**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	56
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
2 (5H)-Furanone	497-23-4	72	E	NJ+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB3A**	QC Batch:	90210 -110
Sample #:	**345199DL**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	56
Unit:	ug/kg dry	Dilution Factor:	89

Use DF 10 results as 1/14/04

CAS Number	Semivolatile Organics *OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	15000 U		15000	219
95-94-3	1,2,4,5-Tetrachloro-benzene	15000 U		15000	2550
108-60-1	Bis (2-Chloroisopropyl)-Ether	15000 U		15000	117
95-95-4	2,4,5-Trichlorophenol	15000 U		15000	297
88-06-2	2,4,6-Trichlorophenol	15000 U		15000	233
120-83-2	2,4-Dichlorophenol	15000 U		15000	313
105-67-9	2,4-Dimethylphenol	15000 U		15000	707
51-28-5	2,4-Dinitrophenol	29000 U		29000	285
121-14-2	2,4-Dinitrotoluene	15000 U		15000	280
606-20-2	2,6-Dinitrotoluene	15000 U		15000	2470
91-58-7	2-Chloronaphthalene	15000 U		15000	205
95-57-8	2-Chlorophenol	15000 U		15000	179
91-57-6	2-Methylnaphthalene	15000 U		15000	244
95-48-7	2-Methylphenol	15000 U		15000	431
88-74-4	2-Nitroaniline	15000 U		15000	409
88-75-5	2-Nitrophenol	15000 U		15000	151
91-94-1	3,3'-Dichlorobenzidine	15000 U		15000	5940
99-09-2	3-Nitroaniline	15000 U		15000	2960
534-52-1	4,6-Dinitro-2-Methylphenol	15000 U		15000	401
101-55-3	4-Bromophenyl Phenylether	15000 U		15000	301
59-50-7	4-Chloro-3-Methylphenol	15000 U		15000	464
106-47-8	4-Chloroaniline	15000 U	VJC	15000	112
7005-72-3	4-Chlorophenylphenyl-Ether	15000 U		15000	291
106-44-5	4-Methylphenol	15000 U		15000	567
100-01-6	4-Nitroaniline	15000 U		15000	645
100-02-7	4-Nitrophenol	29000 U		29000	252
83-32-9	Acenaphthene	15000 U		15000	153
208-96-8	Acenaphthylene	15000 U		15000	134
98-86-2	Acetophenone	15000 U		15000	169

* See attached Statement of Data Qualifications.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB3A**	QC Batch:	90210 -110
Sample #:	**345199DL**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	56
Unit:	ug/kg dry	Dilution Factor:	89

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
120-12-7	Anthracene	15000 U	15000	411
1912-24-9	Atrazine	15000 U	15000	612
100-52-7	Benzaldehyde	15000 U UJ,C	15000	360
56-55-3	Benzo (a) Anthracene	15000 U	15000	1180
50-32-8	Benzo (a) Pyrene	15000 U	15000	508
205-99-2	Benzo (b) Fluoranthene	15000 U	15000	869
191-24-2	Benzo (g,h,i,) Perylene	15000 U	15000	776
207-08-9	Benzo (k) Fluoranthene	15000 U	15000	1190
111-91-1	Bis (2-Chloroethoxy)-Methane	15000 U	15000	279
111-44-4	Bis (2-Chloroethyl) Ether	15000 U	15000	154
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**3000 J**	15000	184
85-68-7	Butyl Benzyl Phthalate	15000 U	15000	399
105-60-2	Caprolactam	29000 U	29000	568
86-74-8	Carbazole	15000 U	15000	543
218-01-9	Chrysene	15000 U	15000	908
53-70-3	Dibenzo (a,h) Anthracene	15000 U	15000	525
132-64-9	Dibenzofuran	15000 U	15000	281
84-66-2	Diethylphthalate	15000 U	15000	169
131-11-3	Dimethylphthalate	15000 U	15000	295
84-74-2	**Di-n-Butylphthalate**	**8200 J**	15000	340
117-84-0	Di-n-Octylphthalate	15000 U	15000	276
206-44-0	Fluoranthene	15000 U	15000	209
86-73-7	Fluorene	15000 U	15000	150
118-74-1	Hexachlorobenzene	15000 U	15000	223
87-68-3	Hexachlorobutadiene	15000 U	15000	344
77-47-4	Hexachlorocyclopentadiene	15000 U	15000	176
67-72-1	Hexachloroethane	15000 U	15000	208
193-39-5	Indeno (1,2,3-cd) Pyrene	15000 U	15000	349
78-59-1	Isophorone	15000 U	15000	154
91-20-3	Naphthalene	15000 U	15000	245
98-95-3	Nitrobenzene	15000 U	15000	285

★ Use only these results, ★ 1/14/04

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB3A**	QC Batch:	90210 -110
Sample #:	**345199DL**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	56
Unit:	ug/kg dry	Dilution Factor:	89

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	15000 U	15000	293
86-30-6	N-Nitroso-di-Phenylamine	15000 U	15000	423
87-86-5	Pentachlorophenol	29000 U	29000	391
85-01-8	Phenanthrene	15000 U	15000	205
108-95-2	Phenol	15000 U	15000	352
129-00-0	Pyrene	15000 U	15000	132

Use DF 10 results
AB 1/14/2004

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB3B**	QC Batch:	90210 -110
Sample #:	**345200**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U	220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U	220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U	220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U	220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U	220	3.41
120-83-2	2,4-Dichlorophenol	220 U	220	4.58
105-67-9	2,4-Dimethylphenol	220 U	220	10.3
51-28-5	2,4-Dinitrophenol	430 U	430	4.16
121-14-2	2,4-Dinitrotoluene	220 U	220	4.10
606-20-2	2,6-Dinitrotoluene	220 U	220	36.0
91-58-7	2-Chloronaphthalene	220 U	220	2.99
95-57-8	2-Chlorophenol	220 U	220	2.61
91-57-6	2-Methylnaphthalene	220 U	220	3.56
95-48-7	2-Methylphenol	220 U	220	6.29
88-74-4	2-Nitroaniline	220 U	220	5.98
88-75-5	2-Nitrophenol	220 U	220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U	220	86.7
99-09-2	3-Nitroaniline	220 U	220	43.3
534-52-1	4,6-Dinitro-2-Methylphenol	220 U	220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U	220	4.39
59-50-7	4-Chloro-3-Methylphenol	220 U	220	6.77
106-47-8	4-Chloroaniline	220 U	220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U	220	4.25
106-44-5	4-Methylphenol	220 U	220	8.28
100-01-6	4-Nitroaniline	220 U	220	9.43
100-02-7	4-Nitrophenol	430 U	430	3.68
83-32-9	Acenaphthene	220 U	220	2.24
208-96-8	Acenaphthylene	220 U	220	1.95
98-86-2	Acetophenone	220 U	220	2.47

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB3B**	QC Batch:	90210 -110
Sample #:	**345200**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL	
120-12-7	Anthracene	220 U		220	6.01	
1912-24-9	Atrazine	220 U		220	8.94	
100-52-7	Benzaldehyde	220 U	UJc	220	5.27	
56-55-3	Benzo (a) Anthracene	220 U		220	17.3	
~~50-32-8~~	~~*Benzo (a) Pyrene~~	~~220 UR~~	~~Rj~~	~~220~~	~~7.42~~	See Dilution
~~205-99-2~~	~~*Benzo (b) Fluoranthene~~	~~220 UR~~	~~Rj~~	~~220~~	~~12.7~~	
~~191-24-2~~	~~*Benzo (g,h,i,) Perylene~~	~~220 UR~~	~~Rj~~	~~220~~	~~11.3~~	~~1/14/04~~
~~207-08-9~~	~~*Benzo (k) Fluoranthene~~	~~220 UR~~	~~Rj~~	~~220~~	~~17.4~~	
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08	
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25	
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**98 J**		170	2.69	
85-68-7	Butyl Benzyl Phthalate	220 U		220	5.82	
105-60-2	Caprolactam	430 U		430	8.29	
86-74-8	Carbazole	220 U		220	7.93	
218-01-9	Chrysene	220 U		220	13.3	
~~53-70-3~~	~~*Dibenzo (a,h) Anthracene~~	~~220 UR~~	~~Rj~~	~~220~~	~~7.67~~	See dilution ~~1/14/04~~
132-64-9	Dibenzofuran	220 U		220	4.11	
84-66-2	**Diethylphthalate**	**5.0 J**	B,X	220	2.47	
131-11-3	Dimethylphthalate	220 U		220	4.30	
84-74-2	**Di-n-Butylphthalate**	**500**		220	4.97	
117-84-0	Di-n-Octylphthalate	220 U		220	4.03	
206-44-0	**Fluoranthene**	**9.0 J**		220	3.06	
86-73-7	Fluorene	220 U		220	2.18	
118-74-1	Hexachlorobenzene	220 U		220	3.26	
87-68-3	Hexachlorobutadiene	220 U		220	5.03	
77-47-4	Hexachlorocyclopentadiene	220 U		220	2.57	
67-72-1	Hexachloroethane	220 U		220	3.03	
~~193-39-5~~	~~*Indeno (1,2,3-cd) Pyrene~~	~~220 UR~~	~~Rj~~	~~220~~	~~5.10~~	See dilution ~~1/14/04~~
78-59-1	Isophorone	220 U		220	2.25	
91-20-3	Naphthalene	220 U		220	3.58	
98-95-3	Nitrobenzene	220 U		220	4.16	

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB3B**	QC Batch:	90210 -110
Sample #:	**345200**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	**N-Nitroso-di-Phenylamine**	**17 J**	220	6.18
87-86-5	Pentachlorophenol	430 U	430	5.71
85-01-8	**Phenanthrene**	**7.0 J**	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	**Pyrene**	**5.0 J**	220	1.92

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB3B**	QC Batch:	90210 -110
Sample #:	**345200**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	76
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	47	E B, X
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~690~~	~~E~~

1/14/2003

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB3B**	QC Batch:	90210 -110
Sample #:	**345200DL**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	6.6

See straight run 1/14/04

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	1100 U		1100	16.2
95-94-3	1,2,4,5-Tetrachloro-benzene	1100 U		1100	189
108-60-1	Bis (2-Chloroisopropyl)-Ether	1100 U		1100	8.71
95-95-4	2,4,5-Trichlorophenol	1100 U		1100	22.0
88-06-2	2,4,6-Trichlorophenol	1100 U		1100	17.3
120-83-2	2,4-Dichlorophenol	1100 U		1100	23.2
105-67-9	2,4-Dimethylphenol	1100 U		1100	52.4
51-28-5	2,4-Dinitrophenol	2200 U		2200	21.1
121-14-2	2,4-Dinitrotoluene	1100 U		1100	20.8
606-20-2	2,6-Dinitrotoluene	1100 U		1100	183
91-58-7	2-Chloronaphthalene	1100 U		1100	15.2
95-57-8	2-Chlorophenol	1100 U		1100	13.3
91-57-6	2-Methylnaphthalene	1100 U		1100	18.1
95-48-7	2-Methylphenol	1100 U		1100	31.9
88-74-4	2-Nitroaniline	1100 U		1100	30.4
88-75-5	2-Nitrophenol	1100 U		1100	11.2
91-94-1	3,3'-Dichlorobenzidine	1100 U		1100	440
99-09-2	3-Nitroaniline	1100 U		1100	220
534-52-1	4,6-Dinitro-2-Methylphenol	1100 U		1100	29.8
101-55-3	4-Bromophenyl Phenylether	1100 U		1100	22.3
59-50-7	4-Chloro-3-Methylphenol	1100 U		1100	34.4
106-47-8	4-Chloroaniline	1100 U	VJ,c	1100	8.32
7005-72-3	4-Chlorophenylphenyl-Ether	1100 U		1100	21.6
106-44-5	4-Methylphenol	1100 U		1100	42.0
100-01-6	4-Nitroaniline	1100 U		1100	47.9
100-02-7	4-Nitrophenol	2200 U		2200	18.7
83-32-9	Acenaphthene	1100 U		1100	11.4
208-96-8	Acenaphthylene	1100 U		1100	9.90
98-86-2	Acetophenone	1100 U		1100	12.5

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB3B**	QC Batch:	90210 -110
Sample #:	**345200DL**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	6.6

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
120-12-7	Anthracene	1100 U	1100	30.5
1912-24-9	Atrazine	1100 U	1100	45.4
100-52-7	Benzaldehyde	1100 U UJ,C	1100	26.7
56-55-3	Benzo (a) Anthracene	1100 U	1100	87.8
50-32-8	Benzo (a) Pyrene	1100 U	1100	37.7
205-99-2	Benzo (b) Fluoranthene	1100 U	1100	64.4
191-24-2	Benzo (g,h,i,) Perylene	1100 U	1100	57.6
207-08-9	Benzo (k) Fluoranthene	1100 U	1100	88.4
111-91-1	Bis (2-Chloroethoxy)-Methane	1100 U	1100	20.7
111-44-4	Bis (2-Chloroethyl) Ether	1100 U	1100	11.4
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**220 J**	1100	13.7
85-68-7	Butyl Benzyl Phthalate	1100 U	1100	29.6
105-60-2	Caprolactam	2200 U	2200	42.1
86-74-8	Carbazole	1100 U	1100	40.3
218-01-9	Chrysene	1100 U	1100	67.3
53-70-3	Dibenzo (a,h) Anthracene	1100 U	1100	38.9
132-64-9	Dibenzofuran	1100 U	1100	20.9
84-66-2	Diethylphthalate	1100 U	1100	12.5
131-11-3	Dimethylphthalate	1100 U	1100	21.8
84-74-2	**Di-n-Butylphthalate**	**430 J**	1100	25.2
117-84-0	Di-n-Octylphthalate	1100 U	1100	20.5
206-44-0	Fluoranthene	1100 U	1100	15.5
86-73-7	Fluorene	1100 U	1100	11.1
118-74-1	Hexachlorobenzene	1100 U	1100	16.6
87-68-3	Hexachlorobutadiene	1100 U	1100	25.5
77-47-4	Hexachlorocyclopentadiene	1100 U	1100	13.1
67-72-1	Hexachloroethane	1100 U	1100	15.4
193-39-5	Indeno (1,2,3-cd) Pyrene	1100 U	1100	25.9
78-59-1	Isophorone	1100 U	1100	11.4
91-20-3	Naphthalene	1100 U	1100	18.2
98-95-3	Nitrobenzene	1100 U	1100	21.1

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB3B**	QC Batch:	90210 -110
Sample #:	**345200DL**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	6.6

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	1100 U	1100	21.7
86-30-6	N-Nitroso-di-Phenylamine	1100 U	1100	31.4
87-86-5	Pentachlorophenol	2200 U	2200	29.0
85-01-8	Phenanthrene	1100 U	1100	15.2
108-95-2	Phenol	1100 U	1100	26.1
129-00-0	Pyrene	1100 U	1100	9.77

use straight analysis
1/14/04

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB3C**	QC Batch:	90210 -110
Sample #:	**345201**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	210 U	210	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	210 U	210	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	210 U	210	1.58
95-95-4	2,4,5-Trichlorophenol	210 U	210	4.01
88-06-2	2,4,6-Trichlorophenol	210 U	210	3.14
120-83-2	2,4-Dichlorophenol	210 U	210	4.22
105-67-9	2,4-Dimethylphenol	210 U	210	9.53
51-28-5	2,4-Dinitrophenol	410 U	410	3.84
121-14-2	2,4-Dinitrotoluene	210 U	210	3.78
606-20-2	2,6-Dinitrotoluene	210 U	210	33.2
91-58-7	2-Chloronaphthalene	210 U	210	2.76
95-57-8	2-Chlorophenol	210 U	210	2.41
91-57-6	2-Methylnaphthalene	210 U	210	3.29
95-48-7	2-Methylphenol	210 U	210	5.81
88-74-4	2-Nitroaniline	210 U	210	5.52
88-75-5	2-Nitrophenol	210 U	210	2.04
91-94-1	3,3'-Dichlorobenzidine	210 U	210	80.0
99-09-2	3-Nitroaniline	210 U	210	40.0
534-52-1	4,6-Dinitro-2-Methylphenol	210 U	210	5.41
101-55-3	4-Bromophenyl Phenylether	210 U	210	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**17 J** B,X	210	6.25
106-47-8	4-Chloroaniline	210 U	210	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	210 U	210	3.92
106-44-5	4-Methylphenol	210 U	210	7.64
100-01-6	4-Nitroaniline	210 U	210	8.70
100-02-7	4-Nitrophenol	410 U	410	3.40
83-32-9	Acenaphthene	210 U	210	2.06
208-96-8	Acenaphthylene	210 U	210	1.80
98-86-2	Acetophenone	210 U	210	2.28

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB3C**	QC Batch:	90210 -110
Sample #:	**345201**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	210 U		210	5.54
1912-24-9	Atrazine	210 U		210	8.26
100-52-7	Benzaldehyde	210 U	UJ,C	210	4.86
56-55-3	Benzo (a) Anthracene	210 U		210	16.0
50-32-8	Benzo (a) Pyrene	210 U		210	6.85
205-99-2	Benzo (b) Fluoranthene	210 U		210	11.7
191-24-2	Benzo (g,h,i,) Perylene	210 U		210	10.5
207-08-9	Benzo (k) Fluoranthene	210 U		210	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	210 U		210	3.77
111-44-4	Bis (2-Chloroethyl) Ether	210 U		210	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**53 J**		210	2.48
85-68-7	**Butyl Benzyl Phthalate**	**41 J**	B,X	210	5.38
105-60-2	**Caprolactam**	**130 J**		410	7.66
86-74-8	Carbazole	210 U		210	7.32
218-01-9	Chrysene	210 U		210	12.2
53-70-3	Dibenzo (a,h) Anthracene	210 U		210	7.08
132-64-9	Dibenzofuran	210 U		210	3.79
84-66-2	**Diethylphthalate**	**4.0 J**	B,X	210	2.28
131-11-3	Dimethylphthalate	210 U		210	3.97
84-74-2	**Di-n-Butylphthalate**	**66 J**		210	4.58
117-84-0	Di-n-Octylphthalate	210 U		210	3.72
206-44-0	Fluoranthene	210 U		210	2.82
86-73-7	Fluorene	210 U		210	2.02
118-74-1	Hexachlorobenzene	210 U		210	3.01
87-68-3	Hexachlorobutadiene	210 U		210	4.64
77-47-4	Hexachlorocyclopentadiene	210 U		210	2.38
67-72-1	Hexachloroethane	210 U		210	2.80
193-39-5	Indeno (1,2,3-cd) Pyrene	210 U		210	4.70
78-59-1	Isophorone	210 U		210	2.08
91-20-3	Naphthalene	210 U		210	3.30
98-95-3	Nitrobenzene	210 U		210	3.84

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB3C**	QC Batch:	90210 -110
Sample #:	**345201**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	210 U	210	3.95
86-30-6	N-Nitroso-di-Phenylamine	210 U	210	5.70
87-86-5	Pentachlorophenol	410 U	410	5.27
85-01-8	Phenanthrene	210 U	210	2.76
108-95-2	Phenol	210 U	210	4.75
129-00-0	Pyrene	210 U	210	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB3C**	QC Batch:	90210 -110
Sample #:	**345201**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	80
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
.beta.-Sesquiphellan-drene	1000122102 (10012?2-10-2)	24	E	NJ,+
1,2-Benzenedicarboxylic acid, butyl 2-methylpropyl ester	17851-53-5	53	E	NJ,+
Erucylamide	112-84-5	570	E	B,X
Ethanol, 2-(hexadecyloxy)-	2136-71-2	53	E	NJ,+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~83~~	~~E~~	* 1/14/2004
Stearic Acid	57-11-4	120	E	B,X

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 13:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB2A**	QC Batch:	90482 -114
Sample #:	**345408**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U		220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U		220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U		220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U		220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U		220	3.41
120-83-2	2,4-Dichlorophenol	220 U		220	4.58
105-67-9	2,4-Dimethylphenol	220 U		220	10.3
51-28-5	2,4-Dinitrophenol	430 U		430	4.16
121-14-2	2,4-Dinitrotoluene	220 U		220	4.10
606-20-2	2,6-Dinitrotoluene	220 U		220	36.0
91-58-7	2-Chloronaphthalene	220 U		220	2.99
95-57-8	2-Chlorophenol	220 U		220	2.61
91-57-6	2-Methylnaphthalene	220 U		220	3.56
95-48-7	2-Methylphenol	220 U		220	6.29
88-74-4	2-Nitroaniline	220 U		220	5.98
88-75-5	2-Nitrophenol	220 U		220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U		220	86.7
99-09-2	3-Nitroaniline	220 U		220	43.3
534-52-1	4,6-Dinitro-2-Methylphenol	220 U		220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U		220	4.39
59-50-7	**4-Chloro-3-Methylphenol**	**9.0 J**	B,X	220	6.77
106-47-8	4-Chloroaniline	220 U	U5,c	220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U		220	4.25
106-44-5	4-Methylphenol	220 U		220	8.28
100-01-6	4-Nitroaniline	220 U		220	9.43
100-02-7	4-Nitrophenol	430 U		430	3.68
83-32-9	Acenaphthene	220 U		220	2.24
208-96-8	Acenaphthylene	220 U		220	1.95
98-86-2	Acetophenone	220 U		220	2.47

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 13:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB2A**	QC Batch:	90482 -114
Sample #:	**345408**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	220 U		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U	UJ,c	220	5.27
56-55-3	Benzo (a) Anthracene	220 U		220	17.3
50-32-8	**Benzo (a) Pyrene**	**25 J**		220	7.42
205-99-2	**Benzo (b) Fluoranthene**	**45 J**	J,l	220	12.7
191-24-2	Benzo (g,h,i,) Perylene	220 U		220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**54 J**	B,z	220	2.69
85-68-7	**Butyl Benzyl Phthalate**	**42 J**	B,x	220	5.82
105-60-2	Caprolactam	430 U		430	8.29
86-74-8	Carbazole	220 U		220	7.93
218-01-9	Chrysene	220 U		220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U		220	7.67
132-64-9	Dibenzofuran	220 U		220	4.11
84-66-2	**Diethylphthalate**	**4.0 J**	B,x	220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**29 J**	B,z	220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	**Fluoranthene**	**14 J**		220	3.06
86-73-7	Fluorene	220 U		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U		220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**36 J**	J,l	220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	Naphthalene	220 U		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 13:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB2A**	QC Batch:	90482 -114
Sample #:	**345408**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	N-Nitroso-di-Phenylamine	220 U	220	6.18
87-86-5	Pentachlorophenol	430 U	430	5.71
85-01-8	**Phenanthrene**	**6.0 J**	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	**Pyrene**	**12 J**	220	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 13:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB2A**	QC Batch:	90482 -114
Sample #:	**345408**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	78
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	590	E	B, X
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	44	E	B, X
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~400~~	~~E~~	A, 1/14/2004

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 13:30
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB2B**	QC Batch:	90210 -110
Sample #:	**345409**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	240 U	240	3.44
95-94-3	1,2,4,5-Tetrachloro-benzene	240 U	240	40.2
108-60-1	Bis (2-Chloroisopropyl)-Ether	240 U	240	1.85
95-95-4	2,4,5-Trichlorophenol	240 U	240	4.68
88-06-2	2,4,6-Trichlorophenol	240 U	240	3.67
120-83-2	2,4-Dichlorophenol	240 U	240	4.93
105-67-9	2,4-Dimethylphenol	240 U	240	11.1
51-28-5	2,4-Dinitrophenol	460 U	460	4.48
121-14-2	2,4-Dinitrotoluene	240 U	240	4.41
606-20-2	2,6-Dinitrotoluene	240 U	240	38.8
91-58-7	2-Chloronaphthalene	240 U	240	3.22
95-57-8	2-Chlorophenol	240 U	240	2.81
91-57-6	2-Methylnaphthalene	240 U	240	3.84
95-48-7	2-Methylphenol	240 U	240	6.78
88-74-4	2-Nitroaniline	240 U	240	6.44
88-75-5	2-Nitrophenol	240 U	240	2.38
91-94-1	3,3'-Dichlorobenzidine	240 U	240	93.4
99-09-2	3-Nitroaniline	240 U	240	46.6
534-52-1	4,6-Dinitro-2-Methylphenol	240 U	240	6.31
101-55-3	4-Bromophenyl Phenylether	240 U	240	4.73
59-50-7	**4-Chloro-3-Methylphenol**	**26 J** B,X	240	7.29
106-47-8	4-Chloroaniline	240 U	240	1.76
7005-72-3	4-Chlorophenylphenyl-Ether	240 U	240	4.58
106-44-5	4-Methylphenol	240 U	240	8.92
100-01-6	4-Nitroaniline	240 U	240	10.2
100-02-7	4-Nitrophenol	460 U	460	3.96
83-32-9	Acenaphthene	240 U	240	2.41
208-96-8	Acenaphthylene	240 U	240	2.10
98-86-2	Acetophenone	240 U	240	2.66

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 13:30
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB2B**	QC Batch:	90210 -110
Sample #:	**345409**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	240 U		240	6.47
1912-24-9	Atrazine	240 U		240	9.63
100-52-7	Benzaldehyde	240 U	U,c	240	5.67
56-55-3	Benzo (a) Anthracene	240 U		240	18.6
50-32-8	Benzo (a) Pyrene	240 U		240	7.99
205-99-2	Benzo (b) Fluoranthene	240 U		240	13.7
191-24-2	Benzo (g,h,i,) Perylene	240 U		240	12.2
207-08-9	Benzo (k) Fluoranthene	240 U		240	18.8
111-91-1	Bis (2-Chloroethoxy)-Methane	240 U		240	4.40
111-44-4	Bis (2-Chloroethyl) Ether	240 U		240	2.42
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**50 J**		240	2.90
85-68-7	Butyl Benzyl Phthalate	240 U		240	6.27
105-60-2	**Caprolactam**	**90 J**		460	8.93
86-74-8	Carbazole	240 U		240	8.54
218-01-9	Chrysene	240 U		240	14.3
53-70-3	Dibenzo (a,h) Anthracene	240 U		240	8.26
132-64-9	Dibenzofuran	240 U		240	4.42
84-66-2	**Diethylphthalate**	**5.0 J**	B,x	240	2.66
131-11-3	Dimethylphthalate	240 U		240	4.63
84-74-2	**Di-n-Butylphthalate**	**5.6 J**		240	5.35
117-84-0	Di-n-Octylphthalate	240 U		240	4.34
206-44-0	Fluoranthene	240 U		240	3.29
86-73-7	Fluorene	240 U		240	2.35
118-74-1	Hexachlorobenzene	240 U		240	3.51
87-68-3	Hexachlorobutadiene	240 U		240	5.42
77-47-4	Hexachlorocyclopentadiene	240 U		240	2.77
67-72-1	Hexachloroethane	240 U		240	3.27
193-39-5	Indeno (1,2,3-cd) Pyrene	240 U		240	5.49
78-59-1	Isophorone	240 U		240	2.42
91-20-3	Naphthalene	240 U		240	3.85
98-95-3	Nitrobenzene	240 U		240	4.48

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 13:30
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB2B**	QC Batch:	90210 -110
Sample #:	**345409**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	240 U	240	4.61
86-30-6	N-Nitroso-di-Phenylamine	240 U	240	6.65
87-86-5	Pentachlorophenol	460 U	460	6.15
85-01-8	Phenanthrene	240 U	240	3.22
108-95-2	Phenol	240 U	240	5.54
129-00-0	Pyrene	240 U	240	2.07

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 13:30
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB2B**	QC Batch:	90210 -110
Sample #:	**345409**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	73
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	260	E	B,x
1,2-Benzenedicarboxylic acid, butyl 2-methylpropyl ester	17851-53-5	85	E	NJ,+
2-Ethyl-1-Hexanol	104-76-7	27	E	NJ,+
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,9-diene-2,8	1000143924 (100014-39-24)	32	E	NJ,+
Erucylamide	112-84-5	850	E	B,x
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~260~~	~~E~~	1/14/2004

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 13:45
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB2C**	QC Batch:	90210 -110
Sample #:	**345410**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	240 U		240	3.44
95-94-3	1,2,4,5-Tetrachloro-benzene	240 U		240	40.2
108-60-1	Bis (2-Chloroisopropyl)-Ether	240 U		240	1.85
95-95-4	2,4,5-Trichlorophenol	240 U		240	4.68
88-06-2	2,4,6-Trichlorophenol	240 U		240	3.67
120-83-2	2,4-Dichlorophenol	240 U		240	4.93
105-67-9	2,4-Dimethylphenol	240 U		240	11.1
51-28-5	2,4-Dinitrophenol	460 U		460	4.48
121-14-2	2,4-Dinitrotoluene	240 U		240	4.41
606-20-2	2,6-Dinitrotoluene	240 U		240	38.8
91-58-7	2-Chloronaphthalene	240 U		240	3.22
95-57-8	2-Chlorophenol	240 U		240	2.81
91-57-6	2-Methylnaphthalene	240 U		240	3.84
95-48-7	2-Methylphenol	240 U		240	6.78
88-74-4	2-Nitroaniline	240 U		240	6.44
88-75-5	2-Nitrophenol	240 U		240	2.38
91-94-1	3,3'-Dichlorobenzidine	240 U		240	93.4
99-09-2	3-Nitroaniline	240 U		240	46.6
534-52-1	4,6-Dinitro-2-Methylphenol	240 U		240	6.31
101-55-3	4-Bromophenyl Phenylether	240 U		240	4.73
59-50-7	**4-Chloro-3-Methylphenol**	**19 J**	B,X	240	7.29
106-47-8	4-Chloroaniline	240 U		240	1.76
7005-72-3	4-Chlorophenylphenyl-Ether	240 U		240	4.58
106-44-5	4-Methylphenol	240 U		240	8.92
100-01-6	4-Nitroaniline	240 U		240	10.2
100-02-7	4-Nitrophenol	460 U		460	3.96
83-32-9	Acenaphthene	240 U		240	2.41
208-96-8	Acenaphthylene	240 U		240	2.10
98-86-2	Acetophenone	240 U		240	2.66

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 13:45
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/07/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/17/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**68SB2C**	QC Batch:	90210 -110
Sample #:	**345410**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	240 U		240	6.47
1912-24-9	Atrazine	240 U		240	9.63
100-52-7	Benzaldehyde	240 U	VJC	240	5.67
56-55-3	Benzo (a) Anthracene	240 U		240	18.6
50-32-8	Benzo (a) Pyrene	240 U		240	7.99
205-99-2	Benzo (b) Fluoranthene	240 U		240	13.7
191-24-2	Benzo (g,h,i,) Perylene	240 U		240	12.2
207-08-9	Benzo (k) Fluoranthene	240 U		240	18.8
111-91-1	Bis (2-Chloroethoxy)-Methane	240 U		240	4.40
111-44-4	Bis (2-Chloroethyl) Ether	240 U		240	2.42
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**55 J**		240	2.90
85-68-7	Butyl Benzyl Phthalate	240 U		240	6.27
105-60-2	Caprolactam	460 U		460	8.93
86-74-8	Carbazole	240 U		240	8.54
218-01-9	Chrysene	240 U		240	14.3
53-70-3	Dibenzo (a,h) Anthracene	240 U		240	8.26
132-64-9	Dibenzofuran	240 U		240	4.42
84-66-2	**Diethylphthalate**	**4.0 J**	B/X	240	2.66
131-11-3	Dimethylphthalate	240 U		240	4.63
84-74-2	**Di-n-Butylphthalate**	**55 J**		240	5.35
117-84-0	Di-n-Octylphthalate	240 U		240	4.34
206-44-0	Fluoranthene	240 U		240	3.29
86-73-7	Fluorene	240 U		240	2.35
118-74-1	Hexachlorobenzene	240 U		240	3.51
87-68-3	Hexachlorobutadiene	240 U		240	5.42
77-47-4	Hexachlorocyclopentadiene	240 U		240	2.77
67-72-1	Hexachloroethane	240 U		240	3.27
193-39-5	Indeno (1,2,3-cd) Pyrene	240 U		240	5.49
78-59-1	Isophorone	240 U		240	2.42
91-20-3	Naphthalene	240 U		240	3.85
98-95-3	Nitrobenzene	240 U		240	4.48

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 13:45
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB2C**	QC Batch:	90210 -110
Sample #:	**345410**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	240 U	240	4.61
86-30-6	N-Nitroso-di-Phenylamine	240 U	240	6.65
87-86-5	Pentachlorophenol	460 U	460	6.15
85-01-8	Phenanthrene	240 U	240	3.22
108-95-2	Phenol	240 U	240	5.54
129-00-0	Pyrene	240 U	240	2.07

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 13:45
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB2C**	QC Batch:	90210 -110
Sample #:	**345410**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	71
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	100	E	B,X
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	120	E	NJ,+
Erucylamide	112-84-5	820	E	B,X
Ethanol, 2-(hexadecyloxy)-	2136-71-2	70	E	NJ,+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~40~~	~~E~~	~~h, 1/14/04~~

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD5**	QC Batch:	90210 -110
Sample #:	**345411**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U	220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U	220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U	220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U	220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U	220	3.41
120-83-2	2,4-Dichlorophenol	220 U	220	4.58
105-67-9	2,4-Dimethylphenol	220 U	220	10.3
51-28-5	2,4-Dinitrophenol	460 U	460	4.16
121-14-2	2,4-Dinitrotoluene	220 U	220	4.10
606-20-2	2,6-Dinitrotoluene	220 U	220	36.0
91-58-7	2-Chloronaphthalene	220 U	220	2.99
95-57-8	2-Chlorophenol	220 U	220	2.61
91-57-6	2-Methylnaphthalene	220 U	220	3.56
95-48-7	2-Methylphenol	220 U	220	6.29
88-74-4	2-Nitroaniline	220 U	220	5.98
88-75-5	2-Nitrophenol	220 U	220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U	220	86.7
99-09-2	3-Nitroaniline	220 U	220	43.3
534-52-1	4,6-Dinitro-2-Methylphenol	220 U	220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U	220	4.39
59-50-7	4-Chloro-3-Methylphenol	220 U	220	6.77
106-47-8	4-Chloroaniline	220 U	220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U	220	4.25
106-44-5	4-Methylphenol	220 U	220	8.28
100-01-6	4-Nitroaniline	220 U	220	9.43
100-02-7	4-Nitrophenol	460 U	460	3.68
83-32-9	Acenaphthene	220 U	220	2.24
208-96-8	Acenaphthylene	220 U	220	1.95
98-86-2	Acetophenone	220 U	220	2.47

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD5**	QC Batch:	90210 -110
Sample #:	**345411**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	220 U		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U	U5,C	220	5.27
56-55-3	Benzo (a) Anthracene	220 U		220	17.3
50-32-8	Benzo (a) Pyrene	220 U		220	7.42
205-99-2	Benzo (b) Fluoranthene	220 U		220	12.7
191-24-2	Benzo (g,h,i,) Perylene	220 U		220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**100 J**		220	2.69
85-68-7	Butyl Benzyl Phthalate	220 U		220	5.82
105-60-2	Caprolactam	460 U		460	8.29
86-74-8	Carbazole	220 U		220	7.93
218-01-9	Chrysene	220 U		220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U		220	7.67
132-64-9	Dibenzofuran	220 U		220	4.11
84-66-2	**Diethylphthalate**	**6.0 J**	B,X	220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**100 J**		220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	Fluoranthene	220 U		220	3.06
86-73-7	Fluorene	220 U		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U		220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	Indeno (1,2,3-cd) Pyrene	220 U		220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	Naphthalene	220 U		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD5**	QC Batch:	90210 -110
Sample #:	**345411**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	N-Nitroso-di-Phenylamine	220 U	220	6.18
87-86-5	Pentachlorophenol	460 U	460	5.71
85-01-8	Phenanthrene	220 U	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	Pyrene	220 U	220	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD5**	QC Batch:	90210 -110
Sample #:	**345411**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	76
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	540	E	B,X
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	90	E	B,X
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	82	E	NJ,+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~40~~	~~E~~	

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB1A**	QC Batch:	90210 -110
Sample #:	**345412**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U		220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U		220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U		220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U		220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U		220	3.41
120-83-2	2,4-Dichlorophenol	220 U		220	4.58
105-67-9	2,4-Dimethylphenol	220 U		220	10.3
51-28-5	2,4-Dinitrophenol	460 U		460	4.16
121-14-2	2,4-Dinitrotoluene	220 U		220	4.10
606-20-2	2,6-Dinitrotoluene	220 U		220	36.0
91-58-7	2-Chloronaphthalene	220 U		220	2.99
95-57-8	2-Chlorophenol	220 U		220	2.61
91-57-6	2-Methylnaphthalene	220 U		220	3.56
95-48-7	2-Methylphenol	220 U		220	6.29
88-74-4	2-Nitroaniline	220 U		220	5.98
88-75-5	2-Nitrophenol	220 U		220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U		220	86.7
99-09-2	3-Nitroaniline	220 U		220	43.3
534-52-1	4,6-Dinitro-2-Methylphenol	220 U		220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U		220	4.39
59-50-7	**4-Chloro-3-Methylphenol**	**19 J**	B,X	220	6.77
106-47-8	4-Chloroaniline	220 U		220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U		220	4.25
106-44-5	4-Methylphenol	220 U		220	8.28
100-01-6	4-Nitroaniline	220 U		220	9.43
100-02-7	4-Nitrophenol	460 U		460	3.68
83-32-9	Acenaphthene	220 U		220	2.24
208-96-8	Acenaphthylene	220 U		220	1.95
98-86-2	Acetophenone	220 U		220	2.47

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB1A**	QC Batch:	90210 -110
Sample #:	**345412**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	220 U		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U	UJc	220	5.27
56-55-3	Benzo (a) Anthracene	220 U		220	17.3
50-32-8	Benzo (a) Pyrene	220 U		220	7.42
205-99-2	Benzo (b) Fluoranthene	220 U		220	12.7
191-24-2	Benzo (g,h,i,) Perylene	220 U		220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**54 J**		220	2.69
85-68-7	**Butyl Benzyl Phthalate**	**41 J**	B,X	220	5.82
105-60-2	Caprolactam	460 U		460	8.29
86-74-8	Carbazole	220 U		220	7.93
218-01-9	Chrysene	220 U		220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U		220	7.67
132-64-9	Dibenzofuran	220 U		220	4.11
84-66-2	**Diethylphthalate**	**4.0 J**	B,X	220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**110 J**		220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	Fluoranthene	220 U		220	3.06
86-73-7	Fluorene	220 U		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U		220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	Indeno (1,2,3-cd) Pyrene	220 U		220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	Naphthalene	220 U		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB1A**	QC Batch:	90210 -110
Sample #:	**345412**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	N-Nitroso-di-Phenylamine	220 U	220	6.18
87-86-5	Pentachlorophenol	460 U	460	5.71
85-01-8	Phenanthrene	220 U	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	Pyrene	220 U	220	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB1A**	QC Batch:	90210 -110
Sample #:	**345412**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	78
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	780	E	B,X
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	23	E	B,X
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	110	E	NJ,+
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,9-diene-2,8	1000143924	23	E	NJ,+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~790~~	~~E~~	

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB1B**	QC Batch:	90210 -110
Sample #:	**345413**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	72
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	240 U		240	3.44
95-94-3	1,2,4,5-Tetrachloro-benzene	240 U		240	40.2
108-60-1	Bis (2-Chloroisopropyl)-Ether	240 U		240	1.85
95-95-4	2,4,5-Trichlorophenol	240 U		240	4.68
88-06-2	2,4,6-Trichlorophenol	240 U		240	3.67
120-83-2	2,4-Dichlorophenol	240 U		240	4.93
105-67-9	2,4-Dimethylphenol	240 U		240	11.1
51-28-5	2,4-Dinitrophenol	460 U		460	4.48
121-14-2	2,4-Dinitrotoluene	240 U		240	4.41
606-20-2	2,6-Dinitrotoluene	240 U		240	38.8
91-58-7	2-Chloronaphthalene	240 U		240	3.22
95-57-8	2-Chlorophenol	240 U		240	2.81
91-57-6	2-Methylnaphthalene	240 U		240	3.84
95-48-7	2-Methylphenol	240 U		240	6.78
88-74-4	2-Nitroaniline	240 U		240	6.44
88-75-5	2-Nitrophenol	240 U		240	2.38
91-94-1	3,3'-Dichlorobenzidine	240 U		240	93.4
99-09-2	3-Nitroaniline	240 U		240	46.6
534-52-1	4,6-Dinitro-2-Methylphenol	240 U		240	6.31
101-55-3	4-Bromophenyl Phenylether	240 U		240	4.73
59-50-7	**4-Chloro-3-Methylphenol**	**22 J**	B,X	240	7.29
106-47-8	4-Chloroaniline	240 U		240	1.76
7005-72-3	4-Chlorophenylphenyl-Ether	240 U		240	4.58
106-44-5	4-Methylphenol	240 U		240	8.92
100-01-6	4-Nitroaniline	240 U		240	10.2
100-02-7	4-Nitrophenol	460 U		460	3.96
83-32-9	Acenaphthene	240 U		240	2.41
208-96-8	Acenaphthylene	240 U		240	2.10
98-86-2	Acetophenone	240 U		240	2.66

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB1B**	QC Batch:	90210 -110
Sample #:	**345413**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	72
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	240 U		240	6.47
1912-24-9	Atrazine	240 U		240	9.63
100-52-7	Benzaldehyde	240 U	UJ,c	240	5.67
56-55-3	Benzo (a) Anthracene	240 U		240	18.6
50-32-8	Benzo (a) Pyrene	240 U		240	7.99
205-99-2	Benzo (b) Fluoranthene	240 U		240	13.7
191-24-2	Benzo (g,h,i,) Perylene	240 U		240	12.2
207-08-9	Benzo (k) Fluoranthene	240 U		240	18.8
111-91-1	Bis (2-Chloroethoxy)-Methane	240 U		240	4.40
111-44-4	Bis (2-Chloroethyl) Ether	240 U		240	2.42
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**53 J**		240	2.90
85-68-7	**Butyl Benzyl Phthalate**	**46 J**	B,X	240	6.27
105-60-2	Caprolactam	460 U		460	8.93
86-74-8	Carbazole	240 U		240	8.54
218-01-9	Chrysene	240 U		240	14.3
53-70-3	Dibenzo (a,h) Anthracene	240 U		240	8.26
132-64-9	Dibenzofuran	240 U		240	4.42
84-66-2	**Diethylphthalate**	**4.0 J**	B,X	240	2.66
131-11-3	Dimethylphthalate	240 U		240	4.63
84-74-2	**Di-n-Butylphthalate**	**75 J**		240	5.35
117-84-0	Di-n-Octylphthalate	240 U		240	4.34
206-44-0	**Fluoranthene**	**4.0 J**		240	3.29
86-73-7	Fluorene	240 U		240	2.35
118-74-1	Hexachlorobenzene	240 U		240	3.51
87-68-3	Hexachlorobutadiene	240 U		240	5.42
77-47-4	Hexachlorocyclopentadiene	240 U		240	2.77
67-72-1	Hexachloroethane	240 U		240	3.27
193-39-5	Indeno (1,2,3-cd) Pyrene	240 U		240	5.49
78-59-1	Isophorone	240 U		240	2.42
91-20-3	Naphthalene	240 U		240	3.85
98-95-3	Nitrobenzene	240 U		240	4.48

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB1B**	QC Batch:	90210 -110
Sample #:	**345413**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	72
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	240 U	240	4.61
86-30-6	N-Nitroso-di-Phenylamine	240 U	240	6.65
87-86-5	Pentachlorophenol	460 U	460	6.15
85-01-8	Phenanthrene	240 U	240	3.22
108-95-2	Phenol	240 U	240	5.54
129-00-0	Pyrene	240 U	240	2.07

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB1B**	QC Batch:	90210 -110
Sample #:	**345413**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	72
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	160	E	B,X
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	110	E	NJ,+
Erucylamide	112-84-5	750	E	B,X
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~210~~	~~E~~	~~B,X~~

AS 1/14/04

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB1C**	QC Batch:	90210 -110
Sample #:	**345414**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U		220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U		220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U		220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U		220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U		220	3.41
120-83-2	2,4-Dichlorophenol	220 U		220	4.58
105-67-9	2,4-Dimethylphenol	220 U		220	10.3
51-28-5	2,4-Dinitrophenol	460 U		460	4.16
121-14-2	2,4-Dinitrotoluene	220 U		220	4.10
606-20-2	2,6-Dinitrotoluene	220 U		220	36.0
91-58-7	2-Chloronaphthalene	220 U		220	2.99
95-57-8	2-Chlorophenol	220 U		220	2.61
91-57-6	2-Methylnaphthalene	220 U		220	3.56
95-48-7	2-Methylphenol	220 U		220	6.29
88-74-4	2-Nitroaniline	220 U		220	5.98
88-75-5	2-Nitrophenol	220 U		220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U		220	86.7
99-09-2	3-Nitroaniline	220 U		220	43.3
534-52-1	4,6-Dinitro-2-Methylphenol	220 U		220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U		220	4.39
59-50-7	**4-Chloro-3-Methylphenol**	**27 J**	B, x	220	6.77
106-47-8	4-Chloroaniline	220 U		220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U		220	4.25
106-44-5	4-Methylphenol	220 U		220	8.28
100-01-6	4-Nitroaniline	220 U		220	9.43
100-02-7	4-Nitrophenol	460 U		460	3.68
83-32-9	Acenaphthene	220 U		220	2.24
208-96-8	Acenaphthylene	220 U		220	1.95
98-86-2	Acetophenone	220 U		220	2.47

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB1C**	QC Batch:	90210 -110
Sample #:	**345414**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	220 U		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U	UJ,C	220	5.27
56-55-3	Benzo (a) Anthracene	220 U		220	17.3
50-32-8	Benzo (a) Pyrene	220 U		220	7.42
205-99-2	Benzo (b) Fluoranthene	220 U		220	12.7
191-24-2	Benzo (g,h,i,) Perylene	220 U		220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**58 J**		220	2.69
85-68-7	Butyl Benzyl Phthalate	220 U		220	5.82
105-60-2	Caprolactam	460 U		460	8.29
86-74-8	Carbazole	220 U		220	7.93
218-01-9	Chrysene	220 U		220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U		220	7.67
132-64-9	Dibenzofuran	220 U		220	4.11
84-66-2	**Diethylphthalate**	**6.0 J**	B,X	220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**180 J**		220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	Fluoranthene	220 U		220	3.06
86-73-7	Fluorene	220 U		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U		220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	Indeno (1,2,3-cd) Pyrene	220 U		220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	Naphthalene	220 U		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB1C**	QC Batch:	90210 -110
Sample #:	**345414**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	N-Nitroso-di-Phenylamine	220 U	220	6.18
87-86-5	Pentachlorophenol	460 U	460	5.71
85-01-8	Phenanthrene	220 U	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	Pyrene	220 U	220	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB1C**	QC Batch:	90210 -110
Sample #:	**345414**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	75
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	210	E	B,X
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	370	E	B,X
2(5H)-Furanone, 5,5-dimethyl-	20019-64-1	210	E	NJ,+
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	120	E	NJ,+
Erucylamide	112-84-5	840	E	B,X
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~600~~	~~E~~	~~B,X~~ 1/14/04

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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Individual sample results relate only to the sample tested.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3510C
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**EQB3**	QC Batch:	90070 -113
Sample #:	**345617**	Anal. Batch:	208316
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	5.0 U		5.0	0.013
95-94-3	1,2,4,5-Tetrachloro-benzene	5.0 U		5.0	0.775
108-60-1	Bis (2-Chloroisopropyl)-Ether	5.0 U		5.0	0.014
95-95-4	2,4,5-Trichlorophenol	5.0 U		5.0	0.014
88-06-2	2,4,6-Trichlorophenol	5.0 U		5.0	0.015
120-83-2	2,4-Dichlorophenol	5.0 U		5.0	0.018
105-67-9	2,4-Dimethylphenol	5.0 U		5.0	0.198
51-28-5	2,4-Dinitrophenol	10 U	UJ,l	10	1.24
121-14-2	2,4-Dinitrotoluene	5.0 U		5.0	0.007
606-20-2	2,6-Dinitrotoluene	5.0 U		5.0	0.052
91-58-7	2-Chloronaphthalene	5.0 U		5.0	0.005
95-57-8	2-Chlorophenol	5.0 U		5.0	0.011
91-57-6	2-Methylnaphthalene	5.0 U		5.0	0.084
95-48-7	2-Methylphenol	5.0 U		5.0	0.007
88-74-4	2-Nitroaniline	5.0 U		5.0	0.010
88-75-5	2-Nitrophenol	5.0 U		5.0	0.011
91-94-1	3,3'-Dichlorobenzidine	5.0 U		5.0	0.058
99-09-2	3-Nitroaniline	5.0 U		5.0	0.032
534-52-1	4,6-Dinitro-2-Methylphenol	5.0 U		5.0	0.054
101-55-3	4-Bromophenyl Phenylether	5.0 U		5.0	0.019
59-50-7	**4-Chloro-3-Methylphenol**	**0.14 J**		5.0	0.018
106-47-8	4-Chloroaniline	5.0 U	UJ,c	5.0	0.011
7005-72-3	4-Chlorophenylphenyl-Ether	5.0 U		5.0	0.015
106-44-5	4-Methylphenol	5.0 U		5.0	0.014
100-01-6	4-Nitroaniline	5.0 U		5.0	0.070
100-02-7	4-Nitrophenol	10 U		10	0.134
83-32-9	Acenaphthene	5.0 U		5.0	0.008
208-96-8	Acenaphthylene	5.0 U		5.0	0.007
98-86-2	Acetophenone	5.0 U		5.0	0.011

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3510C
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**EQB3**	QC Batch:	90070 -113
Sample #:	**345617**	Anal. Batch:	208316
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	5.0 U		5.0	0.014
1912-24-9	Atrazine	5.0 U		5.0	0.018
100-52-7	Benzaldehyde	5.0 U	UJ,C	5.0	0.616
56-55-3	Benzo (a) Anthracene	5.0 U		5.0	0.022
50-32-8	Benzo (a) Pyrene	5.0 U		5.0	0.025
205-99-2	Benzo (b) Fluoranthene	5.0 U		5.0	0.019
191-24-2	Benzo (g,h,i,) Perylene	5.0 U		5.0	0.046
207-08-9	Benzo (k) Fluoranthene	5.0 U		5.0	0.064
111-91-1	Bis (2-Chloroethoxy)-Methane	5.0 U		5.0	0.013
111-44-4	Bis (2-Chloroethyl) Ether	5.0 U		5.0	0.012
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**1.4 J**	B,Z	5.0	0.149
85-68-7	**Butyl Benzyl Phthalate**	**1.0 J**	B,Z	5.0	0.015
105-60-2	Caprolactam	5.0 U	UJ,I	5.0	0.024
86-74-8	Carbazole	5.0 U		5.0	0.015
218-01-9	Chrysene	5.0 U		5.0	0.025
53-70-3	Dibenzo (a,h) Anthracene	5.0 U		5.0	0.025
132-64-9	Dibenzofuran	5.0 U		5.0	0.014
84-66-2	**Diethylphthalate**	**0.11 J**		5.0	0.074
131-11-3	Dimethylphthalate	5.0 U		5.0	0.013
84-74-2	Di-n-Butylphthalate	5.0 U		5.0	1.60
117-84-0	Di-n-Octylphthalate	5.0 U		5.0	0.162
206-44-0	Fluoranthene	5.0 U		5.0	0.024
86-73-7	Fluorene	5.0 U		5.0	0.012
118-74-1	Hexachlorobenzene	5.0 U		5.0	0.011
87-68-3	Hexachlorobutadiene	5.0 U		5.0	0.019
77-47-4	Hexachlorocyclopentadiene	5.0 U		5.0	0.016
67-72-1	Hexachloroethane	5.0 U		5.0	0.023
193-39-5	Indeno (1,2,3-cd) Pyrene	5.0 U		5.0	0.033
78-59-1	Isophorone	5.0 U		5.0	0.017
91-20-3	Naphthalene	5.0 U		5.0	0.006
98-95-3	Nitrobenzene	5.0 U		5.0	0.012

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3510C
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**EQB3**	QC Batch:	90070 -113
Sample #:	**345617**	Anal. Batch:	208316
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	5.0 U	5.0	0.017
86-30-6	N-Nitroso-di-Phenylamine	5.0 U	5.0	0.019
87-86-5	Pentachlorophenol	10 U	10	0.075
85-01-8	Phenanthrene	5.0 U	5.0	0.016
108-95-2	Phenol	5.0 U	5.0	0.006
129-00-0	Pyrene	5.0 U	5.0	0.033

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**EQB3**	QC Batch:	90070 -113
Sample #:	**345617**	Anal. Batch:	208316
Matrix:	QC Water	Percent Solids:	n/a
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/L)**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	1.24	E	NJ,+
Erucylamide	112-84-5	26.3	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/08/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**EQB2**	QC Batch:	90710 -108
Sample #:	**345184**	Anal. Batch:	208174
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	1.2 U	1.2	0.0279
208-96-8	Acenaphthylene	1.2 U	1.2	0.0525
120-12-7	Anthracene	1.2 U	1.2	0.0024
56-55-3	Benzo (a) Anthracene	0.062 U	0.062	0.0026
50-32-8	Benzo (a) Pyrene	0.062 U	0.062	0.0069
205-99-2	Benzo (b) Fluoranthene	0.090 U	0.090	0.0138
191-24-2	Benzo (g,h,i,) Perylene	1.2 U	1.2	0.0539
207-08-9	Benzo (k) Fluoranthene	0.12 U	0.12	0.0043
218-01-9	Chrysene	1.2 U	1.2	0.0034
53-70-3	Dibenzo (a,h) Anthracene	0.24 U	0.24	0.0416
206-44-0	Fluoranthene	1.2 U	1.2	0.0074
86-73-7	Fluorene	1.2 U	1.2	0.0096
193-39-5	Indeno (1,2,3-cd) Pyrene	0.062 U	0.062	0.0050
91-20-3	Naphthalene	0.62 U	0.62	0.0422
85-01-8	Phenanthrene	1.2 U	1.2	0.0032
129-00-0	Pyrene	1.2 U	1.2	0.0194

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 08:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/27/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**38SB2A**	QC Batch:	90708 -113
Sample #:	**345186**	Anal. Batch:	208739
Matrix:	Soil	Percent Solids:	86
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	120 U		120	11.3
208-96-8	Acenaphthylene	240 U		240	13.9
120-12-7	Anthracene	24 U		24	0.840
56-55-3	Benzo (a) Anthracene	24 U		24	0.960
50-32-8	Benzo (a) Pyrene	24 U		24	1.20
205-99-2	Benzo (b) Fluoranthene	24 U		24	1.56
191-24-2	Benzo (g,h,i,) Perylene	24 U		24	15.0
207-08-9	Benzo (k) Fluoranthene	24 U		24	1.20
218-01-9	Chrysene	24 U		24	1.44
53-70-3	Dibenzo (a,h) Anthracene	24 U		24	1.68
206-44-0	Fluoranthene	24 U	UJ,1	24	2.04
86-73-7	Fluorene	24 U		24	1.56
193-39-5	Indeno (1,2,3-cd) Pyrene	24 U		24	0.840
91-20-3	Naphthalene	120 U		120	9.48
85-01-8	Phenanthrene	24 U		24	0.720
129-00-0	Pyrene	24 U		24	1.08

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 09:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/28/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**38SB2B**	QC Batch:	90708 -113
Sample #:	**345187**	Anal. Batch:	208739
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	120 U		120	11.3
208-96-8	Acenaphthylene	250 U		250	13.9
120-12-7	Anthracene	25 U		25	0.840
56-55-3	Benzo (a) Anthracene	25 U		25	0.960
50-32-8	Benzo (a) Pyrene	25 U		25	1.20
205-99-2	Benzo (b) Fluoranthene	25 U		25	1.56
191-24-2	Benzo (g,h,i,) Perylene	25 U		25	15.0
207-08-9	Benzo (k) Fluoranthene	25 U		25	1.20
218-01-9	Chrysene	25 U		25	1.44
53-70-3	Dibenzo (a,h) Anthracene	25 U		25	1.68
206-44-0	Fluoranthene	25 U	UJ,I	25	2.04
86-73-7	Fluorene	25 U		25	1.56
193-39-5	Indeno (1,2,3-cd) Pyrene	25 U		25	0.840
91-20-3	Naphthalene	120 U		120	9.48
85-01-8	Phenanthrene	25 U		25	0.720
129-00-0	Pyrene	25 U		25	1.08

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/28/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**SBD4**	QC Batch:	90708 -113
Sample #:	**345188**	Anal. Batch:	208739
Matrix:	Soil	Percent Solids:	81
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	120 U	UL,S	120	11.3
208-96-8	Acenaphthylene	260 U		260	13.9
120-12-7	Anthracene	26 U		26	0.840
56-55-3	Benzo (a) Anthracene	26 U		26	0.960
50-32-8	Benzo (a) Pyrene	26 U		26	1.20
205-99-2	Benzo (b) Fluoranthene	26 U		26	1.56
191-24-2	Benzo (g,h,i,) Perylene	26 U		26	15.0
207-08-9	Benzo (k) Fluoranthene	26 U		26	1.20
218-01-9	Chrysene	26 U		26	1.44
53-70-3	Dibenzo (a,h) Anthracene	26 U		26	1.68
206-44-0	Fluoranthene	26 U	UJ,I	26	2.04
86-73-7	Fluorene	26 U	UL,S	26	1.56
193-39-5	Indeno (1,2,3-cd) Pyrene	26 U		26	0.840
91-20-3	Naphthalene	120 U		120	9.48
85-01-8	Phenanthrene	26 U		26	0.720
129-00-0	Pyrene	26 U		26	1.08

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 09:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/28/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**38SB2C**	QC Batch:	90708 -113
Sample #:	**345189**	Anal. Batch:	208739
Matrix:	Soil	Percent Solids:	93
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	110 U	UL,s	110	10.3
208-96-8	Acenaphthylene	230 U		230	12.8
120-12-7	Anthracene	23 U		23	0.770
56-55-3	Benzo (a) Anthracene	23 U		23	0.880
50-32-8	Benzo (a) Pyrene	23 U		23	1.10
205-99-2	Benzo (b) Fluoranthene	23 U		23	1.43
191-24-2	Benzo (g,h,i,) Perylene	23 U		23	13.8
207-08-9	Benzo (k) Fluoranthene	23 U		23	1.10
218-01-9	Chrysene	23 U		23	1.32
53-70-3	Dibenzo (a,h) Anthracene	23 U		23	1.54
206-44-0	Fluoranthene	23 U	UJ,l	23	1.87
86-73-7	Fluorene	23 U	UL,s	23	1.43
193-39-5	Indeno (1,2,3-cd) Pyrene	23 U		23	0.770
91-20-3	Naphthalene	110 U		110	8.69
85-01-8	Phenanthrene	23 U		23	0.660
129-00-0	Pyrene	23 U		23	0.990

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 10:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/28/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**38SB1A**	QC Batch:	90708 -113
Sample #:	**345196**	Anal. Batch:	208739
Matrix:	Soil	Percent Solids:	70
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	140 U	UL,S	140	13.2
208-96-8	Acenaphthylene	300 U	L	300	16.2
120-12-7	**Anthracene**	**6.6 J**	L,S	30	0.980
56-55-3	Benzo (a) Anthracene	30 U	UL,S	30	1.12
50-32-8	Benzo (a) Pyrene	30 U	L	30	1.40
205-99-2	**Benzo (b) Fluoranthene**	**23 J**	L,S	30	1.82
191-24-2	Benzo (g,h,i,) Perylene	30 U	UL,S	30	17.5
207-08-9	Benzo (k) Fluoranthene	30 U	L	30	1.40
218-01-9	**Chrysene**	**29 J**	L,S	30	1.68
53-70-3	Dibenzo (a,h) Anthracene	30 U	UL,S	30	1.96
206-44-0	**Fluoranthene**	**110**	J,I	30	2.38
86-73-7	**Fluorene**	**4.6 J**	L,S	30	1.82
193-39-5	Indeno (1,2,3-cd) Pyrene	30 U	UL,S	30	0.980
91-20-3	Naphthalene	140 U	L	140	11.1
85-01-8	**Phenanthrene**	**46**	L,S	30	0.840
129-00-0	**Pyrene**	**56**	L,S	30	1.26

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/30/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**38SB1B**	QC Batch:	90709 -114
Sample #:	**345197**	Anal. Batch:	209213
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.32

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	UL,S	130	12.4
208-96-8	Acenaphthylene	280 U		280	15.3
120-12-7	Anthracene	28 U		28	0.924
56-55-3	Benzo (a) Anthracene	28 U		28	1.06
50-32-8	Benzo (a) Pyrene	28 U		28	1.32
205-99-2	Benzo (b) Fluoranthene	28 U		28	1.72
191-24-2	Benzo (g,h,i,) Perylene	28 U		28	16.5
207-08-9	Benzo (k) Fluoranthene	28 U		28	1.32
218-01-9	Chrysene	28 U		28	1.58
53-70-3	Dibenzo (a,h) Anthracene	28 U		28	1.85
206-44-0	Fluoranthene	28 U		28	2.24
86-73-7	Fluorene	28 U		28	1.72
193-39-5	Indeno (1,2,3-cd) Pyrene	28 U		28	0.924
91-20-3	Naphthalene	130 U		130	10.4
85-01-8	Phenanthrene	28 U		28	0.792
129-00-0	Pyrene	28 U		28	1.19

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 11:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/30/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**38SB1C**	QC Batch:	90709 -114
Sample #:	**345198**	Anal. Batch:	209213
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	120 U	120	11.3
208-96-8	Acenaphthylene	260 U	260	13.9
120-12-7	Anthracene	26 U	26	0.840
56-55-3	Benzo (a) Anthracene	26 U	26	0.960
50-32-8	Benzo (a) Pyrene	26 U	26	1.20
205-99-2	Benzo (b) Fluoranthene	26 U	26	1.56
191-24-2	Benzo (g,h,i,) Perylene	26 U	26	15.0
207-08-9	Benzo (k) Fluoranthene	26 U	26	1.20
218-01-9	Chrysene	26 U	26	1.44
53-70-3	Dibenzo (a,h) Anthracene	26 U	26	1.68
206-44-0	Fluoranthene	26 U	26	2.04
86-73-7	Fluorene	26 U	26	1.56
193-39-5	Indeno (1,2,3-cd) Pyrene	26 U	26	0.840
91-20-3	Naphthalene	120 U	120	9.48
85-01-8	Phenanthrene	26 U	26	0.720
129-00-0	Pyrene	26 U	26	1.08

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/29/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**38SB3A**	QC Batch:	90709 -114
Sample #:	**345199**	Anal. Batch:	209056
Matrix:	Soil	Percent Solids:	56
Unit:	ug/kg dry	Dilution Factor:	1.8

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	180 U	180	16.9
208-96-8	Acenaphthylene	380 U	380	20.9
120-12-7	**Anthracene**	**13 J**	38	1.26
56-55-3	**Benzo (a) Anthracene**	**82**	38	1.44
50-32-8	Benzo (a) Pyrene	38 U	38	1.80
205-99-2	**Benzo (b) Fluoranthene**	**15 J**	38	2.34
191-24-2	Benzo (g,h,i,) Perylene	38 U	38	22.5
207-08-9	**Benzo (k) Fluoranthene**	**7.5 J**	38	1.80
218-01-9	**Chrysene**	**28 J**	38	2.16
53-70-3	Dibenzo (a,h) Anthracene	38 U	38	2.52
206-44-0	**Fluoranthene**	**180**	38	3.06
86-73-7	**Fluorene**	**8.9 J**	38	2.34
193-39-5	Indeno (1,2,3-cd) Pyrene	38 U	38	1.26
91-20-3	Naphthalene	180 U	180	14.2
85-01-8	**Phenanthrene**	**100**	38	1.08
129-00-0	**Pyrene**	**98**	38	1.62

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/30/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**38SB3B**	QC Batch:	90709 -114
Sample #:	**345200**	Anal. Batch:	209213
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.79

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	180 U	UL,S	180	16.8
208-96-8	Acenaphthylene	380 U		380	20.8
120-12-7	Anthracene	38 U		38	1.25
56-55-3	Benzo (a) Anthracene	38 U		38	1.43
50-32-8	Benzo (a) Pyrene	38 U		38	1.79
205-99-2	Benzo (b) Fluoranthene	38 U		38	2.33
191-24-2	Benzo (g,h,i,) Perylene	38 U		38	22.4
207-08-9	Benzo (k) Fluoranthene	38 U		38	1.79
218-01-9	Chrysene	38 U		38	2.15
53-70-3	Dibenzo (a,h) Anthracene	38 U		38	2.51
206-44-0	Fluoranthene	38 U		38	3.04
86-73-7	Fluorene	38 U		38	2.33
193-39-5	Indeno (1,2,3-cd) Pyrene	38 U		38	1.25
91-20-3	Naphthalene	180 U		180	14.1
85-01-8	Phenanthrene	38 U		38	1.07
129-00-0	Pyrene	38 U		38	1.61

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/30/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**38SB3C**	QC Batch:	90709 -114
Sample #:	**345201**	Anal. Batch:	209213
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	120 U	120	11.3
208-96-8	Acenaphthylene	260 U	260	13.9
120-12-7	Anthracene	26 U	26	0.840
56-55-3	Benzo (a) Anthracene	26 U	26	0.960
50-32-8	Benzo (a) Pyrene	26 U	26	1.20
205-99-2	Benzo (b) Fluoranthene	26 U	26	1.56
191-24-2	Benzo (g,h,i,) Perylene	26 U	26	15.0
207-08-9	Benzo (k) Fluoranthene	26 U	26	1.20
218-01-9	Chrysene	26 U	26	1.44
53-70-3	Dibenzo (a,h) Anthracene	26 U	26	1.68
206-44-0	Fluoranthene	26 U	26	2.04
86-73-7	Fluorene	26 U	26	1.56
193-39-5	Indeno (1,2,3-cd) Pyrene	26 U	26	0.840
91-20-3	Naphthalene	120 U	120	9.48
85-01-8	Phenanthrene	26 U	26	0.720
129-00-0	Pyrene	26 U	26	1.08

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Client:	**URS Corporation**	Sampled:	10/06/03 @ 13:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/29/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**68SB2A**	QC Batch:	90834 -115
Sample #:	**345408**	Anal. Batch:	209056
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	120 U	UL,S	120	11.3
208-96-8	Acenaphthylene	260 U	UL,S	260	13.9
120-12-7	**Anthracene**	**7.1 J**	L,S	26	0.840
56-55-3	**Benzo (a) Anthracene**	**14 J**	L,S	26	0.960
50-32-8	**Benzo (a) Pyrene**	**15 J**	L,S	26	1.20
205-99-2	**Benzo (b) Fluoranthene**	**9.5 J**	L,S	26	1.56
191-24-2	Benzo (g,h,i,) Perylene	26 U	UL,S	26	15.0
207-08-9	**Benzo (k) Fluoranthene**	**6.7 J**	L,S	26	1.20
218-01-9	**Chrysene**	**12 J**	L,S	26	1.44
53-70-3	Dibenzo (a,h) Anthracene	26 U	UL,S	26	1.68
206-44-0	**Fluoranthene**	**38**	L,S	26	2.04
86-73-7	**Fluorene**	**3.1 J**	L,S	26	1.56
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**8.6 J**	L,S	26	0.840
91-20-3	Naphthalene	120 U	UL,S	120	9.48
85-01-8	***Phenanthrene**	**30**	L,S	26	0.720
129-00-0	***Pyrene**	**30**	L,S	26	1.08

* See attached Statement of Data Qualifications.

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Client:	**URS Corporation**	Sampled:	10/06/03 @ 13:30
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/29/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**68SB2B**	QC Batch:	90709 -114
Sample #:	**345409**	Anal. Batch:	209056
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	140 U	VL,S	140	13.2
208-96-8	Acenaphthylene	290 U		290	16.2
120-12-7	Anthracene	29 U		29	0.980
56-55-3	Benzo (a) Anthracene	29 U		29	1.12
50-32-8	Benzo (a) Pyrene	29 U		29	1.40
205-99-2	Benzo (b) Fluoranthene	29 U		29	1.82
191-24-2	Benzo (g,h,i,) Perylene	29 U		29	17.5
207-08-9	Benzo (k) Fluoranthene	29 U		29	1.40
218-01-9	Chrysene	29 U		29	1.68
53-70-3	Dibenzo (a,h) Anthracene	29 U		29	1.96
206-44-0	Fluoranthene	29 U		29	2.38
86-73-7	Fluorene	29 U		29	1.82
193-39-5	Indeno (1,2,3-cd) Pyrene	29 U		29	0.980
91-20-3	Naphthalene	140 U		140	11.1
85-01-8	Phenanthrene	29 U		29	0.840
129-00-0	Pyrene	29 U		29	1.26

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 13:45
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/29/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**68SB2C**	QC Batch:	90709 -114
Sample #:	**345410**	Anal. Batch:	209056
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	140 U	140	13.2
208-96-8	Acenaphthylene	300 U	300	16.2
120-12-7	Anthracene	30 U	30	0.980
56-55-3	Benzo (a) Anthracene	30 U	30	1.12
50-32-8	Benzo (a) Pyrene	30 U	30	1.40
205-99-2	Benzo (b) Fluoranthene	30 U	30	1.82
191-24-2	Benzo (g,h,i,) Perylene	30 U	30	17.5
207-08-9	Benzo (k) Fluoranthene	30 U	30	1.40
218-01-9	Chrysene	30 U	30	1.68
53-70-3	Dibenzo (a,h) Anthracene	30 U	30	1.96
206-44-0	Fluoranthene	30 U	30	2.38
86-73-7	Fluorene	30 U	30	1.82
193-39-5	Indeno (1,2,3-cd) Pyrene	30 U	30	0.980
91-20-3	Naphthalene	140 U	140	11.1
85-01-8	Phenanthrene	30 U	30	0.840
129-00-0	Pyrene	30 U	30	1.26

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/30/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**SBD5**	QC Batch:	90709 -114
Sample #:	**345411**	Anal. Batch:	209213
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	140 U	140	12.2
208-96-8	Acenaphthylene	280 U	280	15.1
120-12-7	Anthracene	28 U	28	0.910
56-55-3	Benzo (a) Anthracene	28 U	28	1.04
50-32-8	Benzo (a) Pyrene	28 U	28	1.30
205-99-2	Benzo (b) Fluoranthene	28 U	28	1.69
191-24-2	Benzo (g,h,i,) Perylene	28 U	28	16.3
207-08-9	Benzo (k) Fluoranthene	28 U	28	1.30
218-01-9	Chrysene	28 U	28	1.56
53-70-3	Dibenzo (a,h) Anthracene	28 U	28	1.82
206-44-0	Fluoranthene	28 U	28	2.21
86-73-7	Fluorene	28 U	28	1.69
193-39-5	Indeno (1,2,3-cd) Pyrene	28 U	28	0.910
91-20-3	Naphthalene	140 U	140	10.3
85-01-8	Phenanthrene	28 U	28	0.780
129-00-0	Pyrene	28 U	28	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/29/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**68SB1A**	QC Batch:	90709 -114
Sample #:	**345412**	Anal. Batch:	209056
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	UL,S	130	12.2
208-96-8	Acenaphthylene	270 U		270	15.1
120-12-7	Anthracene	27 U		27	0.910
56-55-3	Benzo (a) Anthracene	27 U		27	1.04
50-32-8	Benzo (a) Pyrene	27 U		27	1.30
205-99-2	Benzo (b) Fluoranthene	27 U		27	1.69
191-24-2	Benzo (g,h,i,) Perylene	27 U		27	16.3
207-08-9	Benzo (k) Fluoranthene	27 U		27	1.30
218-01-9	Chrysene	27 U		27	1.56
53-70-3	Dibenzo (a,h) Anthracene	27 U		27	1.82
206-44-0	**Fluoranthene**	**2.8 J**	L,S	27	2.21
86-73-7	Fluorene	27 U	UL,S	27	1.69
193-39-5	Indeno (1,2,3-cd) Pyrene	27 U		27	0.910
91-20-3	Naphthalene	130 U		130	10.3
85-01-8	Phenanthrene	27 U		27	0.780
129-00-0	**Pyrene**	**2.1 J**	L,S	27	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/29/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**68SB1B**	QC Batch:	90709 -114
Sample #:	**345413**	Anal. Batch:	209056
Matrix:	Soil	Percent Solids:	72
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	140 U	UL,S	140	13.2
208-96-8	Acenaphthylene	250 U		250	16.2
120-12-7	Anthracene	30 U		30	0.980
56-55-3	Benzo (a) Anthracene	30 U		30	1.12
50-32-8	Benzo (a) Pyrene	30 U		30	1.40
205-99-2	Benzo (b) Fluoranthene	30 U		30	1.82
191-24-2	Benzo (g,h,i,) Perylene	30 U		30	17.5
207-08-9	Benzo (k) Fluoranthene	30 U		30	1.40
218-01-9	Chrysene	30 U		30	1.68
53-70-3	Dibenzo (a,h) Anthracene	30 U		30	1.96
206-44-0	Fluoranthene	30 U		30	2.38
86-73-7	Fluorene	30 U		30	1.82
193-39-5	Indeno (1,2,3-cd) Pyrene	30 U		30	0.980
91-20-3	Naphthalene	140 U		140	11.1
85-01-8	Phenanthrene	30 U		30	0.840
129-00-0	Pyrene	30 U		30	1.26

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/29/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**68SB1C**	QC Batch:	90709 -114
Sample #:	**345414**	Anal. Batch:	209056
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	VL,S	130	12.2
208-96-8	Acenaphthylene	270 U		270	15.1
120-12-7	Anthracene	27 U		27	0.910
56-55-3	Benzo (a) Anthracene	27 U		27	1.04
50-32-8	Benzo (a) Pyrene	27 U		27	1.30
205-99-2	Benzo (b) Fluoranthene	27 U		27	1.69
191-24-2	Benzo (g,h,i,) Perylene	27 U		27	16.3
207-08-9	Benzo (k) Fluoranthene	27 U		27	1.30
218-01-9	Chrysene	27 U		27	1.56
53-70-3	Dibenzo (a,h) Anthracene	27 U		27	1.82
206-44-0	Fluoranthene	27 U		27	2.21
86-73-7	Fluorene	27 U		27	1.69
193-39-5	Indeno (1,2,3-cd) Pyrene	27 U		27	0.910
91-20-3	Naphthalene	130 U		130	10.3
85-01-8	Phenanthrene	27 U		27	0.780
129-00-0	Pyrene	27 U		27	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/27/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**EQB3**	QC Batch:	90710 -114
Sample #:	**345617**	Anal. Batch:	208739
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	1.2 U	1.2	0.0279
208-96-8	Acenaphthylene	1.2 U	1.2	0.0525
120-12-7	Anthracene	1.2 U	1.2	0.0024
56-55-3	Benzo (a) Anthracene	0.062 U	0.062	0.0026
50-32-8	Benzo (a) Pyrene	0.062 U	0.062	0.0069
205-99-2	Benzo (b) Fluoranthene	0.090 U	0.090	0.0138
191-24-2	Benzo (g,h,i,) Perylene	1.2 U	1.2	0.0539
207-08-9	Benzo (k) Fluoranthene	0.12 U	0.12	0.0043
218-01-9	Chrysene	1.2 U	1.2	0.0034
53-70-3	Dibenzo (a,h) Anthracene	0.24 U	0.24	0.0416
206-44-0	Fluoranthene	1.2 U	1.2	0.0074
86-73-7	Fluorene	1.2 U	1.2	0.0096
193-39-5	Indeno (1,2,3-cd) Pyrene	0.062 U	0.062	0.0050
91-20-3	Naphthalene	0.62 U	0.62	0.0422
85-01-8	Phenanthrene	1.2 U	1.2	0.0032
129-00-0	Pyrene	1.2 U	1.2	0.0194

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/19/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**EQB2**	QC Batch:	89804 -109
Sample #:	**345184**	Anal. Batch:	207913
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.65 U	0.65	0.150
99-65-0	1,3-Dinitrobenzene	0.65 U	0.65	0.121
118-96-7	2,4,6-Trinitrotoluene	0.65 U	0.65	0.102
121-14-2	2,4-Dinitrotoluene	0.65 U	0.65	0.114
606-20-2	2,6-Dinitrotoluene	0.65 U	0.65	0.217
35572-78-2	2-Amino-4,6-dinitro-toluene	1.0 U	1.0	0.245
88-72-2	2-Nitrotoluene	0.65 U	0.65	0.175
99-08-1	3-Nitrotoluene	2.0 U	2.0	0.413
19406-51-0	4-Amino-2,6-dinitro-toluene	1.0 U	1.0	0.239
99-99-0	4-Nitrotoluene	2.0 U	2.0	0.488
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.277
98-95-3	Nitrobenzene	0.65 U	0.65	0.0825
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.65 U	0.65	0.109
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	2.0 U	2.0	0.0931

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 08:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**38SB2A**	QC Batch:	90258 -114
Sample #:	**345186**	Anal. Batch:	208353
Matrix:	Soil	Percent Solids:	86
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,c	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U		0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 09:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**38SB2B**	QC Batch:	90258 -114
Sample #:	**345187**	Anal. Batch:	208353
Matrix:	Soil	Percent Solids:	85
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ, C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U		0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**SBD4**	QC Batch:	90258 -114
Sample #:	**345188**	Anal. Batch:	208353
Matrix:	Soil	Percent Solids:	81
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U		0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 09:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**38SB2C**	QC Batch:	90258 -114
Sample #:	**345189**	Anal. Batch:	208353
Matrix:	Soil	Percent Solids:	93
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,c	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U		0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 10:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**38SB1A**	QC Batch:	90258 -114
Sample #:	**345196**	Anal. Batch:	208353
Matrix:	Soil	Percent Solids:	70
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/27/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**38SB1B**	QC Batch:	90259 -115
Sample #:	**345197**	Anal. Batch:	208354
Matrix:	Soil	Percent Solids:	82
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 11:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/27/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**38SB1C**	QC Batch:	90259 -115
Sample #:	**345198**	Anal. Batch:	208354
Matrix:	Soil	Percent Solids:	78
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/27/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**38SB3A**	QC Batch:	90259 -115
Sample #:	**345199**	Anal. Batch:	208354
Matrix:	Soil	Percent Solids:	56
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**38SB3B**	QC Batch:	90259 -115
Sample #:	**345200**	Anal. Batch:	208353
Matrix:	Soil	Percent Solids:	76
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U		0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**38SB3C**	QC Batch:	90259 -115
Sample #:	**345201**	Anal. Batch:	208353
Matrix:	Soil	Percent Solids:	80
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U		0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 13:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/27/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**68SB2A**	QC Batch:	90259 -115
Sample #:	**345408**	Anal. Batch:	208354
Matrix:	Soil	Percent Solids:	78
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 13:30
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/27/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**68SB2B**	QC Batch:	90259 -115
Sample #:	**345409**	Anal. Batch:	208354
Matrix:	Soil	Percent Solids:	73
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 13:45
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/27/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**68SB2C**	QC Batch:	90259 -115
Sample #:	**345410**	Anal. Batch:	208354
Matrix:	Soil	Percent Solids:	71
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/27/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**SBD5**	QC Batch:	90259 -115
Sample #:	**345411**	Anal. Batch:	208354
Matrix:	Soil	Percent Solids:	76
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,c	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,c	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/27/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**68SB1A**	QC Batch:	90259 -115
Sample #:	**345412**	Anal. Batch:	208354
Matrix:	Soil	Percent Solids:	78
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,c	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,c	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/27/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**68SB1B**	QC Batch:	90259 -115
Sample #:	**345413**	Anal. Batch:	208354
Matrix:	Soil	Percent Solids:	72
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,c	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,c	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/27/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**68SB1C**	QC Batch:	90259 -115
Sample #:	**345414**	Anal. Batch:	208354
Matrix:	Soil	Percent Solids:	75
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/19/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**EQB3**	QC Batch:	89804 -109
Sample #:	**345617**	Anal. Batch:	207866
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.65 U	0.65	0.150
99-65-0	1,3-Dinitrobenzene	0.65 U	0.65	0.121
118-96-7	2,4,6-Trinitrotoluene	0.65 U	0.65	0.102
121-14-2	2,4-Dinitrotoluene	0.65 U	0.65	0.114
606-20-2	2,6-Dinitrotoluene	0.65 U	0.65	0.217
35572-78-2	2-Amino-4,6-dinitro-toluene	1.0 U	1.0	0.245
88-72-2	2-Nitrotoluene	0.65 U	0.65	0.175
99-08-1	3-Nitrotoluene	2.0 U	2.0	0.413
19406-51-0	4-Amino-2,6-dinitro-toluene	1.0 U	1.0	0.239
99-99-0	4-Nitrotoluene	2.0 U	2.0	0.488
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.277
98-95-3	Nitrobenzene	0.65 U	0.65	0.0825
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.65 U	0.65	0.109
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	2.0 U	2.0	0.0931

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/08/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3510C
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by MSN
	RAAP	Anal. Method:	USEPA-8081A
Sample ID:	**EQB2**	QC Batch:	90180 -108
Sample #:	**345184**	Anal. Batch:	208237
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Chlorinated Pesticides OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
72-54-8	4,4'-DDD	0.10 U	0.10	0.0016
72-55-9	4,4'-DDE	0.10 U	0.10	0.0025
50-29-3	4,4'-DDT	0.10 U	0.10	0.0018
309-00-2	Aldrin	0.050 U	0.050	0.0019
319-84-6	Alpha-BHC	0.050 U	0.050	0.0014
57-74-9	A-Chlordane	0.050 U	0.050	0.0024
5103-74-2	G-Chlordane	0.050 U	0.050	0.0023
319-85-7	Beta-BHC	0.050 U	0.050	0.0039
319-86-8	Delta-BHC	0.050 U	0.050	0.0025
60-57-1	Dieldrin	0.10 U	0.10	0.0034
115-29-7	Endosulfan I	0.050 U	0.050	0.0026
33213-65-9	Endosulfan II	0.10 U	0.10	0.0021
1031-07-8	Endosulfan Sulfate	0.10 U	0.10	0.0022
72-20-8	Endrin	0.10 U	0.10	0.0038
7421-93-4	Endrin Aldehyde	0.10 U	0.10	0.0053
53494-70-5	Endrin Ketone	0.10 U	0.10	0.0020
58-89-9	Lindane	0.050 U	0.050	0.0016
76-44-8	Heptachlor	0.050 U	0.050	0.0021
1024-57-3	Heptachlor Epoxide	0.050 U	0.050	0.0022
72-43-5	Methoxychlor	0.50 U	0.50	0.0032
8001-35-2	Toxaphene	1.0 U	1.0	0.118

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 10:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/09/03 by JRR
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 by MSN
	RAAP	Anal. Method:	USEPA-8081A
Sample ID:	**38SB1A**	QC Batch:	90181 -109
Sample #:	**345196**	Anal. Batch:	208238
Matrix:	Soil	Percent Solids:	70
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Chlorinated Pesticides OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
72-54-8	4,4'-DDD	28 U	28	0.333
72-55-9	4,4'-DDE	28 U	28	0.245
50-29-3	4,4'-DDT	28 U	28	0.252
309-00-2	Aldrin	28 U	28	0.426
319-84-6	Alpha-BHC	28 U	28	0.424
57-74-9	A-Chlordane	28 U	28	0.608
5103-74-2	G-Chlordane	28 U	28	0.984
319-85-7	Beta-BHC	28 U	28	1.58
319-86-8	Delta-BHC	28 U	28	1.15
60-57-1	Dieldrin	28 U	28	0.433
115-29-7	Endosulfan I	28 U	28	1.27
33213-65-9	Endosulfan II	28 U	28	0.300
1031-07-8	Endosulfan Sulfate	28 U	28	0.704
72-20-8	Endrin	28 U	28	0.417
7421-93-4	Endrin Aldehyde	28 U	28	1.55
53494-70-5	Endrin Ketone	28 U	28	0.385
58-89-9	Lindane	28 U	28	0.272
76-44-8	Heptachlor	28 U	28	0.987
1024-57-3	Heptachlor Epoxide	28 U	28	0.637
72-43-5	Methoxychlor	28 U	28	0.392
8001-35-2	Toxaphene	240 U	240	32.6

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/09/03 by JRR
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/11/03 by MSN
	RAAP	Anal. Method:	USEPA-8081A
Sample ID:	**68SB1A**	QC Batch:	90181 -109
Sample #:	**345412**	Anal. Batch:	208238
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Chlorinated Pesticides OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
72-54-8	4,4'-DDD	26 U	26	0.309
72-55-9	4,4'-DDE	26 U	26	0.228
50-29-3	4,4'-DDT	26 U	26	0.234
309-00-2	Aldrin	26 U	26	0.395
319-84-6	Alpha-BHC	26 U	26	0.394
57-74-9	A-Chlordane	26 U	26	0.564
5103-74-2	G-Chlordane	26 U	26	0.914
319-85-7	Beta-BHC	26 U	26	1.47
319-86-8	Delta-BHC	26 U	26	1.06
60-57-1	Dieldrin	26 U	26	0.402
115-29-7	Endosulfan I	26 U	26	1.18
33213-65-9	Endosulfan II	26 U	26	0.278
1031-07-8	Endosulfan Sulfate	26 U	26	0.654
72-20-8	Endrin	26 U	26	0.387
7421-93-4	Endrin Aldehyde	26 U	26	1.44
53494-70-5	Endrin Ketone	26 U	26	0.358
58-89-9	Lindane	26 U	26	0.252
76-44-8	Heptachlor	26 U	26	0.917
1024-57-3	Heptachlor Epoxide	26 U	26	0.592
72-43-5	Methoxychlor	26 U	26	0.364
8001-35-2	Toxaphene	220 U	220	30.3

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/08/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3510C
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JLRM
	RAAP	Anal. Method:	USEPA-8082
Sample ID:	**EQB2**	QC Batch:	89851 -108
Sample #:	**345184**	Anal. Batch:	207778
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Polychlorinated Biphenyls OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
12674-11-2	PCB-1016	0.30 U	0.30	0.0753
11104-28-2	PCB-1221	0.50 U	0.50	0.0504
11141-16-5	PCB-1232	0.30 U	0.30	0.0794
53469-21-9	PCB-1242	0.30 U	0.30	0.0809
12672-29-6	PCB-1248	0.25 U	0.25	0.0828
11097-69-1	PCB-1254	0.10 U	0.10	0.0341
11096-82-5	PCB-1260	0.20 U	0.20	0.0481

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 10:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/09/03 by JRR
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JLRM
	RAAP	Anal. Method:	USEPA-8082
Sample ID:	**38SB1A**	QC Batch:	89881 -109
Sample #:	**345196**	Anal. Batch:	207924
Matrix:	Soil	Percent Solids:	70
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Polychlorinated Biphenyls OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
12674-11-2	PCB-1016	94 U	94	22.4
11104-28-2	PCB-1221	47 U	47	2.80
11141-16-5	PCB-1232	47 U	47	7.00
53469-21-9	PCB-1242	47 U	47	4.20
12672-29-6	PCB-1248	47 U	47	7.00
11097-69-1	**PCB-1254**	**570**	47	4.20
11096-82-5	PCB-1260	47 U	47	9.80

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/09/03 by JRR
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JLRM
	RAAP	Anal. Method:	USEPA-8082
Sample ID:	**68SB1A**	QC Batch:	89881 -109
Sample #:	**345412**	Anal. Batch:	207924
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polychlorinated Biphenyls OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
12674-11-2	PCB-1016	85 U	85	20.8
11104-28-2	PCB-1221	42 U	42	2.60
11141-16-5	PCB-1232	42 U	42	6.50
53469-21-9	PCB-1242	42 U	42	3.90
12672-29-6	PCB-1248	42 U	42	6.50
11097-69-1	**PCB-1254**	**8.7 J**	42	3.90
11096-82-5	PCB-1260	42 U	42	9.10

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8151A
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by MSN
	RAAP	Anal. Method:	USEPA-8151A
Sample ID:	**EQB2**	QC Batch:	90447 -109
Sample #:	**345184**	Anal. Batch:	208309
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Herbicides	Analytical Result	Reporting Limit	MDL
93-76-5	2,4,5-T	0.50 U	0.50	0.053
93-72-1	2,4,5-TP (Silvex)	0.50 U	0.50	0.104
94-75-7	2,4-D	5.0 U	5.0	0.670
94-82-6	2,4-DB	5.0 U	5.0	0.955
75-99-0	Dalapon	5.0 U	5.0	0.862
1918-00-9	Dicamba	0.50 U	0.50	0.104
120-36-5	Dichlorprop	5.0 U	5.0	0.195
88-85-7	Dinoseb	1.0 U	1.0	0.168
94-74-6	MCPA	250 U	250	76.8
93-65-2	MCPP	250 U	250	74.8

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 10:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8151A
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by MSN
	RAAP	Anal. Method:	USEPA-8151A
Sample ID:	**38SB1A**	QC Batch:	90218 -110
Sample #:	**345196**	Anal. Batch:	208309
Matrix:	Soil	Percent Solids:	70
Unit:	ug/kg dry	Dilution Factor:	14

CAS Number	Herbicides	Analytical Result	Reporting Limit	MDL
93-76-5	2,4,5-T	710 U	710	28.0
93-72-1	2,4,5-TP (Silvex)	710 U	710	56.0
94-75-7	2,4-D	2800 U	2800	224
94-82-6	2,4-DB	2800 U	2800	868
75-99-0	Dalapon	3600 U	3600	798
1918-00-9	Dicamba	2800 U	2800	28.0
120-36-5	Dichlorprop	2800 U	2800	238
~~88-85-7~~	~~*Dinoseb~~	~~2800 R~~ R,1	~~2800~~	~~294~~
94-74-6	MCPA	280000 U	280000	19500
93-65-2	MCPP	280000 U	280000	70800

See re-extraction 1/11/04

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 10:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	~~10/10/03 by DJM~~ 10/17/2003
Submittal #:	**36440-3**	Prep. Method:	USEPA-8151A
Submittal:	Delivery Order 0046	Analyzed:	10/27/03 by JLRM
	RAAP	Anal. Method:	USEPA-8151A
Sample ID:	**38SB1A**	QC Batch:	90218 -110
Sample #:	**345196DL**	Anal. Batch:	208365
Matrix:	Soil	Percent Solids:	70
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Herbicides	Analytical Result	Reporting Limit	MDL
~~93-76-5~~	~~2,4,5-T~~	~~71 U~~	~~71~~	~~2.80~~
~~93-72-1~~	~~2,4,5-TP (Silvex)~~	~~71 U~~	~~71~~	~~5.60~~
~~94-75-7~~	~~2,4-D~~	~~280 U~~	~~280~~	~~22.4~~
~~94-82-6~~	~~2,4-DB~~	~~280 U~~	~~280~~	~~86.8~~
~~75-99-0~~	~~Dalapon~~	~~360 U~~	~~360~~	~~79.8~~
~~1918-00-9~~	~~Dicamba~~	~~280 U~~	~~280~~	~~2.80~~
~~120-36-5~~	~~Dichlorprop~~	~~280 U~~	~~280~~	~~23.8~~
88-85-7	Dinoseb	280 U	280	29.4
~~94-74-6~~	~~MCPA~~	~~28000 U~~	~~28000~~	~~1950~~
~~93-65-2~~	~~MCPP~~	~~28000 U~~	~~28000~~	~~7080~~

Use only Dinoseb from this re-extraction analysis.
A 1/11/04

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8151A
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by MSN
	RAAP	Anal. Method:	USEPA-8151A
Sample ID:	**68SB1A**	QC Batch:	90218 -110
Sample #:	**345412**	Anal. Batch:	208309
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Herbicides	Analytical Result	Reporting Limit	MDL	
93-76-5	2,4,5-T	64 U	64	2.60	
93-72-1	2,4,5-TP (Silvex)	64 U	64	5.20	
94-75-7	2,4-D	260 U	260	20.8	
94-82-6	2,4-DB	260 U	260	80.6	
75-99-0	Dalapon	320 U	320	74.1	
1918-00-9	Dicamba	260 U	260	2.60	
120-36-5	Dichlorprop	260 U	260	22.1	
~~88-85-7~~	~~*Dinoseb~~	~~260 R~~	R_1 ~~260~~	~~27.3~~	see re-extracted 4/9/04
94-74-6	MCPA	26000 U	26000	1810	
93-65-2	MCPP	26000 U	26000	6570	

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8151A
Submittal:	Delivery Order 0046	Analyzed:	10/27/03 by JLRM
	RAAP	Anal. Method:	USEPA-8151A
Sample ID:	**68SB1A**	QC Batch:	90218 -110
Sample #:	**345412DL**	Anal. Batch:	208365
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

1/11/04 AS

10/17/2003

CAS Number	*Herbicides	Analytical Result	Reporting Limit	MDL
~~93-76-5~~	~~2,4,5-T~~	~~64 U~~	~~64~~	~~2.60~~
~~93-72-1~~	~~2,4,5-TP (Silvex)~~	~~64 U~~	~~64~~	~~5.20~~
~~94-75-7~~	~~2,4-D~~	~~260 U~~	~~260~~	~~20.8~~
~~94-82-6~~	~~2,4-DB~~	~~260 U~~	~~260~~	~~80.6~~
~~75-99-0~~	~~Dalapon~~	~~320 U~~	~~320~~	~~74.1~~
~~1918-00-9~~	~~Dicamba~~	~~260 U~~	~~260~~	~~2.68~~
~~120-36-5~~	~~Dichlorprop~~	~~260 U~~	~~260~~	~~22.1~~
88-85-7	Dinoseb	260 U	260	27.3
~~94-74-6~~	~~MCPA~~	~~26000 U~~	~~26000~~	~~1810~~
~~93-65-2~~	~~MCPP~~	~~26000 U~~	~~26000~~	~~6570~~

* See attached Statement of Data Qualifications.

Use only Dinoseb from this analysis. AS 1/11/04

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/03/03 @ 13:00
Sampler: B.F. & J.S.
Received: 10/04/03 @ 08:35

Submittal #: **36440-3**
Submittal: Delivery Order 0046
RAAP
Sample ID: **EQB2**
Sample #: **345184**
Matrix: QC Water

Percent Solids: n/a

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	100 U		100	18.7	ug/L	10/17/03	DSC	EPA-200.7/6010B
Antimony, Total	1.0 U		1.0	0.552	ug/L	10/16/03	JMF	EPA-200.8/6020
Arsenic, Total	1.0 U		1.0	0.429	ug/L	10/16/03	JMF	EPA-200.8/6020
Barium, Total	10 U		10	1.82	ug/L	10/17/03	DSC	EPA-200.7/6010B
Beryllium, Total	4.0 U		4.0	0.295	ug/L	10/17/03	DSC	EPA-200.7/6010B
Cadmium, Total	0.5 U		0.5	0.135	ug/L	10/16/03	JMF	EPA-200.8/6020
Calcium, Total	500 U		500	33.9	ug/L	10/17/03	DSC	EPA-200.7/6010B
Chromium, Total	1.0 U		1.0	0.554	ug/L	10/16/03	JMF	EPA-200.8/6020
Cobalt, Total	10 U		10	3.91	ug/L	10/17/03	DSC	EPA-200.7/6010B
Copper, Total	10 U		10	5.36	ug/L	10/17/03	DSC	EPA-200.7/6010B
Iron, Total	25 J	B,P	100	2.95	ug/L	10/17/03	DSC	EPA-200.7/6010B
Lead, Total	1.0 U		1.0	0.281	ug/L	10/16/03	JMF	EPA-200.8/6020
Magnesium, Total	500 U		500	57.4	ug/L	10/17/03	DSC	EPA-200.7/6010B
Manganese, Total	10 U		10	3.16	ug/L	10/17/03	DSC	EPA-200.7/6010B
Mercury, Total	0.4 U		0.4	0.0584	ug/L	10/13/03	MSS	USEPA-7470A
Nickel, Total	1.0 U		1.0	0.410	ug/L	10/16/03	JMF	EPA-200.8/6020
Potassium, Total	200 U		200	59.7	ug/L	10/17/03	DSC	EPA-200.7/6010B
Selenium, Total	2.0 U		2.0	0.933	ug/L	10/16/03	JMF	EPA-200.8/6020
Silver, Total	0.5 U		0.5	0.0765	ug/L	10/16/03	JMF	EPA-200.8/6020
Sodium, Total	180 J	B,P	500	76.9	ug/L	10/17/03	DSC	EPA-200.7/6010B
Thallium, Total	1.0 U		1.0	0.208	ug/L	10/16/03	JMF	EPA-200.8/6020
Vanadium, Total	10 U		10	2.89	ug/L	10/17/03	DSC	EPA-200.7/6010B
Zinc, Total	5.7 J		20	4.55	ug/L	10/17/03	DSC	EPA-200.7/6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/03/03 @ 08:50
Sampler: B.F. & J.S.
Received: 10/04/03 @ 08:35

Submittal #: **36440-3**
Submittal: Delivery Order 0046
RAAP
Sample ID: **38SB2A**
Sample #: **345186**
Matrix: Soil

Percent Solids: 86

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	11100		50	1.83	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Antimony, Total	0.50 U		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	0.80		0.40	0.0232	mg/kg dry	10/17/03	JMF	USEPA-6020
Barium, Total	107	L,M	5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	0.60 J		1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	1.4		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	1150	K,M	250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	17		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	7.9	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	7.2		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	16600		250	10.6	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Lead, Total	9.6		1.0	0.0218	mg/kg dry	10/17/03	JMF	USEPA-6020
Magnesium, Total	2840		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	414		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.010 J		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	11		0.50	0.0356	mg/kg dry	10/17/03	JMF	USEPA-6020
Potassium, Total	1600		100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.55 J		1.0	0.0502	mg/kg dry	10/17/03	JMF	USEPA-6020
Silver, Total	0.064 J		3.0	0.0044	mg/kg dry	10/17/03	JMF	USEPA-6020
Sodium, Total	38 J		100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.15 J		0.50	0.0270	mg/kg dry	10/17/03	JMF	USEPA-6020
Vanadium, Total	24		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	55	B,X	4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 09:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
Submittal #:	**36440-3**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**38SB2B**		
Sample #:	**345187**		
Matrix:	Soil	Percent Solids:	85

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	18500		50	1.83	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Antimony, Total	0.50 U		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	1.4		0.40	0.0232	mg/kg dry	10/17/03	JMF	USEPA-6020
Barium, Total	119	L,M	5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	0.55 J		1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	1.8		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	1590	K,M	250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	22		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	12	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	13		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	28500		500	21.2	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Lead, Total	12		1.0	0.0218	mg/kg dry	10/17/03	JMF	USEPA-6020
Magnesium, Total	5040		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	471		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.013 J		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	16		0.50	0.0356	mg/kg dry	10/17/03	JMF	USEPA-6020
Potassium, Total	1700		100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.56 J		1.0	0.0502	mg/kg dry	10/17/03	JMF	USEPA-6020
Silver, Total	0.047 J	B,P	3.0	0.0044	mg/kg dry	10/17/03	JMF	USEPA-6020
Sodium, Total	46 J		100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.22 J		0.50	0.0270	mg/kg dry	10/17/03	JMF	USEPA-6020
Vanadium, Total	43		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	65	B,X	4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/03/03 @ 00:00
Sampler: B.F. & J.S.
Received: 10/04/03 @ 08:35

Submittal #: **36440-3**
Submittal: Delivery Order 0046
RAAP
Sample ID: **SBD4**
Sample #: **345188**
Matrix: Soil

Percent Solids: 81

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	17800		50	1.83	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Antimony, Total	0.50 U		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	1.6		0.40	0.0232	mg/kg dry	10/17/03	JMF	USEPA-6020
Barium, Total	113	L,M	5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	0.64 J		1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	1.7		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	1550	K,M	250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	22		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	12	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	13		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	27800		500	21.2	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Lead, Total	11		1.0	0.0218	mg/kg dry	10/17/03	JMF	USEPA-6020
Magnesium, Total	5010		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	460		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.010 J		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	16		0.50	0.0356	mg/kg dry	10/17/03	JMF	USEPA-6020
Potassium, Total	1810		100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.61 J		1.0	0.0502	mg/kg dry	10/17/03	JMF	USEPA-6020
Silver, Total	0.066 J		3.0	0.0044	mg/kg dry	10/17/03	JMF	USEPA-6020
Sodium, Total	52 J		100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.23 J		0.50	0.0270	mg/kg dry	10/17/03	JMF	USEPA-6020
Vanadium, Total	43		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	68	B,X	4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/03/03 @ 09:10
Sampler: B.F. & J.S.
Received: 10/04/03 @ 08:35

Submittal #: **36440-3**
Submittal: Delivery Order 0046
RAAP
Sample ID: **38SB2C**
Sample #: **345189**
Matrix: Soil

Percent Solids: 93

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	10600		50	1.83	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Antimony, Total	0.50 U		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	2.1		0.40	0.0232	mg/kg dry	10/17/03	JMF	USEPA-6020
Barium, Total	83	L,m	5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	0.43 J		1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	1.4		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	1270	K,m	250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	20		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	9.0	J,s	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	8.8		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	21800		500	21.2	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Lead, Total	7.3		1.0	0.0218	mg/kg dry	10/17/03	JMF	USEPA-6020
Magnesium, Total	3420		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	375		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.10 U		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	11		0.50	0.0356	mg/kg dry	10/17/03	JMF	USEPA-6020
Potassium, Total	1520		100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.43 J		1.0	0.0502	mg/kg dry	10/17/03	JMF	USEPA-6020
Silver, Total	0.051 J		3.0	0.0044	mg/kg dry	10/17/03	JMF	USEPA-6020
Sodium, Total	53 J		100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.12 J		0.50	0.0270	mg/kg dry	10/17/03	JMF	USEPA-6020
Vanadium, Total	24		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	47	B,X	4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/03/03 @ 10:45
Sampler: B.F. & J.S.
Received: 10/04/03 @ 08:35

Submittal #: **36440-3**
Submittal: Delivery Order 0046
RAAP
Sample ID: **38SB1A**
Sample #: **345196**
Matrix: Soil

Percent Solids: 70

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	22000		50	1.83	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Antimony, Total	0.31 J		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	3.4		0.40	0.0232	mg/kg dry	10/17/03	JMF	USEPA-6020
Barium, Total	94	L,M	5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	0.67 J		1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	1.8		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	27600	K,M	1250	16.6	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Chromium, Total	75		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	7.9	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	57		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	24600		500	21.2	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Lead, Total	52		10	0.218	mg/kg dry	10/17/03	JMF	USEPA-6020
Magnesium, Total	4550		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	400		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.16		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	33		0.50	0.0356	mg/kg dry	10/17/03	JMF	USEPA-6020
Potassium, Total	1670		100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.59 J		1.0	0.0502	mg/kg dry	10/17/03	JMF	USEPA-6020
Silver, Total	0.13 J		3.0	0.0044	mg/kg dry	10/17/03	JMF	USEPA-6020
Sodium, Total	55 J		100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.17 J		0.50	0.0270	mg/kg dry	10/17/03	JMF	USEPA-6020
Vanadium, Total	35		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	90	B,X	4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/03/03 @ 11:00
Sampler: B.F. & J.S.
Received: 10/04/03 @ 08:35

Submittal #: **36440-3**
Submittal: Delivery Order 0046
RAAP
Sample ID: **38SB1B**
Sample #: **345197**
Matrix: Soil

Percent Solids: 82

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	21800		50	1.83	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Antimony, Total	0.50 U		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	1.6		0.40	0.0232	mg/kg dry	10/17/03	JMF	USEPA-6020
Barium, Total	128	L,M	5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	0.75 J		1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	1.8		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	2690	K,M	250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	24		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	13	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	15		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	32200		500	21.2	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Lead, Total	12		1.0	0.0218	mg/kg dry	10/17/03	JMF	USEPA-6020
Magnesium, Total	5130		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	397		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.015 J		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	18		0.50	0.0356	mg/kg dry	10/17/03	JMF	USEPA-6020
Potassium, Total	2150		100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.67 J		1.0	0.0502	mg/kg dry	10/17/03	JMF	USEPA-6020
Silver, Total	0.063 J		3.0	0.0044	mg/kg dry	10/17/03	JMF	USEPA-6020
Sodium, Total	49 J		100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.25 J		0.50	0.0270	mg/kg dry	10/17/03	JMF	USEPA-6020
Vanadium, Total	50		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	72	B,X	4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/03/03 @ 11:20
Sampler: B.F. & J.S.
Received: 10/04/03 @ 08:35

Submittal #: **36440-3**
Submittal: Delivery Order 0046
RAAP
Sample ID: **38SB1C**
Sample #: **345198**
Matrix: Soil

Percent Solids: 78

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	19900		50	1.83	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Antimony, Total	0.50 U		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	1.7		0.40	0.0232	mg/kg dry	10/17/03	JMF	USEPA-6020
Barium, Total	117	L,M	5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	0.53 J		1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	1.9		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	3010	K,M	250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	26		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	9.1	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	12		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	25300		500	21.2	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Lead, Total	9.9		1.0	0.0218	mg/kg dry	10/17/03	JMF	USEPA-6020
Magnesium, Total	8240		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	377		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.011 J		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	15		0.50	0.0356	mg/kg dry	10/17/03	JMF	USEPA-6020
Potassium, Total	2210		100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.54 J		1.0	0.0502	mg/kg dry	10/17/03	JMF	USEPA-6020
Silver, Total	0.075 J		3.0	0.0044	mg/kg dry	10/17/03	JMF	USEPA-6020
Sodium, Total	52 J		100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.22 J		0.50	0.0270	mg/kg dry	10/17/03	JMF	USEPA-6020
Vanadium, Total	41		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	55	B,X	4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35

Submittal #: **36440-3**
Submittal: Delivery Order 0046
RAAP
Sample ID: **38SB3A**
Sample #: **345199**
Matrix: Soil

Percent Solids: 56

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	26400		250	9.15	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Antimony, Total	0.26 J		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	4.6		0.40	0.0232	mg/kg dry	10/17/03	JMF	USEPA-6020
Barium, Total	116	L,M	5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	0.91 J		1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	1.9		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	6740	K,M	250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	82		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	9.8	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	85		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	30700		500	21.2	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Lead, Total	50		10	0.218	mg/kg dry	10/17/03	JMF	USEPA-6020
Magnesium, Total	5590		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	414		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.033 J		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	35		0.50	0.0356	mg/kg dry	10/17/03	JMF	USEPA-6020
Potassium, Total	2410		100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.64 J		1.0	0.0502	mg/kg dry	10/17/03	JMF	USEPA-6020
Silver, Total	0.14 J		3.0	0.0044	mg/kg dry	10/17/03	JMF	USEPA-6020
Sodium, Total	46 J		100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.19 J		0.50	0.0270	mg/kg dry	10/17/03	JMF	USEPA-6020
Vanadium, Total	42		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	100	B,X	4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/03/03 @ 12:15
Sampler: B.F. & J.S.
Received: 10/04/03 @ 08:35

Submittal #: **36440-3**
Submittal: Delivery Order 0046
RAAP
Sample ID: **38SB3B**
Sample #: **345200**
Matrix: Soil

Percent Solids: 76

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	22000		50	1.83	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Antimony, Total	0.50 U		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	1.8		0.40	0.0232	mg/kg dry	10/17/03	JMF	USEPA-6020
Barium, Total	138	L,m	5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	0.93 J		1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	1.3		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	2580	K,m	250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	27		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	12	J,s	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	18		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	31900		500	21.2	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Lead, Total	13		1.0	0.0218	mg/kg dry	10/17/03	JMF	USEPA-6020
Magnesium, Total	4960		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	472		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.021 J		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	18		0.50	0.0356	mg/kg dry	10/17/03	JMF	USEPA-6020
Potassium, Total	2040		100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.78 J		1.0	0.0502	mg/kg dry	10/17/03	JMF	USEPA-6020
Silver, Total	0.061 J		3.0	0.0044	mg/kg dry	10/17/03	JMF	USEPA-6020
Sodium, Total	55 J		100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.25 J		0.50	0.0270	mg/kg dry	10/17/03	JMF	USEPA-6020
Vanadium, Total	49		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	73	B,x	4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/03/03 @ 12:30
Sampler: B.F. & J.S.
Received: 10/04/03 @ 08:35

Submittal #: **36440-3**
Submittal: Delivery Order 0046
RAAP
Sample ID: **38SB3C**
Sample #: **345201**
Matrix: Soil

Percent Solids: 80

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	20000		50	1.83	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Antimony, Total	0.50 U		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	1.5		0.40	0.0232	mg/kg dry	10/17/03	JMF	USEPA-6020
Barium, Total	131	L,M	5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	0.63 J		1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	1.7		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	2630	K,M	250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	25		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	11	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	15		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	30200		500	21.2	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Lead, Total	12		1.0	0.0218	mg/kg dry	10/17/03	JMF	USEPA-6020
Magnesium, Total	4640		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	478		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.016 J		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	16		0.50	0.0356	mg/kg dry	10/17/03	JMF	USEPA-6020
Potassium, Total	1880		100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.65 J		1.0	0.0502	mg/kg dry	10/17/03	JMF	USEPA-6020
Silver, Total	0.056 J		3.0	0.0044	mg/kg dry	10/17/03	JMF	USEPA-6020
Sodium, Total	53 J		100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.22 J		0.50	0.0270	mg/kg dry	10/17/03	JMF	USEPA-6020
Vanadium, Total	45		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	65	B,X	4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/06/03 @ 13:15
Sampler: B.F.& J.S.
Received: 10/07/03 @ 08:55

Submittal #: **36440-3**
Submittal: Delivery Order 0046
RAAP
Sample ID: **68SB2A**
Sample #: **345408**
Matrix: Soil

Percent Solids: 78

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	30700		250	5.10	mg/kg dry	10/23/03	DSC	USEPA-6010B
Antimony, Total	0.50 U		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	2.5		0.40	0.0232	mg/kg dry	10/17/03	JMF	USEPA-6020
* Barium, Total	86	L,M	5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	0.76 J		1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	1.8		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
* Calcium, Total	1230	K,M	250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	21		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	24	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	14		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	29300		500	21.2	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Lead, Total	7.9		1.0	0.0218	mg/kg dry	10/17/03	JMF	USEPA-6020
Magnesium, Total	5740		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	613		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.022 J		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	14		0.50	0.0356	mg/kg dry	10/17/03	JMF	USEPA-6020
Potassium, Total	2970		100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.64 J		1.0	0.0502	mg/kg dry	10/17/03	JMF	USEPA-6020
Silver, Total	0.084 J		3.0	0.0044	mg/kg dry	10/17/03	JMF	USEPA-6020
Sodium, Total	25 J		100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.20 J		0.50	0.0270	mg/kg dry	10/17/03	JMF	USEPA-6020
Vanadium, Total	49		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	34	B,X	4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/06/03 @ 13:30
Sampler: B.F.& J.S.
Received: 10/07/03 @ 08:55

Submittal #: **36440-3**
Submittal: Delivery Order 0046
RAAP
Sample ID: **68SB2B**
Sample #: **345409**
Matrix: Soil

Percent Solids: 73

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	26200		250	5.10	mg/kg dry	10/23/03	DSC	USEPA-6010B
Antimony, Total	0.15 J		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	3.1		0.40	0.0232	mg/kg dry	10/17/03	JMF	USEPA-6020
Barium, Total	31	L,M	5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	1.1		1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	2.3		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	1140	K,M	250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	19		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	4.6	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	4.3		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	56600		1000	71.6	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	6.5		1.0	0.0218	mg/kg dry	10/17/03	JMF	USEPA-6020
Magnesium, Total	1580		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	91		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.042 J		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	9.1		0.50	0.0356	mg/kg dry	10/17/03	JMF	USEPA-6020
Potassium, Total	2610		100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.72 J		1.0	0.0502	mg/kg dry	10/17/03	JMF	USEPA-6020
Silver, Total	0.058 J		3.0	0.0044	mg/kg dry	10/17/03	JMF	USEPA-6020
Sodium, Total	83 J		100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.098 J		0.50	0.0270	mg/kg dry	10/17/03	JMF	USEPA-6020
Vanadium, Total	26		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	27	B,X	4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/06/03 @ 13:45
Sampler: B.F.& J.S.
Received: 10/07/03 @ 08:55

Submittal #: **36440-3**
Submittal: Delivery Order 0046
RAAP
Sample ID: **68SB2C**
Sample #: **345410**
Matrix: Soil

Percent Solids: 71

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	29300		2500	5.10	mg/kg dry	10/23/03	DSC	USEPA-6010B
Antimony, Total	0.91		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	11		0.40	0.0232	mg/kg dry	10/17/03	JMF	USEPA-6020
Barium, Total	44	L,M	5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	2.7		1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	1.9		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	810	K,M	250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	38		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	15	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	24		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	39400		500	35.8	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	9.9		1.0	0.0218	mg/kg dry	10/17/03	JMF	USEPA-6020
Magnesium, Total	31900		12500	10.7	mg/kg dry	10/23/03	DSC	USEPA-6010B
Manganese, Total	534		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.10 U		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	52		5.0	0.356	mg/kg dry	10/17/03	JMF	USEPA-6020
Potassium, Total	7750	J,+	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.35 J		1.0	0.0502	mg/kg dry	10/17/03	JMF	USEPA-6020
Silver, Total	0.17 J		3.0	0.0044	mg/kg dry	10/17/03	JMF	USEPA-6020
Sodium, Total	108		100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.23 J		0.50	0.0270	mg/kg dry	10/17/03	JMF	USEPA-6020
Vanadium, Total	59		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	37	B,X	4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/06/03 @ 00:00
Sampler: B.F.& J.S.
Received: 10/07/03 @ 08:55

Submittal #: **36440-3**
Submittal: Delivery Order 0046
RAAP
Sample ID: **SBD5**
Sample #: **345411**
Matrix: Soil

Percent Solids: 76

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	21400		50	1.83	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Antimony, Total	0.64		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	9.2		0.40	0.0232	mg/kg dry	10/17/03	JMF	USEPA-6020
Barium, Total	46	L,M	5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	2.6		1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	2.0		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	787	K,M	250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	36		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	17	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	25		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	39200		500	35.8	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	8.6		1.0	0.0218	mg/kg dry	10/17/03	JMF	USEPA-6020
Magnesium, Total	23900		1250	16.1	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Manganese, Total	524		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.10 U		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	45		0.50	0.0356	mg/kg dry	10/17/03	JMF	USEPA-6020
Potassium, Total	5380	J,f	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.43 J		1.0	0.0502	mg/kg dry	10/17/03	JMF	USEPA-6020
Silver, Total	0.16 J		3.0	0.0044	mg/kg dry	10/17/03	JMF	USEPA-6020
Sodium, Total	107		100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.21 J		0.50	0.0270	mg/kg dry	10/17/03	JMF	USEPA-6020
Vanadium, Total	56		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	33	B,x	4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/06/03 @ 15:00
Sampler: B.F.& J.S.
Received: 10/07/03 @ 08:55

Submittal #: **36440-3**
Submittal: Delivery Order 0046
RAAP
Sample ID: **68SB1A**
Sample #: **345412**
Matrix: Soil

Percent Solids: 78

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	34500		2500	5.10	mg/kg dry	10/23/03	DSC	USEPA-6010B
Antimony, Total	0.50	U	0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	3.2		0.40	0.0232	mg/kg dry	10/17/03	JMF	USEPA-6020
Barium, Total	78	L,M	5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	1.1		1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	2.2		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	661	K,M	250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	20		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	22	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	15		1.0	0.368	mg/kg dry	10/16/03	DWJ	USRPA-6010B
Iron, Total	33100		500	35.8	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	8.9		1.0	0.0218	mg/kg dry	10/17/03	JMF	USEPA-6020
Magnesium, Total	8010		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	532		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.020	J	0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	17		0.50	0.0356	mg/kg dry	10/17/03	JMF	USEPA-6020
Potassium, Total	3800		100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.89	J	1.0	0.0502	mg/kg dry	10/17/03	JMF	USEPA-6020
Silver, Total	0.11	J	3.0	0.0044	mg/kg dry	10/17/03	JMF	USEPA-6020
Sodium, Total	36	J	100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.25	J	0.50	0.0270	mg/kg dry	10/17/03	JMF	USEPA-6020
Vanadium, Total	53		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	38	B,X	4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/06/03 @ 15:15
Sampler: B.F.& J.S.
Received: 10/07/03 @ 08:55

Submittal #: **36440-3**
Submittal: Delivery Order 0046
RAAP
Sample ID: **68SB1B**
Sample #: **345413**
Matrix: Soil

Percent Solids: 72

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	19200		50	1.83	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Antimony, Total	1.4		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	0.80		0.40	0.0232	mg/kg dry	10/17/03	JMF	USEPA-6020
Barium, Total	20	L,M	5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	1.2		1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	2.1		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	1130	K,M	250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	6.9		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	3.4	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	4.6		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	38400		500	35.8	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	2.9		1.0	0.0218	mg/kg dry	10/17/03	JMF	USEPA-6020
Magnesium, Total	1650		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	213		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.016 J		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	8.0		0.50	0.0356	mg/kg dry	10/17/03	JMF	USEPA-6020
Potassium, Total	2490		100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.55 J		1.0	0.0502	mg/kg dry	10/17/03	JMF	USEPA-6020
Silver, Total	0.047 J	B,P	3.0	0.0044	mg/kg dry	10/17/03	JMF	USEPA-6020
Sodium, Total	31 J		100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.081 J		0.50	0.0270	mg/kg dry	10/17/03	JMF	USEPA-6020
Vanadium, Total	16		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	14	B,X	4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55

Submittal #: **36440-3**
Submittal: Delivery Order 0046
RAAP
Sample ID: **68SB1C**
Sample #: **345414**
Matrix: Soil Percent Solids: 75

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	28500		12500	5.10	mg/kg dry	10/23/03	DSC	USEPA-6010B
Antimony, Total	0.063 J		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	7.8		0.40	0.0232	mg/kg dry	10/17/03	JMF	USEPA-6020
Barium, Total	51	L,m	5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	2.3		1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	1.9		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	250 U		250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	37		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	16	J,s	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	24		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	38500		500	35.8	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	9.7		1.0	0.0218	mg/kg dry	10/17/03	JMF	USEPA-6020
Magnesium, Total	22900		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	484		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.022 J		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	55		5.0	0.356	mg/kg dry	10/17/03	JMF	USEPA-6020
Potassium, Total	5460		100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.21 J	B,p	1.0	0.0502	mg/kg dry	10/17/03	JMF	USEPA-6020
Silver, Total	0.16 J		3.0	0.0044	mg/kg dry	10/17/03	JMF	USEPA-6020
Sodium, Total	213		100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.23 J		0.50	0.0270	mg/kg dry	10/17/03	JMF	USEPA-6020
Vanadium, Total	54		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	38	B,x	4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/07/03 @ 16:00
Sampler: B.F. & J.S.
Received: 10/08/03 @ 08:50

Submittal #: **36440-3**
Submittal: Delivery Order 0046
RAAP
Sample ID: **EQB3**
Sample #: **345617**
Matrix: QC Water

Percent Solids: n/a

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	100 U		100	18.7	ug/L	10/17/03	DSC	EPA-200.7/6010B
Antimony, Total	1.0 U		1.0	0.552	ug/L	10/16/03	JMF	EPA-200.8/6020
Arsenic, Total	1.0 U		1.0	0.429	ug/L	10/16/03	JMF	EPA-200.8/6020
Barium, Total	10 U		10	1.82	ug/L	10/17/03	DSC	EPA-200.7/6010B
Beryllium, Total	4.0 U		4.0	0.295	ug/L	10/17/03	DSC	EPA-200.7/6010B
Cadmium, Total	0.5 U		0.5	0.135	ug/L	10/16/03	JMF	EPA-200.8/6020
Calcium, Total	500 U		500	33.9	ug/L	10/17/03	DSC	EPA-200.7/6010B
Chromium, Total	1.0 U		1.0	0.554	ug/L	10/16/03	JMF	EPA-200.8/6020
Cobalt, Total	10 U		10	3.91	ug/L	10/17/03	DSC	EPA-200.7/6010B
Copper, Total	10 U		10	5.36	ug/L	10/17/03	DSC	EPA-200.7/6010B
Iron, Total	4.8 J	BP	100	2.95	ug/L	10/17/03	DSC	EPA-200.7/6010B
Lead, Total	0.3 J		1.0	0.281	ug/L	10/16/03	JMF	EPA-200.8/6020
Magnesium, Total	500 U		500	57.4	ug/L	10/17/03	DSC	EPA-200.7/6010B
Manganese, Total	10 U		10	3.16	ug/L	10/17/03	DSC	EPA-200.7/6010B
Mercury, Total	0.4 U		0.4	0.0584	ug/L	10/13/03	MSS	USEPA-7470A
Nickel, Total	1.0 U		1.0	0.410	ug/L	10/16/03	JMF	EPA-200.8/6020
Potassium, Total	200 U		200	59.7	ug/L	10/17/03	DSC	EPA-200.7/6010B
Selenium, Total	2.0 U		2.0	0.933	ug/L	10/16/03	JMF	EPA-200.8/6020
Silver, Total	0.5 U		0.5	0.0765	ug/L	10/16/03	JMF	EPA-200.8/6020
Sodium, Total	160 J	BP	500	76.9	ug/L	10/17/03	DSC	EPA-200.7/6010B
Thallium, Total	1.0 U		1.0	0.208	ug/L	10/16/03	JMF	EPA-200.8/6020
Vanadium, Total	10 U		10	2.89	ug/L	10/17/03	DSC	EPA-200.7/6010B
Zinc, Total	20 U		20	4.55	ug/L	10/17/03	DSC	EPA-200.7/6010B

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
Submittal #:	**36440-3**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**EQB2**		
Sample #:	**345184**		
Matrix:	QC Water	Percent Solids:	n/a

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Cyanide, Total	10 U	10	3.40	ug/L	10/16/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 08:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
Submittal #:	**36440-3**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**38SB2A**		
Sample #:	**345186**		
Matrix:	Soil	Percent Solids:	86

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	86	0.1	0.1	%	10/10/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 09:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
Submittal #:	**36440-3**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**38SB2B**		
Sample #:	**345187**		
Matrix:	Soil	Percent Solids:	85

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	85	0.1	0.1	%	10/10/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
Submittal #:	**36440-3**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**SBD4**		
Sample #:	**345188**		
Matrix:	Soil	Percent Solids:	81

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	81	0.1	0.1	%	10/10/03	TAM	SW-846 3550B
Cyanide, Total	0.04 J	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 09:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
Submittal #:	**36440-3**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**38SB2C**		
Sample #:	**345189**		
Matrix:	Soil	Percent Solids:	93

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	93	0.1	0.1	%	10/10/03	TAM	SW-846 3550B
* Cyanide, Total	0.50 U VL,1	0.50	0.0356	mg/kg dry	10/21/03	JLB	USEPA-9012A

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 10:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
Submittal #:	**36440-3**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**38SB1A**		
Sample #:	**345196**		
Matrix:	Soil	Percent Solids:	70

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	70	0.1	0.1	%	10/10/03	TAM	SW-846 3550B
Cyanide, Total	0.30 J	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
Submittal #:	**36440-3**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**38SB1B**		
Sample #:	**345197**		
Matrix:	Soil	Percent Solids:	82

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	82	0.1	0.1	%	10/10/03	TAM	SW-846 3550B
Cyanide, Total	0.13 J	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 11:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
Submittal #:	**36440-3**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**38SB1C**		
Sample #:	**345198**		
Matrix:	Soil	Percent Solids:	78

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	78	0.1	0.1	%	10/10/03	TAM	SW-846 3550B
Cyanide, Total	0.11 J	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
Submittal #:	**36440-3**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**38SB3A**		
Sample #:	**345199**		
Matrix:	Soil	Percent Solids:	56

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	56	0.1	0.1	%	10/10/03	TAM	SW-846 3550B
Cyanide, Total	0.57	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
Submittal #:	**36440-3**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**38SB3B**		
Sample #:	**345200**		
Matrix:	Soil	Percent Solids:	76

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	76	0.1	0.1	%	10/10/03	TAM	SW-846 3550B
Cyanide, Total	0.24 J	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
Submittal #:	**36440-3**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**38SB3C**		
Sample #:	**345201**		
Matrix:	Soil	Percent Solids:	80

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	80	0.1	0.1	%	10/10/03	TAM	SW-846 3550B
Cyanide, Total	0.24 J	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 13:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
Submittal #:	**36440-3**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**68SB2A**		
Sample #:	**345408**		
Matrix:	Soil	Percent Solids:	78

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	78	0.1	0.1	%	10/10/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 13:30
Project:	Richmond, VA RAAP	Sampler: Received:	B.F.& J.S. 10/07/03 @ 08:55
Submittal #:	**36440-3**		
Submittal:	Delivery Order 0046 RAAP		
Sample ID:	**68SB2B**		
Sample #:	**345409**		
Matrix:	Soil	Percent Solids:	73

Paramater	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	73	0.1	0.1	%	10/10/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 13:45
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
Submittal #:	**36440-3**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**68SB2C**		
Sample #:	**345410**		
Matrix:	Soil	Percent Solids:	71

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	71	0.1	0.1	%	10/10/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
Submittal #:	**36440-3**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**SBD5**		
Sample #:	**345411**		
Matrix:	Soil	Percent Solids:	76

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	76	0.1	0.1	%	10/10/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
Submittal #:	**36440-3**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**68SB1A**		
Sample #:	**345412**		
Matrix:	Soil	Percent Solids:	78

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	78	0.1	0.1	%	10/10/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
Submittal #:	**36440-3**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**68SB1B**		
Sample #:	**345413**		
Matrix:	Soil	Percent Solids:	72

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	72	0.1	0.1	%	10/10/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
Submittal #:	**36440-3**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**68SB1C**		
Sample #:	**345414**		
Matrix:	Soil	Percent Solids:	75

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	75	0.1	0.1	%	10/10/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
Submittal #:	**36440-3**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**EQB3**		
Sample #:	**345617**		
Matrix:	QC Water	Percent Solids:	n/a

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Cyanide, Total	10 U	10	3.40	ug/L	10/16/03	JLB	USEPA-9012A

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DATA VALIDATION WORKSHEET

Volatile Organic Analysis by GC/MS

Reviewer: AS
Date: January-04
DV Level: II III IV
Review Document:
X NFG - Region III Modifications
X Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-3
Test Name: 8260B
Method No.: VOC

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Do sample preservation, collection and storage condition meet method requirement?	x		
	If the temperature of the cooler was elevated (> 10 °C) or bubble size in aqueous sample was too big (tiny bubble is OK.), then flag all positive results with a "L" and all non-detects "UL".			
1.5	Do any soil samples contain more than 50% water?		x	
	If any sample analyzed as a soil, other than TCLP, contains % moisture greater than 50%, noted in the DV report.			

Notes: five coolers @ 2.2C, 0.9C, 1.1C, 2.1 & 8.6C (EQB&TB)

2.0 Holding Times		Yes	No	NA
2.1	Were sample preserved as specified in the method or project QAPP?	see above		
2.2	Have any technical holding times, determined from date of sampling to date of analysis, been exceeded? If yes, L(+)/UL(-). For aqueous unpreserved - 7 days for aromatic compounds All others - 14 days.		x	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, L(+)/R(-) .		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per GCMS, 20 samples, batch, matrix, and level)?	x		
3.2	Do any method blanks have positive results? Action: If yes, positive sample results should be reported and qualified "B", if the concentration of the compound in the sample is less than or equal to 5 times (or 10 times for the common volatile lab contaminants - methylene chloride, acetone, and 2-butanone) the amount in the associated blank.	x		
3.3	Do any field equipment blanks/trip blanks have positive results? If Yes, use same rules above.	x		
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, noted in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If no, use professional judgement to determine the effect on the data and note in the reviewer narrative.	x		
4.3	Has a continuing calibration standard been analyzed for every 12 hours of sample analysis per instrument?	x		
4.4	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 15% and %D < ± 20%		x	
	For initial Calibration: for %RSD > ±15%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 20% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >20%, J(+).			
4.5	Do any SPCC compounds have an RRF < control limit? Control limits: >0.10 for chloromethane, 1,1-dichloroethane, & bromoform or >0.30 for chlorobenzene & 1,1,2,2-tetrachloroethane. If yes, L(+)/R(-).		x	

Notes: The second source for methyl acetate was analyzed after sample analyses, but passed at 89% - no action was taken.

5.0 GC/MS Instrument Performance Check		Yes	No	NA
5.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?	x		
5.2	Are BFB enchanced bar graph spectrum and mass/charge (m/z) listing provided for each 12-hour shift?	x		
5.3	Have all samples been analyzed within twelve hours of the BFB tune?	x		
	If twelve hours have elapsed according to the system clock, and the laboratory had analyzed standards, blanks, field samples or QC samples after twelve (12) hours, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
5.4	Have ion abundance criteria for BFB been met for each instrument used?	x		
	If the BFB criteria were not met prior to the analyses of the standards, blanks, field samples and QC samples, all standards, blanks, field samples and QC samples are rejected "R".			

Notes:

6.0 Surrogate Recovery							Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?						x		
6.2	Are surrogate recoveries within acceptance criteria (not to exceed 50-150%) for all samples and method blanks?						x		
6.3	If No in Section 6.2, are these sample(s) or method blank(s) reanalyzed?								x
	If any system monitoring compound(s) in the volatile fraction is out of specification, there should be a reanalysis to confirm that the non-compliance is because of sample matrix effects rather than laboratory deficiencies.								
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? DV report should indicate that extraction efficiency/ method accuracy cannot be verified.								x
		1 or more <10%	1 high/low	2 or 3 high/low	2 or 3 all low	2 or 3 all high			
	Positives	L	J	J	L	K			
	Non-detects	R	UJ	UJ	UL	NONE			
	Note: The B qualifier remains over surrogate flagging.								

Notes:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 50-150%?	x		
7.4	Are there any RPD outside the QC limits not to exceed 50%?	x		
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

68SB2A	ms	msd	lab limits	RPD	lab limits
acetone	2	35	58-140%		
CS2	42	37	53-145%		
MTBE	110	132	76-122%		
methyl acetate				25%	20%

8.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)		Yes	No	NA
8.1	Is the LCS/LCSD recovery form present?	x		
8.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
8.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 50-150%?		x	
	If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
8.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 50%?			x
	If Yes, J(+) only.			

Notes:

9.0 Internal Standard		Yes	No	NA
9.1	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration? If not, J(+)/UJ(-).	x		
	If extremely low area counts are reported, or performance exhibits a major abrupt drop-off, then a severe loss of sensitivity is indicated. Non-detect target compounds should then be qualified as unusable (R).			
9.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	x		
	The chromatographic profile for that sample must be examined to determine if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction. Positive results should not needed to be qualified as "R", if the mass spectral criteria are met.			

Notes:

10.0 Field Duplicate		Yes	No	NA
10.1	Was a field duplicate prepared and analyzed at the correct frequency (one per 20 samples, matrix, and level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
10.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

11.0 Tentatively Identified Compounds (TICs) and Detection Limit Verification		Yes	No	NA
11.1	Are any TICs detected in the field samples? If Yes, all TIC results should be flagged "NJ" (tentativelyidenified, and approximate concentration).	x		
11.2	Do detection limits meet those required by the project QAPP and were they properly adjusted to reflect all sample dilutions and dry weight factors?	x		
11.3	Were sample concentrations above the highest standard run at a dilution? If not, for ion saturation flag "L", unsaturated results "J".			x

Notes:

12.0 Data Completeness		Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit 90%)	x		
	Number of samples: 21			
	Number of target compounds in each analysis:50			
	Number of results rejected and not reported:0			
	% Completeness = (12.1.1 x 12.1.2 - 12.1.3) x 100/(12.1.1 x 12.1.2)			
	% Completeness = 100.0%			

Notes:

DATA VALIDATION WORKSHEET

Semivolatile Organic Analysis

Reviewer: AS
Date: January-04
DV Level: II III IV
Review Document:
X NFG - Region III Modifications
X Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-3
Test Name: SVOC
Method No.: 8270C

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	
1.4	Do sample preservation, collection and storage condition meet method requirement?		x	
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 20 °C), then flag all positive results with a "L" and all non-detects "UL".			
1.5	Do any soil samples contain more than 50% water?		x	
	If any sample analyzed as a soil, other than TCLP, contains % moisture greater than 50%, noted in the DV report.			

Notes: five coolers @ 2.2C, 0.9C, 1.1C, 2.1 & 8.6C (EQB&TB)

2.0 Holding Times		Yes	No	NA
2.1	Were sample preserved as specified in the method or project QAPP?	x		
2.2	Have any technical holding times, determined from date of sampling to date of analysis, been exceeded? If yes, L(+)/UL(-). For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, L(+)/R(-) .		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x		
3.2	Do any preparation/instrument/reagent blanks have positive results? Action: If yes, positive sample results should be reported and qualified "B", if the concentrationof the compound in the sample is less than or equal to 5 times (or 10 times for the common phthalate contaminants) the amount in the associated blank.	x		
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.	x		
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, noted in the Dv report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If no, use professional judgement to determine the effect on the data and note in the reviewer narrative.	x		
4.3	Has a continuing calibration standard been analyzed for every 12 hours of sample analysis per instrument?	x		
4.4	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD ≤ 15%, ICV %D < 30%, and CCV %D ≤ 20%.		x	
	For initial Calibration: for %RSD >_+15%, but < ± 50%, J(+) only. for %RSD > ±50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 20% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >20%, J(+).			
4.5	Do any SPCC compounds have an RRF < 0.05? (n-nitroso-di-n-propylamine,hexachlorocyclopentadiene,2,4-dinitrophenol, & 4-nitrophenol) If yes, J(+)/R(-).		x	

Notes:

5.0 GC/MS Instrument Performance Check		Yes	No	NA
5.1	Are GC/MS Tuning and Mass Calibration forms present for decafluorotriphenylphosphine (DFTPP)?	x		
5.2	Are DFTPP enchanced bar graph spectrum and mass/charge (m/z) listing provided for each 12-hour shift?	x		
	If DFTPP was analyzed simultaneously with any calibration standard or blank, the instrument performance check (IPC) is rejected "R" as well as all associated data.			
5.3	Have all samples been analyzed within twelve hours of the DFTPP tune?	x		
	If twelve hours have elapsed according to the system clock, and the laboratory had analyzed standards, blanks, field samples or QC samples after twelve (12) hours, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
5.4	Have ion abundance criteria for DFTPP been met for each instrument used?	x		
	If the DFTPP criteria were not met prior to the analyses of the standards, blanks, field samples and QC samples, all standards, blanks, field samples and QC samples are rejected "R".			

Notes:

6.0 Surrogate Recovery		Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
6.2	Are surrogate recoveries within acceptance criteria not to exceed 10-150% for all samples and method blanks?		x	
6.3	If No in Section 6.2, are these sample(s) or method blank(s) reanalyzed?	at dilution		
	If any two base/neutral or acid fraction are out of specification, or if any one base/neutral or acid extractable surrogate has a recovery of less than 10%, then there should be a reanalysis to confirm that the non-compliance is because of sample matrix effects rather than laboratory deficiencies.			
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? (recoveries may be diluted out.)		x	
	1 or more <10% 2 or 3 high/low 2 or 3 all low 2 or 3 all high Positives L J L K Non-detects R UJ UL NONE			
	Note: The B qualifier remains over surrogate flagging.			

Notes:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 10-150%?	x		
7.4	Are there any RPDs outside the QC limits not to exceed 60%?	x		
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

8.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)		Yes	No	NA
8.1	Is the LCS/LCSD recovery form present?	x		
8.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
8.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 10-150%?		x	
	If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
8.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 50%?		x	
	If Yes, J(+) only.			

Notes:

9.0 Internal Standard		Yes	No	NA
9.1	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration? If not, J(+)/UJ(-).		x	
	If extremely low area counts are reported, or performance exhibits a major abrupt drop-off, then a severe loss of sensitivity is indicated. Non-detect target compounds should then be qualified as unusable (R).			
9.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	x		
	The chromatographic profile for that sample must be examined to determine if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction. Positive results should not needed to be qualified as "R", if the mass spectral criteria are met.			

Notes:

10.0 Field Duplicate		Yes	No	NA
10.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
10.2	Are all analyte duplicate results within control limits? Generally, no action is taken on the basis of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

11.0 Tentatively Identified Compounds (TICs) and Detection Limit Verification		Yes	No	NA
11.1	Are any TICs detected in the field samples? If Yes, all TIC results should be flagged "NJ" (tentatively identified, and approximate concentration).	x		
11.2	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture?	x	38SB1A, 38SB3A, & 38SB3B	
11.3	Were sample concentrations above the highest standard run at a dilution? If not, for ion saturation flag "L", unsaturated results "J".			x

Notes:

Two samples have all results reported from a 1:10 dilution with the sixth internal standard associated compounds reportable from a further dilution.

12.0 Data Completeness		Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit 90%)	x		
	Number of samples: 19			
	Number of target compounds in each analysis:66			
	Number of results rejected and not reported:0 using Dil results			
	% Completeness = (12.1.1 x 12.1.2 - 12.1.3) x 100/(12.1.1 x 12.1.2)			
	% Completeness = 100.0%			

Notes:

DATA VALIDATION WORKSHEET

Polyaromatic Hydrocarbons

Reviewer: AS
Date: January-04
DV Level: II III IV

Review Document:

__X__ Region III Modified for National Functional Guidelines
____ NFG for organic Data review (February 1994)
__X__ Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-3
Test Name: PAH
Method No.: 8310-HPLC

1.0 Laboratory Deliverables

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. % solids		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes: five coolers @ 2.2C, 0.9C, 1.1C, 2.1 & 8.6C (EQB&TB)

2.0 Holding Times

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?		see above	
	Action: If the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyses, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%	x		
	For initial Calibration: for %RSD > ±20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?		x	
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?			x
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.			x
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 40-150%?	x		
	Are there any RPDs outside the QC limits not to exceed 60%?		x	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

7.0 Laboratory Control Sample (LCS)		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 40-150%?	x		
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?		x	
	Action: If Yes, J(+) only.			

Notes:

8.0 Field Duplicate		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.	x		
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.			x
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	x		

Notes:

10.0 Data Completeness			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		x		
	Number of samples:	19			
	Number of target compounds in each analysis:	16			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

DATA VALIDATION WORKSHEET

Reviewer: AS
Date: January-04
DV Level: II III IV
Review Document:
X Region III Modified for National Functional Guidelines
___ NFG for organic Data review (February 1994)
X Project QAPP/SAP

Explosives

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-3
Test Name: Explosives
Method No.: 8330-HPLC

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. % solids		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes: five coolers @ 2.2C, 0.9C, 1.1C, 2.1 & 8.6C (EQB&TB)

2.0 Holding Times		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?		see above	
	Action: If the temperature of the cooler was elevated (> 10 ^{O}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyese, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%		x	
	For initial Calibration: for %RSD > ±20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?	x		
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?			x
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.			x
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 40-150%?		x	
6.4	Are there any RPDs outside the QC limits not to exceed 60%?	x		
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

7.0 Laboratory Control Sample (LCS)		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 40-150%?		x	
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?			x
	Action: If Yes, J(+) only.			

Notes:

8.0 Field Duplicate		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.	x		
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.	x		
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	x		

Notes:

10.0 Data Completeness			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		x		
	Number of samples:	19			
	Number of target compounds in each analysis:	14			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

DATA VALIDATION WORKSHEET

Pesticides/PCBs

Reviewer: AS
Date: January-04
DV Level: II III IV
Review Document:
X SW-846 - 8081/8082
X NFG - Region III Modifications
___ CLP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-3
Test Name: PEST/PCB
Method No.: 8081A/8082

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Do any soil samples contain more than 50% water?		x	
	If any sample analyzed as a soil, other than TCLP, contains % moisture greater than 50%, noted in the DV report.			

Notes: five coolers @ 2.2C, 0.9C, 1.1C, 2.1 & 8.6C (EQB&TB)
68SB2A's MS/MSD and EQB3 analyses were cancelled.

2.0 Preservation/ Holding Times		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?		see above	
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 20 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampleing to date of analysis, been exceeded? If yes, J(+)/UJ(-). For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, J(+)/R(-) .		x	

Notes: sampled on 10/2/03, extracted on 10/8-9/03, analyzed 10/10-30/03

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix)?	x		
3.2	Do any preparation/instrument/reagent blanks have positive results? Action: If yes, positive sample results should be reported and qualified "B", if the concentration of the compound in the sample is less than or equal to five times the amount in the associated blank.		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note it in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards included in the calibration curve? 1016 and 1260 need at least three peaks at five concentrations. The multi-component target compounds (the other Aroclors, Toxaphene, & Chlordane) must each be analyzed separately at a single concentration level during the initial calibration sequence.	x		
4.2	Has a continuing calibration standard been analyzed for every 12 hours or twenty samples?	x		
4.3	Are all calibration standard (IC and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r>0.99, %RSD < ± 20% and %D < ± 15%		x	
	For initial Calibration: for %RSD > ± 20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Do all standard retention times in the continuing calibration fall within the RT windows established during the initial calibration sequence? If No, the associated sample result should be carefully evaluated.	x		

Notes:

5.0 GC/ECD Instrument Performance Check for Pesticides		Yes	No	NA
5.1	Is the 4,4'-DDT breakdown </= to 15%? If No, for positive DDT results, DDT-L(+), DDD/DDE - NJ(+). For non-detect DDT results, DDD/DDE - R(+).	x		
5.2	Is the endrin breakdown </= to 15%? If No, for positive endrin results, endrin-L(+), endrin aldehyde/ketone - NJ(+). For non-detect DDT results, endrin aldehyde/ketone - R(+).	x		

Notes:

6.0 Surrogate Recovery					Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?				x		
6.2	Do all surrogate retention times fall within the RT windows established during the initial calibration sequence? If No, the associated sample result should be carefully evaluated.				x		
6.3	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?				x		
6.4	If No in Section 6.3, are these sample(s) or method blank(s) reanalyzed?						x
6.5	If No in Section 6.4, is any sample dilution factor greater than 10? (recoveries may be diluted out.)						x
	# of outliers	Recovery	Sample result from column with non-conformance	Sample result from column without non-conformance			
	1 out	high/low	No action	No action			
	2 out	2 high same column	K	No action			
		2 low same column	L, UL	No action			
		mixed same column	J, UJ	No action			
		2 high diff columns	J	Not applicable			
		2 low diff columns	J, UJ	Not applicable			
		mixed diff columns	Professional judgement	Not applicable			
	3 out	All high	K	Not applicable			
		All low	L, UL	Not applicable			
		2 high, 1 low	K (2 high)	J (1 low 2nd column)			
		2 low, 1 high	L, UJ (2 low)	J (1 high 2nd column)			
		other mixed	J, UJ	Not applicable			
	4 out	All high	K	Not applicable			
		All low	L, UL	Not applicable			
		Mixed	J, UJ	Not applicable			
	If any recovery is >0% and <10% then L(+)/R(-).						
	If any recovery is 0% then R(+/-).						

Notes:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 30-150%?	pest	pcb	
7.4	Are there any RPDs outside the QC limits not to exceed 60%?	pest	pcb	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes: MS/MSD from SDG 36440-1

8.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)		Yes	No	NA
8.1	Is the LCS/LCSD recovery form present?	x		
8.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
8.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 30-150%?	aqueous pest	soil all & aqueous PCBs	
	If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
8.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?	x		
	If Yes, J(+) only.			

Notes:

9.0 Field Duplicate		Yes	No	NA
9.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
9.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes: QSB1A/SBD1 submitted in SDG 36440-2, BDL for pest and 0.053/0.051 for Aroclor 1254.

10.0 Compound Identification and Detection Limit Verification		Yes	No	NA
10.1	Is the percent difference calculated for the positive sample results on both columns < 40%? If No, J(+).	x		
10.2	Do detection limits meet those required by the project QAPP and were properly adjusted for dilution factors and moisture?	x		

Notes:

11.0 Pesticide Cleanup Checks		Yes	No	NA
11.1	Is Form IX PEST-1 present and complete for each lot of Florisil Cartridges used? (Florisil Cleanup is required for all Pest/PCB extracts to reduce matrix interference caused by polar compounds.)			x
	Every lot number of Florisil cartridges used for sample cleanup must be checked by spiking with 2,4,5-trichlorophenol and the midpoint concentration of Individual Standard Mixture A.			
11.2	Are all samples listed on the Pesticide Florisil cartridge Check Form?			
11.3	Are percent recoveries of pesticide and surrogate compounds within control limit, 80-120%(if the recovery of 2,4,5-trichlorophenol < 5%), for the florisil cartridge check? If No, the raw data should be examined for the presence of polar interferences and professional judgement should be used in qualifying the data.			

Notes:

Florisil cleanup was performed, no laboratory submission for these CLP descriptors was provided.

12.0 Data Completeness				Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit 90%)	Pest	PCB	x		
	Number of samples:	3	3			
	Number of target compounds in each analysis:	21	7			
	Number of results rejected and not reported:	0	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)					
	% Completeness =	100%	100%			

Notes:

DATA VALIDATION WORKSHEET

Herbicides

Reviewer: AS
Date: January-04
DV Level: II III IV

Review Document:

__X__ Region III Modified for National Functional Guidelines
____ NFG for organic Data review (February 1994)
__X__ Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-3
Test Name: Herbicides
Method No.: 8151A

1.0 Laboratory Deliverables

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. % solids		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes: five coolers @ 2.2C, 0.9C, 1.1C, 2.1 & 8.6C (EQB&TB)
68SB2A's MS/MSD and EQB3 analyses were cancelled.

2.0 Holding Times

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?		see above	
	Action: If the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyese, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes:
38SB1A collected on 10/03/03, re-extracted on 10/17/03
68SB1A collected on 10/06/03, re-extracted on 10/17/03

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%	x		
	For initial Calibration: for %RSD > ±20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 25-150% for all samples and method blanks?		x	
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?		x	
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.		x	
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 25-150%?	x		
6.4	Are there any RPDs outside the QC limits not to exceed 60%?	x		
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes: MS/MSD see SDG 36440-1

7.0 Laboratory Control Sample (LCS)		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 25-150%?	x		
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?		x	
	Action: If Yes, J(+) only.			

Notes: original extraction Dinoseb LCS recovery low, re-extraction passed.

8.0 Field Duplicate		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes: QSB1A and SDB-3 submitted in SDG 36440-2 were both non-detect.

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.	x		
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.	x		
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	x		

Notes:

10.0 Data Completeness			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		x		
	Number of samples:	3			
	Number of target compounds in each analysis:	10			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

DATA VALIDATION WORKSHEET
INORGANIC - ICP, CVAA, AND CYANIDE
REGION III - NATIONAL FUNCTIONAL GUIDELINES

Project Name: Radford SSP
SDG No.: 36440-3
Reviewer: AS
Project No.: 15291974.30000
Date: January-04

1.0 Chain of Custody/Sample Condition/Raw Data		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples which were analyzed?	x			x			x			x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x			x			x			x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x			x			x			x	
1.4	Does sample preservation, collection and storage meet method requirement? (For metal: water samples: with Nitric Acid to pH < 2, and soil/sediment samples: 4 ^{o}C $\pm$ 2 ^{o}C)		x			x			x			x	
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes. % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	x			x			x			x		

Note: five coolers @ 2.2C, 0.9C, 1.1C, 2.1 & 8.6C (EQB&TB)

2.0 Holding Time		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, CN: 14 days, other metals: 6 months) Action:L(+)/UL(-). If the holding time is grossly exceeded (twice the holding time criteria), L(+)/R(-).		x			x		x			x		

Note: 38SB2C was collected on 10/3/03 and distilled/analyzed on 10/21/03 the 18th day.

3.0 Instrument Calibration		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? (ICP& ICPMS: blank + one standard & a RL standard OR 3 standards and a blank with one standard at the RL; CVAA: blank + five standards with one standard at the RL). If not, qualify with "R".	7 + BLK			4 + BLK			5 + BLK			6 + BLK		
3.2	Are the correlation coefficients > 0.99? Action: J(+)/UJ(-).	x			x			x			x		
3.3	Once per calibration, did a high and low distilled standard recovery within 85-115%? If no, follow 3.6.										x		
3.4	Was an initial calibration check standard (labelled LCS by TriMatrix) analyzed immediately after instrument system had been calibrated? Action: If no, all associated data are rejected "R".	x			x			x			x		
3.5	Was continuing calibration standard (CCS) analyzed at a minimum frequency of 10% (every 10 samples) during an analytical run and at the end of the analytical run? If not, document and flag based on professional judgement.	x			x			x			x		
3.6	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? FOR ICP 90%-110%, FOR Hg 80-120%, FOR CN 85-115%.	x			x			x			x		
	ICV and CCV: Action: L(+)/R(-) L(+)/UL(-) K(+) Mercury < 65% 65% - 79% > 120% Cyanide < 65% 65% - 84% > 115% Other Metals < 75% 75% - 89% > 110%												
3.7	For ICP & ICPMS, did the CRDL standard recover between 80-120%? <50% 50%-79% >120% 2xCRDL>[sample]>IDL L(+)/R(-) L(+)/UL(-) K	x					x	x			x		
								passed within 70-130%			passed within 80-120%		

Note: A high point added to Al, Ba, Ca, Fe, Mg, Mn, & K curves and the RLs were elevated by 5.

4.0 Blanks		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were method blank (MB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x			x			x			x		
4.2	Were calibration blanks (ICB and CCBs) analyzed immediately after each and every ICV and CCVs? Action: If no ICB was run, all associated data are rejected. If the frequency of the CCBs does not follow requirement, all associated data are qualified "J".	x			x			x			x		
4.3	Are there reported MB or ICB/CCBs values > RL?	x			x				x			x	
	Sample Results > RL												
	< 5X Blank Contamination B												
4.4	Are there negative blank results with the absolute value > RL?		x			x			x			x	
	Sample Results Non-detects > RL												
	< 5X absolute Blank Contamination UL L												
4.5	Are there reported field blank > ± RL?	x			x				x			x	
	Sample Results > RL												
	< 5X Blank Contamination B												

Note: _____

5.0 ICP Interference Check Sample (ICS)		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1	Was ICS analyzed at beginning of each ICP run?	x			x								
5.2	Are the ICS AB recoveries within 80% - 120%?	x			x								
5.3	Are the results for unspiked analytes (in ICS A) < ± RL?	x			x								
5.4	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?			x			x						
	If not...												
	Action: Not Spiked Analytes Spiked analytes (ICS AB analytes)												
	< -IDL > IDL < 50% 50% - 79% >120%												
	L(+)/UL(-) K(+) L(+)/R(-) L(+)/UL(-) K(+)												

Note: _____

6.0 Laboratory Control Sample (LCS)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	x			x			x			x		
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)		x			x			x			x	
	Action: Solid: < LCL L(+)/UL(-); > UCL K(+). Aqueous: < 50% L(+)/R(-); 50% - 79% L(+)/UL(-); > 120% K(+)												

Note: _____

7.0 Laboratory Duplicates (MSD)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), using professional judgement, analytes not associated with duplicate results.	x			x			x			x		
	For aqueous 6010B and Hg - RPD< 25%, aqueous CN - RPD < 20%, aqueous 6020 - RPD < 20%, and for soil - use laboratory generated limits for MS/MSD.												
7.2	Are all analyte duplicate results within control limits? If no, qualify all associated field samples J(+)/UJ(-) for the analyte with results that fall outside criteria.	x			x			x			x		

Note: _____

8.0 Spike Sample Analysis -Pre-Digestion/Post-Digestion

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
8.1	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, batch, matrix and level)? If not, J(+) with professional judgement.	x			x			x			x		
8.2	For all analytes with sample concentration > 4 x spike concentration, are spike recoveries within the control limit of 75-125% for aqueous and lab limits for soil?	x				x		x			x		
	%R > 125% 30%< %R < 74% < 30%												
	Positive K L L												
	Non-detect None UL R												
8.3	Where pre-digestion matrix spike analytes were outside the acceptable recovery limits(except Ag), was a post-digestion spike performed? Note any failures in DV report, but no data qualifying action is required.	x			x			x					x

Note: 68SB2A Barium 50/37%(65%) calcium 127%/121%(121%)

9.0 Instrument Detection Limits (IDL)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1	Are all IDLs/RLs equal to or less than the reporting limits specified?	x			x			x			x		

Note:

10.0 ICP/AA Serial Dilutions (Not for Mercury Analysis)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	x			x								
10.2	Was a five-fold dilution performed?	x			x								
10.3	Did the serial dilution results agree within 10% for ICP analyte concentration > 5 X the RL for 6010 or > 20 X the RL for 6020 in the original sample? If no, J(+).	x				x							

Note: Serial Dilution: 68SB2A - cobalt 12.5% , post digestion spike recovery passes for cobalt

Post digestion spike: 68SB2A - okay

11.0 Field Duplicate Samples		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?	x			x			x			x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.												
11.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report	x				x		x			x		

Note: _____

12.0 Result Verification/ Internal Standards/ Tune		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?	x			x			x			x		
12.2	Were all dilution reflected in the positive results and detection limits?	x			x			x			x		
12.3	Were the Internal Standard recoveries within 30-120%	x			x								
12.4	Were the tunes run at a minimum of four times with RSD < 5% for analytes in solution?	x											
12.5	Were the tune mass calibrations < 0.1 amu from the true value?	x											
12.6	Was the resolution check peak width < 0.9 amu at 10% peak height?	x											

Note: _____

Several metals by 6010B and lead by 6020 were analyzed straight and then at dilution due to the presence of high target concentrations

13.0 Completeness Calculation		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
13.1	Is % completeness within the control limits? (Control limit 90%)	x			x			x			x		
13.1.1	Number of samples: 19												
13.1.2	Number of target compounds in each analysis: various												
13.1.3	Number of results rejected and not reported: 0												
	% Completeness = (13.1.1 x 13.1.2 - 13.1.3) x 100/(13.1.1 x 13.1.2)												
	% Completeness = 100%	100%			100%			100%			100%		

Note: _____

Metals Cart
616-R-12
JM0060

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1077

Project Number	Project Name
09604317	RFAAP

Project Contact (Name and Phone Number): Darren Renne (804) 965-9000

Samplers: Brett Fisher / John Spangler

LAB: Tri-Matrix

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, [redacted])	Dioxin/Furan(8290)	TAL Metals (Including Mercury) /CN	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	[redacted] Herb	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
EQB 2	10/5/03 1300	5		X	4	BD CE	/	14	X	X	X	X	X	X		X						X	
Trip Blank	10/5/03 —	—	—	—	6	—	—	2	X														

↑ 1300 hrs for TB -WR

Box #1	Box #2	Box #3	Box #4
1. Surface Water 2. Ground Water 3. Leachate 4. Rinsate 5. Soil Sediment/Sludge 6. Trip Blank 7. Oil 8. Waste 9. Other _____	A. HCl + Ice B. HNO3 + Ice C. NaOH + Ice D. H2SO4 + Ice E. Unpreserved F. Ice Only G. Other _____ H. NaHSO4 + Ice I. ZnAc + NaOH + Ice	F. Filtered U. Unfiltered	R. Rush - 3 Day S. Standard 28 Day T. Timely 14 Day O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
[signature]	10/5/03 1800				
Relinquished by:	Date/time	Received by: (for lab) [signature]	Date/Time 10/4/03 8:35	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

36440-3

11-1

metals cart
Tm0555

00005

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1154

Project Number	Project Name
97604-317	RFAAP

Project Contact (Name and Phone Number): Darren Ramm (804) 765 9000

Samplers: Brett Fisher / John Spangler

LAB: Tri-Matrix

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	ANALYSES: TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, [illegible])	Dioxin/Furan(8290)	TAL Metals (Including Mercury) /CN	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	[illegible] - Herb	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
385B2A	10/3/03 850	5		X	S	F	/	5	X	X	X			X		X							
385B2B	10/3/03 900	5		X	S	F	/	5	X	X	X			X		X							
5BD 4	10/3/03	5		X	S	F	/	5	X	X	X			X		X							
385B2C	10/3/03 910	5		X	S	F	/	5	X	X	X			X		X							
385B1A	10/3/03 1045	5		X	S	F	/	8	X	X	X	X	X	X		X						X	
385B1B	10/3/03 1100	5		X	S	F	/	5	X	X	X			X		X							
385B1C	10/3/03 1120	5		X	S	F	/	5	X	X	X			X		X							
385B3A	10/3/03 1200	5		X	S	F	/	5	X	X	X			X		X							
385B3B	10/3/03 1215	5		X	S	F	/	5	X	X	X			X		X							
385B5C	10/3/03 1230	5		X	S	F	/	5	X	X	X			X		X							

Box #1 1. Surface Water 2. Ground Water 3. Leachate 4. Rinsate 5. Soil Sediment/Sludge 6. Trip Blank 7. Oil 8. Waste 9. Other _____

Box #2 A. HCl + Ice B. HNO3 + Ice C. NaOH + Ice D. H2SO4 + Ice E. Unpreserved F. Ice Only G. Other _____ H. NaHSO4 + Ice I. ZnAc + NaOH + Ice

Box #3 F. Filtered U. Unfiltered

Box #4 R. Rush - 3 Day S. Standard 28 Day T. Timely 14 Day O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
Brett Fisher 10/3/03	1800				
Relinquished by:	Date/time	Received by (for lab):	Date/Time: 10/4/03 8:35	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

36440-3

11-1

Volatile Soil Cart 7

000057

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1078

Project Number	Project Name
09604317	RFHAP

Project Contact (Name and Phone Number): Darren Renne (804) 965 9000

Samplers: Brett Fisher / John Spangler

LAB: Tri-Matrix

AIRBILL No:

Courier:

ANALYSES

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, [redacted])	Dioxin/Furan(8290)	TAL Metals (Including Mercury) /CN	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	[redacted] Herb	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
68SB2A	10/6/03 1315	5		X	5	F	/	5	X	X	X			X		X							
68B2A MS	10/6/03 1315	5		X	5	F	/	5	X	X	X			X		X							—
68SB2A MSD	10/6/03 1315	5		X	5	F	/	5	X	X	X			X		X							—
68SB2B	10/6/03 1336	5		X	5	F	/	5	X	X	X			X		X							
68SB2C	10/6/03 1345	5		X	5	F	/	5	X	X	X			X		X							
SBD5	10/6/03 —	5		X	5	F	/	5	X	X	X			X		X							
68SB1A	10/6/03 1500	5		X	5	F	/	7	X	X	X	X	X	X		X						X	
68SB1B	10/6/03 1515	5		X	5	F	/	5	X	X	X			X		X							
68SB1C	10/6/03 1530	5		X	5	F	/	5	X	X	X			X		X							

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
Brett Fisher	10/6/03 1800				
Relinquished by:	Date/time	Received by: (for lab) Jai Pakos	Date/Time 10/7/03 8:55	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

36440-3

TM0194 Big Cart 451-B-9

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1217

000061

Project Number	Project Name
09604317	RFAAP

Project Contact (Name and Phone Number): Darren Renner (804) 965 9000

Samplers: Brett Fisher / John Spangler

LAB: Tri Matrix

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, [illegible])	Dioxin/Furan(8290)	TAL Metals (Including Mercury) /CN	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	~~Paint Filter (9095B)~~ Herb	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
EQB3	10/7/03 1600	5		X	4	AC EF	/	14	X	X	X	X	X	X		X						X	
Trip Blank	10/7/03							2	X														

TC 3

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
[signature]	10/7/03 1800				
Relinquished by:	Date/time	Received by: (for lab) [signature]	Date/Time 10/8/03 8:50	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

TM0194 17-5 36440-3

DATA VALIDATION REPORT - Level III Review

SDG No.: 36440-4 **Fraction:** VOCs, SVOCs, PAHs, Explosives, Pesticides, PCBs, Herbicides, Metals, & Cyanide

Lab: TriMatrix **Project Name:** Radford SSP

Reviewer: AS **Date:** February 9, 2004

This report presents the findings of a review of the referenced data. The report consists of this summary, copies of data reports with data qualifying flags applied (as required), the completed data validation checklist, supporting documentation, and an explanation of the data qualifying flags employed. The review performed is based on the USEPA Region III Modifications to the National Functional Guidelines for Organic and Inorganic Data Review as pertains to the specifics of the analytical methods employed and provisions of the approved project-specific Quality Assurance Project Plan (QAPP).

Major Anomalies: None.

Minor Anomalies:

For the VOC analyses, the method blank for batch 90056-116 contained acetone at 33 ug/Kg. The method blank for batch 90056-117 contained acetone at 22 ug/Kg. The method blank for batch 90050-117 contained acetone at 22 ug/Kg. Positive results less than ten times the blank concentration were flagged "B,z" in the associated samples.

The associated equipment blank EQB3 submitted in sample delivery group 36440-3 displayed positive detections for acetone at 2.3 ug/L and methylene chloride at 0.67 ug/L. The associated trip blank displayed a positive detection for methylene chloride at 0.91 ug/L. The field blank detections for methylene chloride and acetone were previously qualified due to method blank detections. No further data qualifying action was required.

The continuing calibration analyzed on 10/16/03 at 1321 displayed percent differences greater than the control limit (i.e., 20%) with a negative bias for dichlorodifluoromethane at 38.0%, carbon disulfide at 22.3%, methyl acetate at 30.7%, and 2-hexanone at 20.1%. The associated field sample results were non-detect and were flagged "UJ,c". This continuing calibration also displayed percent differences greater than the control limit with a positive bias for methyl-tert-butyl ether at 25.2%, 1,1-dichloroethane at 20.4%, and bromochloromethane at 25.8%. The associated field sample results were non-detect, thus, no data qualifying action was required.

The continuing calibration analyzed on 10/17/03 at 1235 displayed a percent difference greater than the control limit with a negative bias for methyl acetate at 28.7%. The associated field sample results were non-detect and were flagged "UJ,c". This continuing calibration also displayed a percent difference greater than the control limit with a positive bias for trans-1,3-dichloropropene at 23.1%. The associated field sample results were non-detect, thus, no data qualifying action was required.

The laboratory control spike for batch 90056-116 displayed a recovery less than the laboratory generated lower control limit (i.e., 70%) but greater than the project QAPP lower limit (i.e., 50%) for dichlorodifluoromethane at 62%. The associated field sample results were non-detect and were previously flagged for a continuing calibration anomaly. No further data qualifying action was taken.

The matrix spike pair for sample 57SB2B displayed percent recoveries less than the laboratory generated lower control limits for carbon disulfide (33%/37%), chloroethane (74%), methyl acetate (47%/52%), and styrene (48%). The parent sample result for methyl acetate was previously qualified for a low bias displayed in the continuing calibration percent difference and no further data qualifying action was taken. Since one matrix spike recovery was acceptable and the other matrix spike recovery was only marginally low for chloroethane and styrene, no data qualifying action was taken. The parent sample result for carbon disulfide was non-detect and was flagged "UJ,m". This matrix spike pair also displayed relative percent differences greater than the laboratory generated control limits for 1,1,1-trichloroethane at 26%, methyl ethyl ketone at 28%, chlorobenzene at 25%, chloroform at 24%, cis-1,3-dichloropropene at 28%, toluene at 25%, and trichloroethene at 25%. Since these relative percent differences were less than the project QAPP control limit (i.e., 50%), no data qualifying action was taken.

For the SVOC analyses, the method blank for extraction batch 90482-114 displayed positive detections for bis(2-ethylhexyl)phthalate at 26 ug/Kg and di-n-butylphthalate at 11 ug/Kg. Positive associated field sample results less than ten times the blank concentrations were flagged "B,z".

The associated equipment blank EQB3 submitted with sample delivery group 36440-3 contained 4-chloro-3-methylphenol at 0.14 ug/L, bis(2-ethylhexyl)phthalate at 1.4 ug/L, butyl benzyl phthalate at 1.0 ug/L, diethylphthalate at 0.11 ug/L, and two tentatively identified compounds (TICs). The equipment blank detections for bis(2-ethylhexyl) phthalate and butyl benzyl phthalate were previously flagged due to method blank detections and no further data qualifying action was taken. Positive results less than ten times the blank concentration for diethylphthalate or less than five times the blank concentration of the TICs or 4-chloro-3-methylphenol were flagged "B,x" in the associated samples.

The continuing calibration analyzed on 10/18/03 at 0632 displayed percent differences greater than the control limit (i.e., 20%) with a negative bias for benzaldehyde at 26.4% and 4-chloroaniline at 26.2% and with a positive bias for 2,4,5-trichlorophenol at 25.0%. The associated field sample results were non-detect for benzaldehyde and 4-chloroaniline and were flagged "UJ,c". The associated field sample results were non-detect for 2,4,5-trichlorophenol while the continuing calibration displayed a positive bias; thus, no data qualifying action was required.

The continuing calibration analyzed on 11/01/03 at 0653 displayed a percent difference greater than the control limit with a negative bias for 4-chloroaniline at 21.7%. The associated field sample results were non-detect and were flagged "UJ,c".

The continuing calibration analyzed on 11/02/03 at 1249 displayed percent differences greater than the control limit with a negative bias for hexachlorocyclopentadiene at 28.0% and 2,4-dinitrophenol at 22.4%. The associated field sample results were non-detect and were flagged "UJ,c".

The laboratory control spike for batch 90482-114 displayed recoveries greater than the laboratory generated upper control limits for 2,4,5-trichlorophenol at 128%, 2,6-dinitrotoluene at 123%, 2-nitroaniline at 127%, 3,3'-dichlorobenzidine at 117%, acenaphthylene at 118%, benzo(b)fluoranthene at 125%, benzo(g,h,i)perylene at 130%, carbazole at 127%, dibenzo(a,h)anthracene at 126%, diethylphthalate at 119%, dimethylphthalate at 118%,

fluorene at 121%, hexachlorocyclopentadiene at 115%, and indeno(1,2,3-cd)pyrene at 125%. The laboratory control spike for batch 90572-114 displayed a recovery greater than the laboratory generated upper control limit (i.e., 113%) for 3,3'-dichlorobenzidine at 120%. Positive associated field sample results were flagged "J,l", unless previously qualified for an equipment blank detection anomaly.

The matrix spike pair for sample 57SB2B displayed percent recoveries less than the laboratory generated lower control limits for 2,4-dinitrophenol (12%/11%), 4,6-dinitro-2-methylphenol (20%), 4-chloroaniline (24%/28%), and hexachlorocyclopentadiene (39%/37%). Since the matrix spike recoveries were greater than the project QAPP lower limit (i.e., 10%), no data qualifying action was taken based on these anomalies.

Sample 57SB2A displayed two acid fraction surrogate recoveries greater than the laboratory generated upper control limits for 2-fluorophenol at 119% and 2,4,5-tribromophenol at 117%. The associated acid fraction constituents were non-detect or previously flagged for an equipment blank detection anomaly. No data further data qualifying action was taken.

For the PAH analyses, the 2-fluorobiphenyl surrogate percent recoveries were less than the laboratory generated lower control limit (i.e., 49%) for 68SB3A at 39%, 68SB3B at 37%, 68SB3C at 34%, 57SB1A at 32%, 57SB1B at 46%, SBD6 at 30%, 57SB3B at 47%, 57SB2C at 48%, 69SB1A at 46%, 69SB1B at 42%, 69SB1C at 36%, SBD7 at 45%, and 69SB3B at 45%. Positive associated field sample results were flagged "L,s" while non-detects were flagged "UL,s", unless previously qualified for laboratory control spike anomalies.

The matrix spike pair for sample 57SB2B displayed percent recoveries less than the laboratory generated lower control limits for acenaphthylene (56%/56%), benzo(g,h,i)perylene (67%/68%), dibenzo(a,h)anthracene (67%/65%), fluoranthene (67%/66%), and naphthalene (55%/56%). Since most of the associated field sample results were qualified as biased low due to surrogate recovery anomalies, no further data qualifying action was taken.

For the explosive analyses, the continuing calibration analyzed on 10/22/03 at 1517 displayed a percent difference greater than the control limit (i.e., 15%) with a negative bias for 4-nitrotoluene at 15.2%. The continuing calibration analyzed on 10/22/03 at 2017 displayed a percent difference greater than the control limit with a negative bias for RDX at 16.5%. The continuing calibration analyzed on 10/23/03 at 0859 displayed a percent difference greater than the control limit with a negative bias for 3-nitrotoluene at 16.5%. The continuing calibration analyzed on 10/23/03 at 1358 displayed a percent difference greater than the control limit with a negative bias for RDX at 23.0%. The continuing calibration analyzed on 10/23/03 at 1426 displayed a percent difference greater than the control limit with a negative bias for 3-nitrotoluene at 15.1%. The continuing calibration analyzed on 10/27/03 at 1217 displayed a percent difference greater than the control limit with a negative bias for RDX at 16.9%. The continuing calibration analyzed on 10/27/03 at 1244 displayed a percent difference greater than the control limit with a negative bias for 3-nitrotoluene at 17.2%. The continuing calibration analyzed on 10/27/03 at 1810 displayed a percent difference greater than the control limit with a negative bias for 3-nitrotoluene at 15.4%. The continuing calibration analyzed on 10/27/03 at 2310 displayed percent differences greater than the control limit with a negative bias for RDX at 16.1% and 1,3,5-trinitrobenzene at 15.4%. The continuing calibration analyzed on 10/27/03 at 2337 displayed a percent difference greater than the control limit with a negative bias for 3-nitrotoluene at 15.2%. All associated sample results were non-detect and were flagged "UJ,c".

For the PCB analyses, the positive result reported in sample 57SB4A displayed a percent difference greater than the control limit (i.e., 40%) between the two analytical column concentrations for arochlor 1254 at 41.5%. This result was flagged "J,g".

For the herbicide analyses, the laboratory control spike for batch 90218-110 displayed a recovery less than the laboratory generated lower control limit (i.e., 50%) for dinoseb at 0% and a recovery greater than the laboratory generated upper control limit (i.e., 91%) for MCPP at 117%. The associated field sample result was non-detect for MCPP while the laboratory control spike displayed a positive bias, therefore, no data qualifying action was required. All dinoseb results from the original extraction were rejected and manually removed from the result forms by the reviewer. Only dinoseb results from the re-extraction should be used for data interpretation. The surrogate recoveries were greater than the upper laboratory generated control limit (i.e., 114%) for all samples of the re-extraction. Since the associated field sample results were non-detect, no data qualifying action was required.

The closing continuing calibration displayed a percent difference greater than the control limit (i.e., 15%) with a positive bias for dicamba at 29.6% on column one and silvex at 17.0% on column two. The associated field sample results were non-detect. No data qualifying action was required.

For the metal analyses by 6020, the method blank for batches 90105-113 and 90112-120 contained lead at 0.089 and 0.098 mg/Kg, respectively. The associated equipment blank EQB3 submitted with sample delivery group 36440-3 contained lead at 0.3 ug/L. The associated field sample results were positive and greater than five times the blank concentrations. Therefore, no data qualifying action was required.

The matrix spike duplicate performed on sample 57SB2B displayed a percent recovery less than the laboratory generated upper control limit (i.e., 87%) for thallium at 84%. Since this recovery was only marginally less than the control limit, greater than the project QAPP lower control limit (i.e., 75%), and the matrix spike displayed an acceptable recovery, no data qualifying action was taken based on this anomaly.

For the metal analyses by 6010B, the method blank for batch 89971-113 contained beryllium at 0.0495 mg/Kg and sodium at 19.8 mg/Kg. The method blank for batch 90177-120 contained cobalt at 0.374 mg/Kg and sodium at 8.95 mg/Kg. Positive associated field sample results less than five times the blank concentration were flagged "B,p". The associated equipment blank EQB3 submitted with sample delivery group 36440-3 contained iron at 4.8 ug/L and sodium at 160 ug/L. The equipment blank results for iron and sodium were previously qualified due to method blank detections. No further data qualifying action was taken based on equipment blank detections.

The matrix spike performed on sample 57SB2B displayed a percent recovery greater than the laboratory generated upper control limit (i.e., 111%) for magnesium at 121%. Since this recovery was only marginally greater than the control limit, less than the project QAPP upper control limit (i.e., 125%), and the matrix spike duplicate displayed an acceptable recovery, no data qualifying action was taken based on this anomaly. The serial dilution performed on sample 57SB2B displayed percent differences greater than the control limit (i.e., 10%) for beryllium at 18.2%, cobalt at 19.2%, and potassium at 13.1%. All associated field sample results were positive and were flagged "J,s". The field duplicate pair (57SB3A and SBD6) displayed relative percent differences greater than the control limit (i.e., 35%) for barium at 36%, cadmium at 41%, calcium at 45%, chromium at 52%, cobalt at 161%, and zinc at 42%.

The positive results were flagged "J,f" in these two samples, except cobalt results that were previously qualified due to a serial dilution anomaly. The field duplicate pair (69SB3A and SBD7) displayed relative percent differences greater than the control limit (i.e., 35%) for aluminum at 37.2% and iron at 36.8%. The positive results were flagged "J,f" in these two samples, except cobalt results that were previously qualified due to a serial dilution anomaly.

Sample 69SB3C displayed an internal standard recovery greater than the laboratory upper control limit (i.e., 120%) for yttrium at 148%. The sample was reanalyzed at a dilution factor of five that displays an acceptable internal standard recovery. The associated field sample result for beryllium was reported from this dilution and displays an elevated method detection limit. Since the reporting limit was greater than three times the elevated method detection limit, the reporting limit was not elevated based on this dilution factor.

For the cyanide analyses, the matrix spike duplicate performed on sample 57SB2B displayed a percent recovery less than the laboratory generated upper control limit (i.e., 80%) for thallium at 74%. Since this recovery was only marginally less than the control limit and the matrix spike displayed an acceptable recovery, no data qualifying action was taken based on this anomaly.

Correctable Anomalies: None.

Comments: Field coolers were received at the laboratory with internal temperatures less than the lower control limit (i.e., 2°C) at 0.9°C and 0.8 °C. Since the sample aliquots were not frozen and the containers were intact, no data qualifying action was taken. A cooler was received at the laboratory with an internal temperature greater than the upper control limit (i.e., 6°C) at 8.6 °C. Based on professional judgement no data qualifying action was required since this temperature did not exceed 10°C.

It should be noted that TIC results were flagged "NJ,t" in the associated samples. TIC results that were identified as unknown were manually lined out by the reviewer. The GIS-Key format is limited to 12 characters for a TIC CAS number. One or two SVOC TIC detections exceeded this limitation for 57SB3B and 69SB3B. The laboratory reported the CAS number without the dashes. The reviewer manually entered the dashes for evaluation purposes on the hardcopy result forms included in this report.

No anomalies were encountered if a given fraction was not mentioned. All data are usable, as qualified, for their intended purpose based on the data reviewed.

Signed: Andrea Sansom

Andrea Sansom

Radford SSP

Submittal No.	Lab Sample ID	Field Sample ID	Matrix (Code)	Sample Date
36440-4	345619	68SB3A	SO	10/07/03
36440-4	345620	68SB3B	SO	10/07/03
36440-4	345621	68SB3C	SO	10/07/03
36440-4	345622	57SB1A	SO	10/07/03
36440-4	345623	57SB1B	SO	10/07/03
36440-4	345624	57SB1C	SO	10/07/03
36440-4	345625	57SB3A	SO	10/07/03
36440-4	345626	SBD6	SO	10/07/03
36440-4	345627	57SB3B	SO	10/07/03
36440-4	345628	57SB3C	SO	10/07/03
36440-4	345629	57SB2A	SO	10/07/03
36440-4	345630	57SB2B	SO	10/07/03
36440-4	345631	57SB2C	SO	10/07/03
36440-4	345737	57SB4A	SO	10/08/03
36440-4	345738	69SB1A	SO	10/08/03
36440-4	345739	69SB1B	SO	10/08/03
36440-4	345740	69SB1C	SO	10/08/03
36440-4	345741	69SB3A	SO	10/08/03
36440-4	345742	SBD7	SO	10/08/03
36440-4	345743	69SB3B	SO	10/08/03
36440-4	345744	69SB3C	SO	10/08/03

Radford SSP
Duplicate Statistics

57SB3A and SBD6

	Units	RL	5xRL	Sample Conc		Duplicate Conc		%RPD	Delta	4xRL	Pass/ Fail
Volatiles											
methyl ethyl ketone	ug/Kg	26	130	28		32		13.3%	4	104	Pass
acetone	ug/Kg	26	130	99	B	160		47.1%	61	104	Pass
ethylbenzene	ug/Kg	6.5	33	0.66	J	6.6	U	163.6%	5.94	26	N/A
methylene chloride	ug/Kg	26	130	6.5	J	4.3	J	40.7%	2.2	104	N/A
toluene	ug/Kg	6.5	33	1.3	J	2.6	J	66.7%	1.3	26	N/A
trichloroethene	ug/Kg	6.5	33	1.9	J	1.6	J	17.1%	0.3	26	N/A
Semi-Volatiles											
2-methylnaphthalene	ug/Kg	220	1100	6.0	J	12	J	66.7%	6	880	N/A
4-chloro-3-methylphenol	ug/Kg	220	1100	46	J	38	J	19.0%	8	880	N/A
acenaphthylene	ug/Kg	220	1100	4.0	J	9.0	J	76.9%	5	880	N/A
acetophenone	ug/Kg	220	1100	36	J	75	J	70.3%	39	880	N/A
anthracene	ug/Kg	220	1100	220	U	9.0	J	184.3%	211	880	N/A
benzo(a)pyrene	ug/Kg	220	1100	12	J	20	J	50.0%	8	880	N/A
benzo(b)fluoranthene	ug/Kg	220	1100	20	J	35	J	54.5%	15	880	N/A
benzo(g,h,i)perylene	ug/Kg	220	1100	220	U	15	J	174.5%	205	880	N/A
bis(2-ethylhexyl)phthalate	ug/Kg	220	1100	480		62	J	154.2%	418	880	N/A
caprolactam	ug/Kg	430	2150	43	J	25	J	52.9%	18	1720	N/A
chrysene	ug/Kg	220	1100	23	J	22	J	4.4%	1	880	N/A
diethylphthalate	ug/Kg	220	1100	19	J	21	J	10.0%	2	880	N/A
di-n-butylphthalate	ug/Kg	220	1100	360		230		44.1%	130	880	Pass
fluoranthene	ug/Kg	220	1100	40	J	45	J	11.8%	5	880	N/A
fluorene	ug/Kg	220	1100	220	U	3.0	J	194.6%	217	880	N/A
indeno(1,2,3-cd)pyrene	ug/Kg	220	1100	7.0	J	12	J	52.6%	5	880	N/A
naphthalene	ug/Kg	220	1100	4.0	J	6.0	J	40.0%	2	880	N/A
phenanthrene	ug/Kg	220	1100	27	J	50	J	59.7%	23	880	N/A
pyrene	ug/Kg	220	1100	40	J	44	J	9.5%	4	880	N/A
Polyaromatic Hydrocarbons											
anthracene	ug/Kg	24	120	1.6	J	3.0	J	60.9%	1.4	96	N/A
chrysene	ug/Kg	24	120	5.2	J	12	J	79.1%	6.8	96	N/A
fluoranthene	ug/Kg	24	120	46		84		58.5%	38	96	Pass
phenanthrene	ug/Kg	24	120	18	J	30		50.0%	12	96	N/A
pyrene	ug/Kg	24	120	31		54		54.1%	23	96	Pass
Explosives											
BDL											
Metals											
aluminum	mg/Kg	250	1250	28900		33000		13%	4100	1000	Pass
antimony	mg/Kg	0.5	3	102		104		1.9%	2	2	Pass
arsenic	mg/Kg	0.4	2	5.1		5.3		3.8%	0.2	1.6	Pass
barium	mg/Kg	5	25	107		154		**36%**	47	20	**Fail**
beryllium	mg/Kg	1	5	0.45	J	0.39	J	14%	0.06	4	N/A
cadmium	mg/Kg	1	5	27		41		**41%**	14	4	**Fail**
calcium	mg/Kg	250	1250	1750		2760		**45%**	1010	1000	**Fail**
chromium	mg/Kg	25	125	268		454		**52%**	186	100	**Fail**
cobalt	mg/Kg	1	5	75		8.0		**161%**	67	4	**Fail**
copper	mg/Kg	1	5	27		38		34%	11	4	Pass
iron	mg/Kg	1000	5000	47100		46500		1.3%	600	4000	Pass
lead	mg/Kg	50	250	175		268		42%	93	**200**	Pass
magnesium	mg/Kg	250	1250	1420		1990		33%	570	1000	Pass
manganese	mg/Kg	5	25	544		514		5.7%	30	20	Pass
mercury	mg/Kg	0.1	1	0.11		0.13		17%	0.02	0.4	N/A
nickel	mg/Kg	0.5	3	13		14		7.4%	1	2	Pass
potassium	mg/Kg	100	500	967		1060		9.2%	93	400	Pass
selenium	mg/Kg	1	5	0.57	J	0.64	J	12%	0.07	4	N/A
silver	mg/Kg	3	15	0.11	J	0.15	J	31%	0.04	12	N/A
sodium	mg/Kg	100	500	76	J	97	J	24%	21	400	N/A
thallium	mg/Kg	0.5	3	0.24	J	0.24	J	0.0%	0	2	N/A
vanadium	mg/Kg	1	5	69		67		2.9%	2	4	Pass
zinc	mg/Kg	100	500	895		1370		**42%**	475	400	**Fail**
Cyanide											
Total Cyanide	mg/Kg	0.50	2.5	0.17	J	0.16	J	6%	0.01	2	N/A

Soil Control Limits

[sample] > 5 x RL, use 35%
[sample] < 5 x RL, use 4 x RL

Radford SSP
Duplicate Statistics

69SB3A and SBD7

	Units	RL	5xRL	Sample Conc		Duplicate Conc		%RPD	Delta	4xRL	Pass/ Fail
Volatiles											
methyl ethyl ketone	ug/Kg	12	60	41		35		15.8%	6	48	Pass
acetone	ug/Kg	12	60	160		180		11.8%	20	48	Pass
toluene	ug/Kg	6	30	6	U	1.7	J	112%	4.3	24	N/A
4-isopropyltoluene, TIC	ug/Kg	1	5	1	U	1.8		57.1%	0.8	4	N/A
hexanal, TIC	ug/Kg	1	5	1	U	17		178%	16	4	N/A
Semi-Volatiles											
4-chloro-3-methylphenol	ug/Kg	200	1000	23	J	21	J	9.1%	2	800	N/A
bis(2-ethylhexyl)phthalate	ug/Kg	200	1000	19	J	19	J	0.0%	0	800	N/A
butyl benzyl phthalate	ug/Kg	200	1000	6.0	J	210	U	189%	204	800	N/A
caprolactam	ug/Kg	390	1950	14	J	210	U	175%	196	1560	N/A
diethylphthalate	ug/Kg	200	1000	8.0	J	5.0	J	46%	3	800	N/A
di-n-butylphthalate	ug/Kg	200	1000	61	J	63	J	3.2%	2	800	N/A
fluoranthene	ug/Kg	200	1000	27	J	6.0	J	127%	21	800	N/A
phenanthrene	ug/Kg	200	1000	5.0	J	7.0	J	33%	2	800	N/A
pyrene	ug/Kg	200	1000	14	J	7.0	J	67%	7	800	N/A
Polyaromatic Hydrocarbons											
fluoranthene	ug/Kg	25	125	3.8	J	25		147%	21.2	100	N/A
phenanthrene	ug/Kg	25	125	1.6	J	25		176%	23.4	100	N/A
pyrene	ug/Kg	25	125	2.9	J	25		158%	22.1	100	N/A
Explosives											
BDL											
Metals											
aluminum	mg/Kg	50	250	14000		20400		**37.2%**	6400	200	**Fail**
antimony	mg/Kg	0.50	2.5	19.00		14.00		30.3%	5	2	Pass
arsenic	mg/Kg	0.40	2.0	2.9		3.3		13%	0.4	1.6	Pass
barium	mg/Kg	5.0	25	71		90		24%	19	20	Pass
beryllium	mg/Kg	1.0	5.0	0.26	J	0.48	J	59%	0.22	4	N/A
cadmium	mg/Kg	1.0	5.0	2.10		2.5		17%	0.4	4	Pass
calcium	mg/Kg	250	1250	721		835		15%	114	1000	Pass
chromium	mg/Kg	5.0	25	22		38		53%	16	20	Pass
cobalt	mg/Kg	1.0	5.0	11		10		9.5%	1	4	Pass
copper	mg/Kg	1.0	5.0	9		12		31.9%	3.3	4	Pass
iron	mg/Kg	250	1250	17100		24800		**36.8%**	7700	1000	**Fail**
lead	mg/Kg	1.0	5.0	25		22		13%	3	4	Pass
magnesium	mg/Kg	250	1250	997		1040		4.2%	43	1000	Pass
manganese	mg/Kg	5.0	25	914		1010		10%	96	20	Pass
mercury	mg/Kg	0.10	0.50	0.041	J	0.078	J	62%	0.037	0.4	N/A
nickel	mg/Kg	0.50	2.5	9		11		26%	2.5	2	Pass
potassium	mg/Kg	100	500	813		879		7.8%	66	400	Pass
selenium	mg/Kg	1.0	5.0	0.40	J	0.60	J	40%	0.2	4	N/A
silver	mg/Kg	3.0	15	0.051	J	0.050	J	2.0%	0.001	12	N/A
sodium	mg/Kg	100	500	110		116		5.3%	6	400	Pass
thallium	mg/Kg	0.50	2.5	0.26	J	0.23	J	12%	0.03	2	N/A
vanadium	mg/Kg	1.0	5.0	35		49		33%	14	4	Pass
zinc	mg/Kg	4.0	20	45		61		30%	16	16	Pass
Cyanide											
Total Cyanide	mg/Kg	0.50	2.5	0.11	J	0.11	J	0%	0	2	N/A

Soil Control Limits

[sample] > 5 x RL, use 35%
[sample] < 5 x RL, use 4 x RL

URS
Measurement Systems DV Service

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**68SB3A**	QC Batch:	90056 -116
Sample #:	**345619**	Anal. Batch:	208014
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.19

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.0 U		6.0	0.507
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.0 U		6.0	0.903
79-34-5	1,1,2,2-Tetrachloroethane	6.0 U		6.0	0.777
79-00-5	1,1,2-Trichloroethane	6.0 U		6.0	0.706
75-34-3	1,1-Dichloroethane	6.0 U		6.0	0.862
75-35-4	1,1-Dichloroethylene	6.0 U		6.0	0.872
106-93-4	1,2-Dibromoethane	6.0 U		6.0	0.815
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.48
95-50-1	1,2-Dichlorobenzene	6.0 U		6.0	0.576
107-06-2	1,2-Dichloroethane	6.0 U		6.0	0.513
156-59-2	cis-1,2-Dichloroethene	6.0 U		6.0	0.845
156-60-5	trans-1,2-Dichloroethene	6.0 U		6.0	0.837
78-87-5	1,2-Dichloropropane	6.0 U		6.0	0.697
87-61-6	1,2,3-Trichlorobenzene	6.0 U		6.0	0.647
120-82-1	1,2,4-Trichlorobenzene	6.0 U		6.0	0.488
541-73-1	1,3-Dichlorobenzene	6.0 U		6.0	0.319
106-46-7	1,4-Dichlorobenzene	6.0 U		6.0	0.845
78-93-3	**Methyl Ethyl Ketone**	**33**		24	5.95
591-78-6	2-Hexanone	12 U	UJ,C	12	2.69
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.74
67-64-1	***Acetone**	**150 B**	B,Z	24	5.95
71-43-2	Benzene	6.0 U		6.0	0.627
74-97-5	Bromochloromethane	6.0 U		6.0	0.906
75-27-4	Dichlorobromomethane	6.0 U		6.0	0.596
75-25-2	Bromoform	6.0 U		6.0	0.688
74-83-9	Bromomethane	6.0 U		6.0	1.79
75-15-0	Carbon Disulfide	6.0 U	UJ,C	6.0	1.73
56-23-5	Carbon Tetrachloride	6.0 U		6.0	0.555
108-90-7	Chlorobenzene	6.0 U		6.0	0.787
75-00-3	Chloroethane	6.0 U		6.0	1.61
67-66-3	Chloroform	6.0 U		6.0	0.531

* See attached Statement of Data Qualifications.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**
Project:	Richmond, VA
	RAAP
Submittal #:	**36440-4**
Submittal:	Delivery Order 0046
	RAAP
Sample ID:	**68SB3A**
Sample #:	**345619**
Matrix:	Soil
Unit:	ug/kg dry

Sampled:	10/07/03 @ 08:10
Sampler:	B.F. & J.S.
Received:	10/08/03 @ 08:50
Prepared:	n/a
Prep. Method:	n/a
Analyzed:	10/16/03 by JDM
Anal. Method:	USEPA-8260B
QC Batch:	90056 -116
Anal. Batch:	208014
Percent Solids:	84
Dilution Factor:	1.19

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.0 U		6.0	0.992
110-82-7	Cyclohexane	12 U		12	0.376
10061-01-5	cis-1,3-Dichloropropene	6.0 U		6.0	0.584
10061-02-6	trans-1,3-Dichloropropene	6.0 U		6.0	0.620
75-71-8	Dichlorodifluoromethane	6.0 U	UJ, c	6.0	0.795
124-48-1	Chlorodibromomethane	6.0 U		6.0	0.615
100-41-4	Ethylbenzene	6.0 U		6.0	0.503
98-82-8	Isopropylbenzene	6.0 U		6.0	0.650
79-20-9	Methyl Acetate	24 U	UJ, c	24	4.13
108-87-2	Methylcyclohexane	12 U		12	1.01
1634-04-4	Methyl(tert)butyl Ether	6.0 U		6.0	0.763
75-09-2	Methylene Chloride	24 U		24	3.34
100-42-5	Styrene	6.0 U		6.0	0.526
127-18-4	Tetrachloroethene	6.0 U		6.0	0.729
108-88-3	Toluene	6.0 U		6.0	0.552
79-01-6	Trichloroethene	6.0 U		6.0	0.806
75-69-4	Trichlorofluoromethane	6.0 U		6.0	0.884
75-01-4	Vinyl Chloride	6.0 U		6.0	0.440
1330-20-7	Xylene (Total)	6.0 U		6.0	0.501

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
Submittal #:	**36440-4**	Prepared:	n/a
Submittal:	Delivery Order 0046	Prep. Method:	n/a
	RAAP	Analyzed:	10/16/03 JDM
Sample ID:	**68SB3A**	Anal. Method:	USEPA-8260B
Sample #:	**345619**	QC Batch:	90056 -116
Matrix:	Soil	Anal. Batch:	208014
		Percent Solids:	84
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**68SB3B**	QC Batch:	90056 -116
Sample #:	**345620**	Anal. Batch:	208014
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.33

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.7 U		6.7	0.567
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.7 U		6.7	1.01
79-34-5	1,1,2,2-Tetrachloroethane	6.7 U		6.7	0.868
79-00-5	1,1,2-Trichloroethane	6.7 U		6.7	0.789
75-34-3	1,1-Dichloroethane	6.7 U		6.7	0.963
75-35-4	1,1-Dichloroethylene	6.7 U		6.7	0.975
106-93-4	1,2-Dibromoethane	6.7 U		6.7	0.911
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	2.77
95-50-1	1,2-Dichlorobenzene	6.7 U		6.7	0.644
107-06-2	1,2-Dichloroethane	6.7 U		6.7	0.573
156-59-2	cis-1,2-Dichloroethene	6.7 U		6.7	0.944
156-60-5	trans-1,2-Dichloroethene	6.7 U		6.7	0.935
78-87-5	1,2-Dichloropropane	6.7 U		6.7	0.779
87-61-6	1,2,3-Trichlorobenzene	6.7 U		6.7	0.724
120-82-1	1,2,4-Trichlorobenzene	6.7 U		6.7	0.545
541-73-1	1,3-Dichlorobenzene	6.7 U		6.7	0.356
106-46-7	1,4-Dichlorobenzene	6.7 U		6.7	0.944
78-93-3	**Methyl Ethyl Ketone**	**22 J**		26	6.65
591-78-6	2-Hexanone	13 U	UJ,c	13	3.01
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.94
67-64-1	***Acetone**	**49 B**	B,Z	26	6.65
71-43-2	Benzene	6.7 U		6.7	0.701
74-97-5	Bromochloromethane	6.7 U		6.7	1.01
75-27-4	Dichlorobromomethane	6.7 U		6.7	0.666
75-25-2	Bromoform	6.7 U		6.7	0.769
74-83-9	Bromomethane	6.7 U		6.7	2.00
75-15-0	Carbon Disulfide	6.7 U	UJ,c	6.7	1.93
56-23-5	Carbon Tetrachloride	6.7 U		6.7	0.620
108-90-7	Chlorobenzene	6.7 U		6.7	0.879
75-00-3	Chloroethane	6.7 U		6.7	1.80
67-66-3	Chloroform	6.7 U		6.7	0.593

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**68SB3B**	QC Batch:	90056 -116
Sample #:	**345620**	Anal. Batch:	208014
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.33

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.7 U		6.7	1.11
110-82-7	Cyclohexane	13 U		13	0.420
10061-01-5	cis-1,3-Dichloropropene	6.7 U		6.7	0.653
10061-02-6	trans-1,3-Dichloropropene	6.7 U		6.7	0.693
75-71-8	Dichlorodifluoromethane	6.7 U	UJ, C	6.7	0.888
124-48-1	Chlorodibromomethane	6.7 U		6.7	0.688
100-41-4	Ethylbenzene	6.7 U		6.7	0.563
98-82-8	Isopropylbenzene	6.7 U		6.7	0.726
79-20-9	Methyl Acetate	26 U	UJ,C	26	4.62
108-87-2	Methylcyclohexane	13 U		13	1.12
1634-04-4	Methyl(tert)butyl Ether	6.7 U		6.7	0.853
75-09-2	Methylene Chloride	26 U		26	3.74
100-42-5	Styrene	6.7 U		6.7	0.588
127-18-4	Tetrachloroethene	6.7 U		6.7	0.815
108-88-3	Toluene	6.7 U		6.7	0.617
79-01-6	Trichloroethene	6.7 U		6.7	0.900
75-69-4	Trichlorofluoromethane	6.7 U		6.7	0.988
75-01-4	Vinyl Chloride	6.7 U		6.7	0.492
1330-20-7	Xylene (Total)	6.7 U		6.7	0.560

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**68SB3B**	QC Batch:	90056 -116
Sample #:	**345620**	Anal. Batch:	208014
Matrix:	Soil	Percent Solids:	75
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:50
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
Submittal #:	**36440-4**	Prepared:	n/a
Submittal:	Delivery Order 0046 RAAP	Prep. Method:	n/a
		Analyzed:	10/16/03 by JDM
Sample ID:	**68SB3C**	Anal. Method:	USEPA-8260B
Sample #:	**345621**	QC Batch:	90056 -116
Matrix:	Soil	Anal. Batch:	208014
Unit:	ug/kg dry	Percent Solids:	73
		Dilution Factor:	1.37

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.8 U		6.8	0.584
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.8 U		6.8	1.04
79-34-5	1,1,2,2-Tetrachloroethane	6.8 U		6.8	0.895
79-00-5	1,1,2-Trichloroethane	6.8 U		6.8	0.812
75-34-3	1,1-Dichloroethane	6.8 U		6.8	0.992
75-35-4	1,1-Dichloroethylene	6.8 U		6.8	1.00
106-93-4	1,2-Dibromoethane	6.8 U		6.8	0.938
96-12-8	1,2-Dibromo-3-chloropropane	14 U		14	2.85
95-50-1	1,2-Dichlorobenzene	6.8 U		6.8	0.663
107-06-2	1,2-Dichloroethane	6.8 U		6.8	0.590
156-59-2	cis-1,2-Dichloroethene	6.8 U		6.8	0.973
156-60-5	trans-1,2-Dichloroethene	6.8 U		6.8	0.963
78-87-5	1,2-Dichloropropane	6.8 U		6.8	0.803
87-61-6	1,2,3-Trichlorobenzene	6.8 U		6.8	0.745
120-82-1	1,2,4-Trichlorobenzene	6.8 U		6.8	0.562
541-73-1	1,3-Dichlorobenzene	6.8 U		6.8	0.367
106-46-7	1,4-Dichlorobenzene	6.8 U		6.8	0.973
78-93-3	**Methyl Ethyl Ketone**	**24 J**		28	6.85
591-78-6	2-Hexanone	14 U	UJ,c	14	3.10
108-10-1	4-Methyl-2-Pentanone	14 U		14	2.00
67-64-1	***Acetone**	**50 B**	B,2	28	6.85
71-43-2	Benzene	6.8 U		6.8	0.722
74-97-5	Bromochloromethane	6.8 U		6.8	1.04
75-27-4	Dichlorobromomethane	6.8 U		6.8	0.686
75-25-2	Bromoform	6.8 U		6.8	0.792
74-83-9	Bromomethane	6.8 U		6.8	2.06
75-15-0	Carbon Disulfide	6.8 U	UJ,c	6.8	1.99
56-23-5	Carbon Tetrachloride	6.8 U		6.8	0.638
108-90-7	Chlorobenzene	6.8 U		6.8	0.906
75-00-3	Chloroethane	6.8 U		6.8	1.85
67-66-3	Chloroform	6.8 U		6.8	0.611

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**68SB3C**	QC Batch:	90056 -116
Sample #:	**345621**	Anal. Batch:	208014
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.37

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.8 U		6.8	1.14
110-82-7	Cyclohexane	14 U		14	0.433
10061-01-5	cis-1,3-Dichloropropene	6.8 U		6.8	0.673
10061-02-6	trans-1,3-Dichloropropene	6.8 U		6.8	0.714
75-71-8	Dichlorodifluoromethane	6.8 U	UJ, C	6.8	0.915
124-48-1	Chlorodibromomethane	6.8 U		6.8	0.708
100-41-4	Ethylbenzene	6.8 U		6.8	0.580
98-82-8	Isopropylbenzene	6.8 U		6.8	0.748
79-20-9	Methyl Acetate	28 U	UJ,C	28	4.75
108-87-2	Methylcyclohexane	14 U		14	1.16
1634-04-4	Methyl(tert)butyl Ether	6.8 U		6.8	0.878
75-09-2	**Methylene Chloride**	**5.0 J**		28	3.85
100-42-5	Styrene	6.8 U		6.8	0.606
127-18-4	Tetrachloroethene	6.8 U		6.8	0.840
108-88-3	Toluene	6.8 U		6.8	0.636
79-01-6	Trichloroethene	6.8 U		6.8	0.927
75-69-4	Trichlorofluoromethane	6.8 U		6.8	1.02
75-01-4	Vinyl Chloride	6.8 U		6.8	0.507
1330-20-7	Xylene (Total)	6.8 U		6.8	0.577

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**68SB3C**	QC Batch:	90056 -116
Sample #:	**345621**	Anal. Batch:	208014
Matrix:	Soil	Percent Solids:	73
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/16/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**57SB1A**	QC Batch:	90056 -116
Sample #:	**345622**	Anal. Batch:	208014
Matrix:	Soil	Percent Solids:	86
Unit:	ug/kg dry	Dilution Factor:	1.16

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	5.8 U		5.8	0.494
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.8 U		5.8	0.880
79-34-5	1,1,2,2-Tetrachloroethane	5.8 U		5.8	0.757
79-00-5	1,1,2-Trichloroethane	5.8 U		5.8	0.688
75-34-3	1,1-Dichloroethane	5.8 U		5.8	0.840
75-35-4	1,1-Dichloroethylene	5.8 U		5.8	0.850
106-93-4	1,2-Dibromoethane	5.8 U		5.8	0.795
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.41
95-50-1	1,2-Dichlorobenzene	5.8 U		5.8	0.561
107-06-2	1,2-Dichloroethane	5.8 U		5.8	0.500
156-59-2	cis-1,2-Dichloroethene	5.8 U		5.8	0.824
156-60-5	trans-1,2-Dichloroethene	5.8 U		5.8	0.815
78-87-5	1,2-Dichloropropane	5.8 U		5.8	0.680
87-61-6	1,2,3-Trichlorobenzene	5.8 U		5.8	0.631
120-82-1	1,2,4-Trichlorobenzene	5.8 U		5.8	0.476
541-73-1	1,3-Dichlorobenzene	5.8 U		5.8	0.311
106-46-7	1,4-Dichlorobenzene	5.8 U		5.8	0.824
78-93-3	**Methyl Ethyl Ketone**	**29**		24	5.80
591-78-6	2-Hexanone	12 U	VJ,c	12	2.62
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.69
67-64-1	***Acetone**	**100 B**	Bz	24	5.80
71-43-2	Benzene	5.8 U		5.8	0.611
74-97-5	Bromochloromethane	5.8 U		5.8	0.883
75-27-4	Dichlorobromomethane	5.8 U		5.8	0.581
75-25-2	Bromoform	5.8 U		5.8	0.670
74-83-9	Bromomethane	5.8 U		5.8	1.74
75-15-0	Carbon Disulfide	5.8 U	VJ,c	5.8	1.68
56-23-5	Carbon Tetrachloride	5.8 U		5.8	0.541
108-90-7	Chlorobenzene	5.8 U		5.8	0.767
75-00-3	Chloroethane	5.8 U		5.8	1.57
67-66-3	Chloroform	5.8 U		5.8	0.517

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB1A**	QC Batch:	90056 -116
Sample #:	**345622**	Anal. Batch:	208014
Matrix:	Soil	Percent Solids:	86
Unit:	ug/kg dry	Dilution Factor:	1.16

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	5.8 U		5.8	0.967
110-82-7	Cyclohexane	12 U		12	0.367
10061-01-5	cis-1,3-Dichloropropene	5.8 U		5.8	0.570
10061-02-6	trans-1,3-Dichloropropene	5.8 U		5.8	0.604
75-71-8	Dichlorodifluoromethane	5.8 U	UJ, c	5.8	0.775
124-48-1	Chlorodibromomethane	5.8 U		5.8	0.600
100-41-4	Ethylbenzene	5.8 U		5.8	0.491
98-82-8	Isopropylbenzene	5.8 U		5.8	0.633
79-20-9	Methyl Acetate	24 U	UJ,c	24	4.03
108-87-2	Methylcyclohexane	12 U		12	0.980
1634-04-4	Methyl(tert)butyl Ether	5.8 U		5.8	0.744
75-09-2	**Methylene Chloride**	**3.6 J**		24	3.26
100-42-5	Styrene	5.8 U		5.8	0.513
127-18-4	Tetrachloroethene	5.8 U		5.8	0.711
108-88-3	Toluene	5.8 U		5.8	0.538
79-01-6	Trichloroethene	5.8 U		5.8	0.785
75-69-4	Trichlorofluoromethane	5.8 U		5.8	0.862
75-01-4	Vinyl Chloride	5.8 U		5.8	0.429
1330-20-7	Xylene (Total)	5.8 U		5.8	0.488

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB1A**	QC Batch:	90056 -116
Sample #:	**345622**	Anal. Batch:	208014
Matrix:	Soil	Percent Solids:	86
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
Hexanal	66-25-1	7.0	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB1B**	QC Batch:	90056 -116
Sample #:	**345623**	Anal. Batch:	208014
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.33

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.7 U		6.7	0.567
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.7 U		6.7	1.01
79-34-5	1,1,2,2-Tetrachloroethane	6.7 U		6.7	0.868
79-00-5	1,1,2-Trichloroethane	6.7 U		6.7	0.789
75-34-3	1,1-Dichloroethane	6.7 U		6.7	0.963
75-35-4	1,1-Dichloroethylene	6.7 U		6.7	0.975
106-93-4	1,2-Dibromoethane	6.7 U		6.7	0.911
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	2.77
95-50-1	1,2-Dichlorobenzene	6.7 U		6.7	0.644
107-06-2	1,2-Dichloroethane	6.7 U		6.7	0.573
156-59-2	cis-1,2-Dichloroethene	6.7 U		6.7	0.944
156-60-5	trans-1,2-Dichloroethene	6.7 U		6.7	0.935
78-87-5	1,2-Dichloropropane	6.7 U		6.7	0.779
87-61-6	1,2,3-Trichlorobenzene	6.7 U		6.7	0.724
120-82-1	1,2,4-Trichlorobenzene	6.7 U		6.7	0.545
541-73-1	1,3-Dichlorobenzene	6.7 U		6.7	0.356
106-46-7	1,4-Dichlorobenzene	6.7 U		6.7	0.944
78-93-3	**Methyl Ethyl Ketone**	**24 J**		26	6.65
591-78-6	2-Hexanone	13 U	UJ,c	13	3.01
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.94
67-64-1	***Acetone**	**50 B**	B,2	26	6.65
71-43-2	Benzene	6.7 U		6.7	0.701
74-97-5	Bromochloromethane	6.7 U		6.7	1.01
75-27-4	Dichlorobromomethane	6.7 U		6.7	0.666
75-25-2	Bromoform	6.7 U		6.7	0.769
74-83-9	Bromomethane	6.7 U		6.7	2.00
75-15-0	Carbon Disulfide	6.7 U	UJ,c	6.7	1.93
56-23-5	Carbon Tetrachloride	6.7 U		6.7	0.620
108-90-7	Chlorobenzene	6.7 U		6.7	0.879
75-00-3	Chloroethane	6.7 U		6.7	1.80
67-66-3	**Chloroform**	**17**		6.7	0.593

* See attached Statement of Data Qualifications.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB1B**	QC Batch:	90056 -116
Sample #:	**345623**	Anal. Batch:	208014
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.33

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.7 U		6.7	1.11
110-82-7	Cyclohexane	13 U		13	0.420
10061-01-5	cis-1,3-Dichloropropene	6.7 U		6.7	0.653
10061-02-6	trans-1,3-Dichloropropene	6.7 U		6.7	0.693
75-71-8	Dichlorodifluoromethane	6.7 U	UJ, c	6.7	0.888
124-48-1	Chlorodibromomethane	6.7 U		6.7	0.688
100-41-4	Ethylbenzene	6.7 U		6.7	0.563
98-82-8	Isopropylbenzene	6.7 U		6.7	0.726
79-20-9	Methyl Acetate	26 U	UJ, c	26	4.62
108-87-2	Methylcyclohexane	13 U		13	1.12
1634-04-4	Methyl(tert)butyl Ether	6.7 U		6.7	0.853
75-09-2	**Methylene Chloride**	**5.3 J**		26	3.74
100-42-5	Styrene	6.7 U		6.7	0.588
127-18-4	Tetrachloroethene	6.7 U		6.7	0.815
108-88-3	Toluene	6.7 U		6.7	0.617
79-01-6	Trichloroethene	6.7 U		6.7	0.900
75-69-4	Trichlorofluoromethane	6.7 U		6.7	0.988
75-01-4	Vinyl Chloride	6.7 U		6.7	0.492
1330-20-7	Xylene (Total)	6.7 U		6.7	0.560

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/16/03 JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**57SB1B**	QC Batch:	90056 -116
Sample #:	**345623**	Anal. Batch:	208014
Matrix:	Soil	Percent Solids:	75
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/16/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**57SB1C**	QC Batch:	90056 -116
Sample #:	**345624**	Anal. Batch:	208014
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	1.49

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	7.5 U		7.5	0.635
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	7.5 U		7.5	1.13
79-34-5	1,1,2,2-Tetrachloroethane	7.5 U		7.5	0.973
79-00-5	1,1,2-Trichloroethane	7.5 U		7.5	0.884
75-34-3	1,1-Dichloroethane	7.5 U		7.5	1.08
75-35-4	1,1-Dichloroethylene	7.5 U		7.5	1.09
106-93-4	1,2-Dibromoethane	7.5 U		7.5	1.02
96-12-8	1,2-Dibromo-3-chloropropane	15 U		15	3.10
95-50-1	1,2-Dichlorobenzene	7.5 U		7.5	0.721
107-06-2	1,2-Dichloroethane	7.5 U		7.5	0.642
156-59-2	cis-1,2-Dichloroethene	7.5 U		7.5	1.06
156-60-5	trans-1,2-Dichloroethene	7.5 U		7.5	1.05
78-87-5	1,2-Dichloropropane	7.5 U		7.5	0.873
87-61-6	1,2,3-Trichlorobenzene	7.5 U		7.5	0.811
120-82-1	1,2,4-Trichlorobenzene	7.5 U		7.5	0.611
541-73-1	1,3-Dichlorobenzene	7.5 U		7.5	0.399
106-46-7	1,4-Dichlorobenzene	7.5 U		7.5	1.06
78-93-3	**Methyl Ethyl Ketone**	**26 J**		30	7.45
591-78-6	2-Hexanone	15 U	VS,C	15	3.37
108-10-1	4-Methyl-2-Pentanone	15 U		15	2.18
67-64-1	***Acetone**	**54 B**	B,Z	30	7.45
71-43-2	Benzene	7.5 U		7.5	0.785
74-97-5	Bromochloromethane	7.5 U		7.5	1.13
75-27-4	Dichlorobromomethane	7.5 U		7.5	0.746
75-25-2	Bromoform	7.5 U		7.5	0.861
74-83-9	Bromomethane	7.5 U		7.5	2.24
75-15-0	Carbon Disulfide	7.5 U	VS,C	7.5	2.16
56-23-5	Carbon Tetrachloride	7.5 U		7.5	0.694
108-90-7	Chlorobenzene	7.5 U		7.5	0.985
75-00-3	Chloroethane	7.5 U		7.5	2.01
67-66-3	**Chloroform**	**24**		7.5	0.665

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB1C**	QC Batch:	90056 -116
Sample #:	**345624**	Anal. Batch:	208014
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	1.49

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	7.5 U		7.5	1.24
110-82-7	Cyclohexane	15 U		15	0.471
10061-01-5	cis-1,3-Dichloropropene	7.5 U		7.5	0.732
10061-02-6	trans-1,3-Dichloropropene	7.5 U		7.5	0.776
75-71-8	Dichlorodifluoromethane	7.5 U	VJ,c	7.5	0.995
124-48-1	Chlorodibromomethane	7.5 U		7.5	0.770
100-41-4	Ethylbenzene	7.5 U		7.5	0.630
98-82-8	Isopropylbenzene	7.5 U		7.5	0.814
79-20-9	Methyl Acetate	30 U	VJ,c	30	5.17
108-87-2	Methylcyclohexane	15 U		15	1.26
1634-04-4	Methyl(tert)butyl Ether	7.5 U		7.5	0.955
75-09-2	**Methylene Chloride**	**6.4 J**		30	4.19
100-42-5	Styrene	7.5 U		7.5	0.659
127-18-4	Tetrachloroethene	7.5 U		7.5	0.913
108-88-3	Toluene	7.5 U		7.5	0.691
79-01-6	Trichloroethene	7.5 U		7.5	1.01
75-69-4	Trichlorofluoromethane	7.5 U		7.5	1.11
75-01-4	Vinyl Chloride	7.5 U		7.5	0.551
1330-20-7	Xylene (Total)	7.5 U		7.5	0.627

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB1C**	QC Batch:	90056 -116
Sample #:	**345624**	Anal. Batch:	208014
Matrix:	Soil	Percent Solids:	67
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/17/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**57SB3A**	QC Batch:	90056 -117
Sample #:	**345625**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.5 U		6.5	0.554
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.5 U		6.5	0.987
79-34-5	1,1,2,2-Tetrachloroethane	6.5 U		6.5	0.849
79-00-5	1,1,2-Trichloroethane	6.5 U		6.5	0.771
75-34-3	1,1-Dichloroethane	6.5 U		6.5	0.941
75-35-4	1,1-Dichloroethylene	6.5 U		6.5	0.953
106-93-4	1,2-Dibromoethane	6.5 U		6.5	0.891
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	2.70
95-50-1	1,2-Dichlorobenzene	6.5 U		6.5	0.629
107-06-2	1,2-Dichloroethane	6.5 U		6.5	0.560
156-59-2	cis-1,2-Dichloroethene	6.5 U		6.5	0.923
156-60-5	trans-1,2-Dichloroethene	6.5 U		6.5	0.914
78-87-5	1,2-Dichloropropane	6.5 U		6.5	0.762
87-61-6	1,2,3-Trichlorobenzene	6.5 U		6.5	0.707
120-82-1	1,2,4-Trichlorobenzene	6.5 U		6.5	0.533
541-73-1	1,3-Dichlorobenzene	6.5 U		6.5	0.348
106-46-7	1,4-Dichlorobenzene	6.5 U		6.5	0.923
78-93-3	**Methyl Ethyl Ketone**	**28**		26	6.50
591-78-6	2-Hexanone	13 U		13	2.94
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.90
67-64-1	***Acetone**	**99 B**	Bz	26	6.50
71-43-2	Benzene	6.5 U		6.5	0.685
74-97-5	Bromochloromethane	6.5 U		6.5	0.989
75-27-4	Dichlorobromomethane	6.5 U		6.5	0.651
75-25-2	Bromoform	6.5 U		6.5	0.751
74-83-9	Bromomethane	6.5 U		6.5	1.95
75-15-0	Carbon Disulfide	6.5 U		6.5	1.89
56-23-5	Carbon Tetrachloride	6.5 U		6.5	0.606
108-90-7	Chlorobenzene	6.5 U		6.5	0.859
75-00-3	Chloroethane	6.5 U		6.5	1.76
67-66-3	Chloroform	6.5 U		6.5	0.580

* See attached Statement of Data Qualifications.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB3A**	QC Batch:	90056 -117
Sample #:	**345625**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.5 U		6.5	1.08
110-82-7	Cyclohexane	13 U		13	0.411
10061-01-5	cis-1,3-Dichloropropene	6.5 U		6.5	0.638
10061-02-6	trans-1,3-Dichloropropene	6.5 U		6.5	0.677
75-71-8	Dichlorodifluoromethane	6.5 U		6.5	0.868
124-48-1	Chlorodibromomethane	6.5 U		6.5	0.672
100-41-4	**Ethylbenzene**	**0.66 J**		6.5	0.550
98-82-8	Isopropylbenzene	6.5 U		6.5	0.710
79-20-9	Methyl Acetate	26 U	UJ,C	26	4.51
108-87-2	Methylcyclohexane	13 U		13	1.10
1634-04-4	Methyl(tert)butyl Ether	6.5 U		6.5	0.833
75-09-2	**Methylene Chloride**	**6.5 J**		26	3.65
100-42-5	Styrene	6.5 U		6.5	0.575
127-18-4	Tetrachloroethene	6.5 U		6.5	0.797
108-88-3	**Toluene**	**1.3 J**		6.5	0.603
79-01-6	**Trichloroethene**	**1.9 J**		6.5	0.880
75-69-4	Trichlorofluoromethane	6.5 U		6.5	0.966
75-01-4	Vinyl Chloride	6.5 U		6.5	0.481
1330-20-7	Xylene (Total)	6.5 U		6.5	0.547

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/17/03 JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**57SB3A**	QC Batch:	90056 -117
Sample #:	**345625**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	77
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD6**	QC Batch:	90056 -117
Sample #:	**345626**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.32

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.6 U		6.6	0.562
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.6 U		6.6	1.00
79-34-5	1,1,2,2-Tetrachloroethane	6.6 U		6.6	0.862
79-00-5	1,1,2-Trichloroethane	6.6 U		6.6	0.783
75-34-3	1,1-Dichloroethane	6.6 U		6.6	0.956
75-35-4	1,1-Dichloroethylene	6.6 U		6.6	0.968
106-93-4	1,2-Dibromoethane	6.6 U		6.6	0.904
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	2.75
95-50-1	1,2-Dichlorobenzene	6.6 U		6.6	0.639
107-06-2	1,2-Dichloroethane	6.6 U		6.6	0.569
156-59-2	cis-1,2-Dichloroethene	6.6 U		6.6	0.937
156-60-5	trans-1,2-Dichloroethene	6.6 U		6.6	0.928
78-87-5	1,2-Dichloropropane	6.6 U		6.6	0.774
87-61-6	1,2,3-Trichlorobenzene	6.6 U		6.6	0.718
120-82-1	1,2,4-Trichlorobenzene	6.6 U		6.6	0.541
541-73-1	1,3-Dichlorobenzene	6.6 U		6.6	0.354
106-46-7	1,4-Dichlorobenzene	6.6 U		6.6	0.937
78-93-3	**Methyl Ethyl Ketone**	**32**		26	6.60
591-78-6	2-Hexanone	13 U		13	2.98
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.93
67-64-1	**Acetone**	**160**	B,Z	26	6.60
71-43-2	Benzene	6.6 U		6.6	0.696
74-97-5	Bromochloromethane	6.6 U		6.6	1.00
75-27-4	Dichlorobromomethane	6.6 U		6.6	0.661
75-25-2	Bromoform	6.6 U		6.6	0.763
74-83-9	Bromomethane	6.6 U		6.6	1.98
75-15-0	Carbon Disulfide	6.6 U		6.6	1.91
56-23-5	Carbon Tetrachloride	6.6 U		6.6	0.615
108-90-7	Chlorobenzene	6.6 U		6.6	0.873
75-00-3	Chloroethane	6.6 U		6.6	1.78
67-66-3	Chloroform	6.6 U		6.6	0.589

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD6**	QC Batch:	90056 -117
Sample #:	**345626**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.32

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.6 U		6.6	1.10
110-82-7	Cyclohexane	13 U		13	0.417
10061-01-5	cis-1,3-Dichloropropene	6.6 U		6.6	0.648
10061-02-6	trans-1,3-Dichloropropene	6.6 U		6.6	0.688
75-71-8	Dichlorodifluoromethane	6.6 U		6.6	0.882
124-48-1	Chlorodibromomethane	6.6 U		6.6	0.682
100-41-4	Ethylbenzene	6.6 U		6.6	0.558
98-82-8	Isopropylbenzene	6.6 U		6.6	0.721
79-20-9	Methyl Acetate	26 U	UJ,e	26	4.58
108-87-2	Methylcyclohexane	13 U		13	1.12
1634-04-4	Methyl(tert)butyl Ether	6.6 U		6.6	0.846
75-09-2	**Methylene Chloride**	**4.3 J**		26	3.71
100-42-5	Styrene	6.6 U		6.6	0.583
127-18-4	Tetrachloroethene	6.6 U		6.6	0.809
108-88-3	**Toluene**	**2.6 J**		6.6	0.612
79-01-6	**Trichloroethene**	**1.6 J**		6.6	0.894
75-69-4	Trichlorofluoromethane	6.6 U		6.6	0.981
75-01-4	Vinyl Chloride	6.6 U		6.6	0.488
1330-20-7	Xylene (Total)	6.6 U		6.6	0.556

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD6**	QC Batch:	90056 -117
Sample #:	**345626**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	76
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	CAS Number	Result (ug/kg dr	Qualifier
No compound was detected.			

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/17/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**57SB3B**	QC Batch:	90056 -117
Sample #:	**345627**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	63
Unit:	ug/kg dry	Dilution Factor:	1.59

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	7.9 U		7.9	0.677
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	7.9 U		7.9	1.21
79-34-5	1,1,2,2-Tetrachloroethane	7.9 U		7.9	1.04
79-00-5	1,1,2-Trichloroethane	7.9 U		7.9	0.943
75-34-3	1,1-Dichloroethane	7.9 U		7.9	1.15
75-35-4	1,1-Dichloroethylene	7.9 U		7.9	1.17
106-93-4	1,2-Dibromoethane	7.9 U		7.9	1.09
96-12-8	1,2-Dibromo-3-chloropropane	16 U		16	3.31
95-50-1	1,2-Dichlorobenzene	7.9 U		7.9	0.770
107-06-2	1,2-Dichloroethane	7.9 U		7.9	0.685
156-59-2	cis-1,2-Dichloroethene	7.9 U		7.9	1.13
156-60-5	trans-1,2-Dichloroethene	7.9 U		7.9	1.12
78-87-5	1,2-Dichloropropane	7.9 U		7.9	0.932
87-61-6	1,2,3-Trichlorobenzene	7.9 U		7.9	0.865
120-82-1	1,2,4-Trichlorobenzene	7.9 U		7.9	0.652
541-73-1	1,3-Dichlorobenzene	7.9 U		7.9	0.426
106-46-7	1,4-Dichlorobenzene	7.9 U		7.9	1.13
78-93-3	**Methyl Ethyl Ketone**	**29 J**		32	7.95
591-78-6	2-Hexanone	16 U		16	3.59
108-10-1	4-Methyl-2-Pentanone	16 U		16	2.32
67-64-1	***Acetone**	**77 B**	B,Z	32	7.95
71-43-2	Benzene	7.9 U		7.9	0.838
74-97-5	Bromochloromethane	7.9 U		7.9	1.21
75-27-4	Dichlorobromomethane	7.9 U		7.9	0.797
75-25-2	Bromoform	7.9 U		7.9	0.919
74-83-9	Bromomethane	7.9 U		7.9	2.39
75-15-0	Carbon Disulfide	7.9 U		7.9	2.31
56-23-5	Carbon Tetrachloride	7.9 U		7.9	0.741
108-90-7	Chlorobenzene	7.9 U		7.9	1.05
75-00-3	Chloroethane	7.9 U		7.9	2.15
67-66-3	Chloroform	7.9 U		7.9	0.709

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/17/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**57SB3B**	QC Batch:	90056 -117
Sample #:	**345627**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	63
Unit:	ug/kg dry	Dilution Factor:	1.59

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	7.9 U		7.9	1.33
110-82-7	Cyclohexane	16 U		16	0.502
10061-01-5	cis-1,3-Dichloropropene	7.9 U		7.9	0.781
10061-02-6	trans-1,3-Dichloropropene	7.9 U		7.9	0.828
75-71-8	Dichlorodifluoromethane	7.9 U		7.9	1.06
124-48-1	Chlorodibromomethane	7.9 U		7.9	0.822
100-41-4	Ethylbenzene	7.9 U		7.9	0.673
98-82-8	Isopropylbenzene	7.9 U		7.9	0.868
79-20-9	Methyl Acetate	32 U	UJ,c	32	5.52
108-87-2	Methylcyclohexane	16 U		16	1.34
1634-04-4	Methyl(tert)butyl Ether	7.9 U		7.9	1.02
75-09-2	**Methylene Chloride**	**6.8 J**		32	4.47
100-42-5	Styrene	7.9 U		7.9	0.703
127-18-4	Tetrachloroethene	7.9 U		7.9	0.975
108-88-3	Toluene	7.9 U		7.9	0.738
79-01-6	Trichloroethene	7.9 U		7.9	1.08
75-69-4	Trichlorofluoromethane	7.9 U		7.9	1.18
75-01-4	Vinyl Chloride	7.9 U		7.9	0.588
1330-20-7	Xylene (Total)	7.9 U		7.9	0.669

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB3B**	QC Batch:	90056 -117
Sample #:	**345627**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	63
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB3C**	QC Batch:	90056 -117
Sample #:	**345628**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.33

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.7 U		6.7	0.567
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.7 U		6.7	1.01
79-34-5	1,1,2,2-Tetrachloroethane	6.7 U		6.7	0.868
79-00-5	1,1,2-Trichloroethane	6.7 U		6.7	0.789
75-34-3	1,1-Dichloroethane	6.7 U		6.7	0.963
75-35-4	1,1-Dichloroethylene	6.7 U		6.7	0.975
106-93-4	1,2-Dibromoethane	6.7 U		6.7	0.911
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	2.77
95-50-1	1,2-Dichlorobenzene	6.7 U		6.7	0.644
107-06-2	1,2-Dichloroethane	6.7 U		6.7	0.573
156-59-2	cis-1,2-Dichloroethene	6.7 U		6.7	0.944
156-60-5	trans-1,2-Dichloroethene	6.7 U		6.7	0.935
78-87-5	1,2-Dichloropropane	6.7 U		6.7	0.779
87-61-6	1,2,3-Trichlorobenzene	6.7 U		6.7	0.724
120-82-1	1,2,4-Trichlorobenzene	6.7 U		6.7	0.545
541-73-1	1,3-Dichlorobenzene	6.7 U		6.7	0.356
106-46-7	1,4-Dichlorobenzene	6.7 U		6.7	0.944
78-93-3	**Methyl Ethyl Ketone**	**25 J**		26	6.65
591-78-6	2-Hexanone	13 U		13	3.01
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.94
67-64-1	***Acetone**	**55 B**	B,Z	26	6.65
71-43-2	Benzene	6.7 U		6.7	0.701
74-97-5	Bromochloromethane	6.7 U		6.7	1.01
75-27-4	Dichlorobromomethane	6.7 U		6.7	0.666
75-25-2	Bromoform	6.7 U		6.7	0.769
74-83-9	Bromomethane	6.7 U		6.7	2.00
75-15-0	Carbon Disulfide	6.7 U		6.7	1.93
56-23-5	Carbon Tetrachloride	6.7 U		6.7	0.620
108-90-7	Chlorobenzene	6.7 U		6.7	0.879
75-00-3	Chloroethane	6.7 U		6.7	1.80
67-66-3	**Chloroform**	**1.1 J**		6.7	0.593

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB3C**	QC Batch:	90056 -117
Sample #:	**345628**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.33

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.7 U		6.7	1.11
110-82-7	Cyclohexane	13 U		13	0.420
10061-01-5	cis-1,3-Dichloropropene	6.7 U		6.7	0.653
10061-02-6	trans-1,3-Dichloropropene	6.7 U		6.7	0.693
75-71-8	Dichlorodifluoromethane	6.7 U		6.7	0.888
124-48-1	Chlorodibromomethane	6.7 U		6.7	0.688
100-41-4	Ethylbenzene	6.7 U		6.7	0.563
98-82-8	Isopropylbenzene	6.7 U		6.7	0.726
79-20-9	Methyl Acetate	26 U	UJ,C	26	4.62
108-87-2	Methylcyclohexane	13 U		13	1.12
1634-04-4	Methyl(tert)butyl Ether	6.7 U		6.7	0.853
75-09-2	**Methylene Chloride**	**5.4 J**		26	3.74
100-42-5	Styrene	6.7 U		6.7	0.588
127-18-4	Tetrachloroethene	6.7 U		6.7	0.815
108-88-3	Toluene	6.7 U		6.7	0.617
79-01-6	Trichloroethene	6.7 U		6.7	0.900
75-69-4	Trichlorofluoromethane	6.7 U		6.7	0.988
75-01-4	Vinyl Chloride	6.7 U		6.7	0.492
1330-20-7	Xylene (Total)	6.7 U		6.7	0.560

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/17/03 JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**57SB3C**	QC Batch:	90056 -117
Sample #:	**345628**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	75
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	CAS Number	Result (ug/kg dr	Qualifier
No compound was detected.			

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/17/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**57SB2A**	QC Batch:	90056 -117
Sample #:	**345629**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.32

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.6 U		6.6	0.562
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.6 U		6.6	1.00
79-34-5	1,1,2,2-Tetrachloroethane	6.6 U		6.6	0.862
79-00-5	1,1,2-Trichloroethane	6.6 U		6.6	0.783
75-34-3	1,1-Dichloroethane	6.6 U		6.6	0.956
75-35-4	1,1-Dichloroethylene	6.6 U		6.6	0.968
106-93-4	1,2-Dibromoethane	6.6 U		6.6	0.904
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	2.75
95-50-1	1,2-Dichlorobenzene	6.6 U		6.6	0.639
107-06-2	1,2-Dichloroethane	6.6 U		6.6	0.569
156-59-2	cis-1,2-Dichloroethene	6.6 U		6.6	0.937
156-60-5	trans-1,2-Dichloroethene	6.6 U		6.6	0.928
78-87-5	1,2-Dichloropropane	6.6 U		6.6	0.774
87-61-6	1,2,3-Trichlorobenzene	6.6 U		6.6	0.718
120-82-1	1,2,4-Trichlorobenzene	6.6 U		6.6	0.541
541-73-1	1,3-Dichlorobenzene	6.6 U		6.6	0.354
106-46-7	1,4-Dichlorobenzene	6.6 U		6.6	0.937
78-93-3	**Methyl Ethyl Ketone**	**30**		26	6.60
591-78-6	2-Hexanone	13 U		13	2.98
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.93
67-64-1	***Acetone**	**100 B**	B,Z	26	6.60
71-43-2	Benzene	6.6 U		6.6	0.696
74-97-5	Bromochloromethane	6.6 U		6.6	1.00
75-27-4	Dichlorobromomethane	6.6 U		6.6	0.661
75-25-2	Bromoform	6.6 U		6.6	0.763
74-83-9	Bromomethane	6.6 U		6.6	1.98
75-15-0	Carbon Disulfide	6.6 U		6.6	1.91
56-23-5	Carbon Tetrachloride	6.6 U		6.6	0.615
108-90-7	Chlorobenzene	6.6 U		6.6	0.873
75-00-3	Chloroethane	6.6 U		6.6	1.78
67-66-3	Chloroform	6.6 U		6.6	0.589

* See attached Statement of Data Qualifications.

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB2A**	QC Batch:	90056 -117
Sample #:	**345629**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.32

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.6 U		6.6	1.10
110-82-7	Cyclohexane	13 U		13	0.417
10061-01-5	cis-1,3-Dichloropropene	6.6 U		6.6	0.648
10061-02-6	trans-1,3-Dichloropropene	6.6 U		6.6	0.688
75-71-8	Dichlorodifluoromethane	6.6 U		6.6	0.882
124-48-1	Chlorodibromomethane	6.6 U		6.6	0.682
100-41-4	Ethylbenzene	6.6 U		6.6	0.558
98-82-8	Isopropylbenzene	6.6 U		6.6	0.721
79-20-9	Methyl Acetate	26 U	UJ,c	26	4.58
108-87-2	Methylcyclohexane	13 U		13	1.12
1634-04-4	Methyl(tert)butyl Ether	6.6 U		6.6	0.846
75-09-2	**Methylene Chloride**	**6.0 J**		26	3.71
100-42-5	Styrene	6.6 U		6.6	0.583
127-18-4	Tetrachloroethene	6.6 U		6.6	0.809
108-88-3	Toluene	6.6 U		6.6	0.612
79-01-6	Trichloroethene	6.6 U		6.6	0.894
75-69-4	Trichlorofluoromethane	6.6 U		6.6	0.981
75-01-4	Vinyl Chloride	6.6 U		6.6	0.488
1330-20-7	Xylene (Total)	6.6 U		6.6	0.556

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB2A**	QC Batch:	90056 -117
Sample #:	**345629**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	76
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
Hexanal	66-25-1	28	E

NJ, I

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB2B**	QC Batch:	90056 -117
Sample #:	**345630**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.32

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.6 U		6.6	0.562
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.6 U		6.6	1.00
79-34-5	1,1,2,2-Tetrachloroethane	6.6 U		6.6	0.862
79-00-5	1,1,2-Trichloroethane	6.6 U		6.6	0.783
75-34-3	1,1-Dichloroethane	6.6 U		6.6	0.956
75-35-4	1,1-Dichloroethylene	6.6 U		6.6	0.968
106-93-4	1,2-Dibromoethane	6.6 U		6.6	0.904
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	2.75
95-50-1	1,2-Dichlorobenzene	6.6 U		6.6	0.639
107-06-2	1,2-Dichloroethane	6.6 U		6.6	0.569
156-59-2	cis-1,2-Dichloroethene	6.6 U		6.6	0.937
156-60-5	trans-1,2-Dichloroethene	6.6 U		6.6	0.928
78-87-5	1,2-Dichloropropane	6.6 U		6.6	0.774
87-61-6	1,2,3-Trichlorobenzene	6.6 U		6.6	0.718
120-82-1	1,2,4-Trichlorobenzene	6.6 U		6.6	0.541
541-73-1	1,3-Dichlorobenzene	6.6 U		6.6	0.354
106-46-7	1,4-Dichlorobenzene	6.6 U		6.6	0.937
78-93-3	**Methyl Ethyl Ketone**	**23 J**		26	6.60
591-78-6	2-Hexanone	13 U		13	2.98
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.93
67-64-1	***Acetone**	**51 B**	B,Z	26	6.60
71-43-2	Benzene	6.6 U		6.6	0.696
74-97-5	Bromochloromethane	6.6 U		6.6	1.00
75-27-4	Dichlorobromomethane	6.6 U		6.6	0.661
75-25-2	Bromoform	6.6 U		6.6	0.763
74-83-9	Bromomethane	6.6 U		6.6	1.98
75-15-0	*Carbon Disulfide	6.6 U	UJ,M	6.6	1.91
56-23-5	Carbon Tetrachloride	6.6 U		6.6	0.615
108-90-7	Chlorobenzene	6.6 U		6.6	0.873
75-00-3	*Chloroethane	6.6 U		6.6	1.78
67-66-3	Chloroform	6.6 U		6.6	0.589

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB2B**	QC Batch:	90056 -117
Sample #:	**345630**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.32

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.6 U		6.6	1.10
110-82-7	Cyclohexane	13 U		13	0.417
10061-01-5	cis-1,3-Dichloropropene	6.6 U		6.6	0.648
10061-02-6	trans-1,3-Dichloropropene	6.6 U		6.6	0.688
75-71-8	Dichlorodifluoromethane	6.6 U		6.6	0.882
124-48-1	Chlorodibromomethane	6.6 U		6.6	0.682
100-41-4	Ethylbenzene	6.6 U		6.6	0.558
98-82-8	Isopropylbenzene	6.6 U		6.6	0.721
79-20-9	*Methyl Acetate	26 U	UJ,C	26	4.58
108-87-2	Methylcyclohexane	13 U		13	1.12
1634-04-4	Methyl(tert)butyl Ether	6.6 U		6.6	0.846
75-09-2	**Methylene Chloride**	**4.9 J**		26	3.71
100-42-5	*Styrene	6.6 U		6.6	0.583
127-18-4	Tetrachloroethene	6.6 U		6.6	0.809
108-88-3	Toluene	6.6 U		6.6	0.612
79-01-6	Trichloroethene	6.6 U		6.6	0.894
75-69-4	Trichlorofluoromethane	6.6 U		6.6	0.981
75-01-4	Vinyl Chloride	6.6 U		6.6	0.488
1330-20-7	Xylene (Total)	6.6 U		6.6	0.556

* See attached Statement of Data Qualifications.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB2B**	QC Batch:	90056 -117
Sample #:	**345630**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	76
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:40
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB2C**	QC Batch:	90056 -117
Sample #:	**345631**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.32

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.6 U		6.6	0.562
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.6 U		6.6	1.00
79-34-5	1,1,2,2-Tetrachloroethane	6.6 U		6.6	0.862
79-00-5	1,1,2-Trichloroethane	6.6 U		6.6	0.783
75-34-3	1,1-Dichloroethane	6.6 U		6.6	0.956
75-35-4	1,1-Dichloroethylene	6.6 U		6.6	0.968
106-93-4	1,2-Dibromoethane	6.6 U		6.6	0.904
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	2.75
95-50-1	1,2-Dichlorobenzene	6.6 U		6.6	0.639
107-06-2	1,2-Dichloroethane	6.6 U		6.6	0.569
156-59-2	cis-1,2-Dichloroethene	6.6 U		6.6	0.937
156-60-5	trans-1,2-Dichloroethene	6.6 U		6.6	0.928
78-87-5	1,2-Dichloropropane	6.6 U		6.6	0.774
87-61-6	1,2,3-Trichlorobenzene	6.6 U		6.6	0.718
120-82-1	1,2,4-Trichlorobenzene	6.6 U		6.6	0.541
541-73-1	1,3-Dichlorobenzene	6.6 U		6.6	0.354
106-46-7	1,4-Dichlorobenzene	6.6 U		6.6	0.937
78-93-3	**Methyl Ethyl Ketone**	**21 J**		26	6.60
591-78-6	2-Hexanone	13 U		13	2.98
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.93
67-64-1	***Acetone**	**37 B**	B,Z	26	6.60
71-43-2	Benzene	6.6 U		6.6	0.696
74-97-5	Bromochloromethane	6.6 U		6.6	1.00
75-27-4	**Dichlorobromomethane**	**1.2 J**		6.6	0.661
75-25-2	Bromoform	6.6 U		6.6	0.763
74-83-9	Bromomethane	6.6 U		6.6	1.98
75-15-0	Carbon Disulfide	6.6 U		6.6	1.91
56-23-5	Carbon Tetrachloride	6.6 U		6.6	0.615
108-90-7	Chlorobenzene	6.6 U		6.6	0.873
75-00-3	Chloroethane	6.6 U		6.6	1.78
67-66-3	**Chloroform**	**15**		6.6	0.589

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:40
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB2C**	QC Batch:	90056 -117
Sample #:	**345631**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.32

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.6 U		6.6	1.10
110-82-7	Cyclohexane	13 U		13	0.417
10061-01-5	cis-1,3-Dichloropropene	6.6 U		6.6	0.648
10061-02-6	trans-1,3-Dichloropropene	6.6 U		6.6	0.688
75-71-8	Dichlorodifluoromethane	6.6 U		6.6	0.882
124-48-1	Chlorodibromomethane	6.6 U		6.6	0.682
100-41-4	Ethylbenzene	6.6 U		6.6	0.558
98-82-8	Isopropylbenzene	6.6 U		6.6	0.721
79-20-9	Methyl Acetate	26 U	UJ,c	26	4.58
108-87-2	Methylcyclohexane	13 U		13	1.12
1634-04-4	Methyl(tert)butyl Ether	6.6 U		6.6	0.846
75-09-2	**Methylene Chloride**	**4.8 J**		26	3.71
100-42-5	Styrene	6.6 U		6.6	0.583
127-18-4	Tetrachloroethene	6.6 U		6.6	0.809
108-88-3	Toluene	6.6 U		6.6	0.612
79-01-6	Trichloroethene	6.6 U		6.6	0.894
75-69-4	Trichlorofluoromethane	6.6 U		6.6	0.981
75-01-4	Vinyl Chloride	6.6 U		6.6	0.488
1330-20-7	Xylene (Total)	6.6 U		6.6	0.556

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:40
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/17/03 JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**57SB2C**	QC Batch:	90056 -117
Sample #:	**345631**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	76
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 09:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB4A**	QC Batch:	90056 -117
Sample #:	**345737**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.41

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	7.0 U		7.0	0.601
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	7.0 U		7.0	1.07
79-34-5	1,1,2,2-Tetrachloroethane	7.0 U		7.0	0.921
79-00-5	1,1,2-Trichloroethane	7.0 U		7.0	0.836
75-34-3	1,1-Dichloroethane	7.0 U		7.0	1.02
75-35-4	1,1-Dichloroethylene	7.0 U		7.0	1.03
106-93-4	1,2-Dibromoethane	7.0 U		7.0	0.966
96-12-8	1,2-Dibromo-3-chloropropane	14 U		14	2.93
95-50-1	1,2-Dichlorobenzene	7.0 U		7.0	0.682
107-06-2	1,2-Dichloroethane	7.0 U		7.0	0.608
156-59-2	cis-1,2-Dichloroethene	7.0 U		7.0	1.00
156-60-5	trans-1,2-Dichloroethene	7.0 U		7.0	0.991
78-87-5	1,2-Dichloropropane	7.0 U		7.0	0.826
87-61-6	1,2,3-Trichlorobenzene	7.0 U		7.0	0.767
120-82-1	1,2,4-Trichlorobenzene	7.0 U		7.0	0.578
541-73-1	1,3-Dichlorobenzene	7.0 U		7.0	0.378
106-46-7	1,4-Dichlorobenzene	7.0 U		7.0	1.00
78-93-3	**Methyl Ethyl Ketone**	**30**		14	7.05
591-78-6	2-Hexanone	14 U		14	3.19
108-10-1	4-Methyl-2-Pentanone	14 U		14	2.06
67-64-1	***Acetone**	**55 B**	B,Z	14	7.05
71-43-2	Benzene	7.0 U		7.0	0.743
74-97-5	Bromochloromethane	7.0 U		7.0	1.07
75-27-4	Dichlorobromomethane	7.0 U		7.0	0.706
75-25-2	Bromoform	7.0 U		7.0	0.815
74-83-9	Bromomethane	7.0 U		7.0	2.12
75-15-0	Carbon Disulfide	7.0 U		7.0	2.04
56-23-5	Carbon Tetrachloride	7.0 U		7.0	0.657
108-90-7	Chlorobenzene	7.0 U		7.0	0.932
75-00-3	Chloroethane	7.0 U		7.0	1.90
67-66-3	Chloroform	7.0 U		7.0	0.629

* See attached Statement of Data Qualifications.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 09:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB4A**	QC Batch:	90056 -117
Sample #:	**345737**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.41

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	7.0 U		7.0	1.18
110-82-7	Cyclohexane	14 U		14	0.446
10061-01-5	cis-1,3-Dichloropropene	7.0 U		7.0	0.692
10061-02-6	trans-1,3-Dichloropropene	7.0 U		7.0	0.735
75-71-8	Dichlorodifluoromethane	7.0 U		7.0	0.942
124-48-1	Chlorodibromomethane	7.0 U		7.0	0.729
100-41-4	Ethylbenzene	7.0 U		7.0	0.596
98-82-8	Isopropylbenzene	7.0 U		7.0	0.770
79-20-9	Methyl Acetate	14 U	UJc	14	4.89
108-87-2	Methylcyclohexane	14 U		14	1.19
1634-04-4	Methyl(tert)butyl Ether	7.0 U		7.0	0.904
75-09-2	Methylene Chloride	7.0 U		7.0	3.96
100-42-5	Styrene	7.0 U		7.0	0.623
127-18-4	Tetrachloroethene	7.0 U		7.0	0.864
108-88-3	Toluene	7.0 U		7.0	0.654
79-01-6	Trichloroethene	7.0 U		7.0	0.955
75-69-4	Trichlorofluoromethane	7.0 U		7.0	1.05
75-01-4	Vinyl Chloride	7.0 U		7.0	0.522
1330-20-7	Xylene (Total)	7.0 U		7.0	0.594

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 09:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB4A**	QC Batch:	90056 -117
Sample #:	**345737**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	71
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 11:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**69SB1A**	QC Batch:	90056 -117
Sample #:	**345738**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.28

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.4 U		6.4	0.545
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.4 U		6.4	0.972
79-34-5	1,1,2,2-Tetrachloroethane	6.4 U		6.4	0.836
79-00-5	1,1,2-Trichloroethane	6.4 U		6.4	0.759
75-34-3	1,1-Dichloroethane	6.4 U		6.4	0.927
75-35-4	1,1-Dichloroethylene	6.4 U		6.4	0.938
106-93-4	1,2-Dibromoethane	6.4 U		6.4	0.877
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	2.66
95-50-1	1,2-Dichlorobenzene	6.4 U		6.4	0.620
107-06-2	1,2-Dichloroethane	6.4 U		6.4	0.552
156-59-2	cis-1,2-Dichloroethene	6.4 U		6.4	0.909
156-60-5	trans-1,2-Dichloroethene	6.4 U		6.4	0.900
78-87-5	1,2-Dichloropropane	6.4 U		6.4	0.750
87-61-6	1,2,3-Trichlorobenzene	6.4 U		6.4	0.696
120-82-1	1,2,4-Trichlorobenzene	6.4 U		6.4	0.525
541-73-1	1,3-Dichlorobenzene	6.4 U		6.4	0.343
106-46-7	1,4-Dichlorobenzene	6.4 U		6.4	0.909
78-93-3	**Methyl Ethyl Ketone**	**31**		13	6.40
591-78-6	2-Hexanone	13 U		13	2.89
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.87
67-64-1	***Acetone**	**100 B**	B,Z	13	6.40
71-43-2	Benzene	6.4 U		6.4	0.675
74-97-5	Bromochloromethane	6.4 U		6.4	0.974
75-27-4	Dichlorobromomethane	6.4 U		6.4	0.641
75-25-2	Bromoform	6.4 U		6.4	0.740
74-83-9	Bromomethane	6.4 U		6.4	1.92
75-15-0	Carbon Disulfide	6.4 U		6.4	1.86
56-23-5	Carbon Tetrachloride	6.4 U		6.4	0.596
108-90-7	Chlorobenzene	6.4 U		6.4	0.846
75-00-3	Chloroethane	6.4 U		6.4	1.73
67-66-3	Chloroform	6.4 U		6.4	0.571

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 11:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**69SB1A**	QC Batch:	90056 -117
Sample #:	**345738**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.28

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.4 U		6.4	1.07
110-82-7	Cyclohexane	13 U		13	0.404
10061-01-5	cis-1,3-Dichloropropene	6.4 U		6.4	0.628
10061-02-6	trans-1,3-Dichloropropene	6.4 U		6.4	0.667
75-71-8	Dichlorodifluoromethane	6.4 U		6.4	0.855
124-48-1	Chlorodibromomethane	6.4 U		6.4	0.662
100-41-4	Ethylbenzene	6.4 U		6.4	0.541
98-82-8	Isopropylbenzene	6.4 U		6.4	0.699
79-20-9	Methyl Acetate	13 U	VJ,C	13	4.44
108-87-2	Methylcyclohexane	13 U		13	1.08
1634-04-4	Methyl(tert)butyl Ether	6.4 U		6.4	0.820
75-09-2	Methylene Chloride	6.4 U		6.4	3.60
100-42-5	Styrene	6.4 U		6.4	0.566
127-18-4	Tetrachloroethene	6.4 U		6.4	0.785
108-88-3	Toluene	6.4 U		6.4	0.594
79-01-6	Trichloroethene	6.4 U		6.4	0.867
75-69-4	Trichlorofluoromethane	6.4 U		6.4	0.951
75-01-4	Vinyl Chloride	6.4 U		6.4	0.474
1330-20-7	Xylene (Total)	6.4 U		6.4	0.539

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 11:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/17/03 JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**69SB1A**	QC Batch:	90056 -117
Sample #:	**345738**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	78
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 11:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/17/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**69SB1B**	QC Batch:	90056 -117
Sample #:	**345739**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.22

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.1 U		6.1	0.520
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.1 U		6.1	0.926
79-34-5	1,1,2,2-Tetrachloroethane	6.1 U		6.1	0.797
79-00-5	1,1,2-Trichloroethane	6.1 U		6.1	0.723
75-34-3	1,1-Dichloroethane	6.1 U		6.1	0.883
75-35-4	1,1-Dichloroethylene	6.1 U		6.1	0.894
106-93-4	1,2-Dibromoethane	6.1 U		6.1	0.836
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.54
95-50-1	1,2-Dichlorobenzene	6.1 U		6.1	0.590
107-06-2	1,2-Dichloroethane	6.1 U		6.1	0.526
156-59-2	cis-1,2-Dichloroethene	6.1 U		6.1	0.866
156-60-5	trans-1,2-Dichloroethene	6.1 U		6.1	0.858
78-87-5	1,2-Dichloropropane	6.1 U		6.1	0.715
87-61-6	1,2,3-Trichlorobenzene	6.1 U		6.1	0.664
120-82-1	1,2,4-Trichlorobenzene	6.1 U		6.1	0.500
541-73-1	1,3-Dichlorobenzene	6.1 U		6.1	0.327
106-46-7	1,4-Dichlorobenzene	6.1 U		6.1	0.866
78-93-3	**Methyl Ethyl Ketone**	**22**		12	6.10
591-78-6	2-Hexanone	12 U		12	2.76
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.78
67-64-1	***Acetone**	**44 B**	QZ	12	6.10
71-43-2	Benzene	6.1 U		6.1	0.643
74-97-5	Bromochloromethane	6.1 U		6.1	0.928
75-27-4	Dichlorobromomethane	6.1 U		6.1	0.611
75-25-2	Bromoform	6.1 U		6.1	0.705
74-83-9	Bromomethane	6.1 U		6.1	1.83
75-15-0	Carbon Disulfide	6.1 U		6.1	1.77
56-23-5	Carbon Tetrachloride	6.1 U		6.1	0.569
108-90-7	Chlorobenzene	6.1 U		6.1	0.806
75-00-3	Chloroethane	6.1 U		6.1	1.65
67-66-3	Chloroform	6.1 U		6.1	0.544

* See attached Statement of Data Qualifications.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 11:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**69SB1B**	QC Batch:	90056 -117
Sample #:	**345739**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.22

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.1 U		6.1	1.02
110-82-7	Cyclohexane	12 U		12	0.386
10061-01-5	cis-1,3-Dichloropropene	6.1 U		6.1	0.599
10061-02-6	trans-1,3-Dichloropropene	6.1 U		6.1	0.636
75-71-8	Dichlorodifluoromethane	6.1 U		6.1	0.815
124-48-1	Chlorodibromomethane	6.1 U		6.1	0.631
100-41-4	Ethylbenzene	6.1 U		6.1	0.516
98-82-8	Isopropylbenzene	6.1 U		6.1	0.666
79-20-9	Methyl Acetate	12 U	UJ,C	12	4.23
108-87-2	Methylcyclohexane	12 U		12	1.03
1634-04-4	Methyl(tert)butyl Ether	6.1 U		6.1	0.782
75-09-2	Methylene Chloride	6.1 U		6.1	3.43
100-42-5	Styrene	6.1 U		6.1	0.539
127-18-4	Tetrachloroethene	6.1 U		6.1	0.748
108-88-3	Toluene	6.1 U		6.1	0.566
79-01-6	Trichloroethene	6.1 U		6.1	0.826
75-69-4	Trichlorofluoromethane	6.1 U		6.1	0.906
75-01-4	Vinyl Chloride	6.1 U		6.1	0.451
1330-20-7	Xylene (Total)	6.1 U		6.1	0.514

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 11:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/17/03 JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**69SB1B**	QC Batch:	90056 -117
Sample #:	**345739**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	82
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 12:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/17/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**69SB1C**	QC Batch:	90056 -117
Sample #:	**345740**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.35

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.8 U		6.8	0.575
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.8 U		6.8	1.02
79-34-5	1,1,2,2-Tetrachloroethane	6.8 U		6.8	0.882
79-00-5	1,1,2-Trichloroethane	6.8 U		6.8	0.801
75-34-3	1,1-Dichloroethane	6.8 U		6.8	0.977
75-35-4	1,1-Dichloroethylene	6.8 U		6.8	0.990
106-93-4	1,2-Dibromoethane	6.8 U		6.8	0.925
96-12-8	1,2-Dibromo-3-chloropropane	14 U		14	2.81
95-50-1	1,2-Dichlorobenzene	6.8 U		6.8	0.653
107-06-2	1,2-Dichloroethane	6.8 U		6.8	0.582
156-59-2	cis-1,2-Dichloroethene	6.8 U		6.8	0.959
156-60-5	trans-1,2-Dichloroethene	6.8 U		6.8	0.949
78-87-5	1,2-Dichloropropane	6.8 U		6.8	0.791
87-61-6	1,2,3-Trichlorobenzene	6.8 U		6.8	0.734
120-82-1	1,2,4-Trichlorobenzene	6.8 U		6.8	0.554
541-73-1	1,3-Dichlorobenzene	6.8 U		6.8	0.362
106-46-7	1,4-Dichlorobenzene	6.8 U		6.8	0.959
78-93-3	**Methyl Ethyl Ketone**	**26**		14	6.75
591-78-6	2-Hexanone	14 U		14	3.05
108-10-1	4-Methyl-2-Pentanone	14 U		14	1.97
67-64-1	***Acetone**	**70 B**	B,Z	14	6.75
71-43-2	Benzene	6.8 U		6.8	0.711
74-97-5	Bromochloromethane	6.8 U		6.8	1.03
75-27-4	Dichlorobromomethane	6.8 U		6.8	0.676
75-25-2	Bromoform	6.8 U		6.8	0.780
74-83-9	Bromomethane	6.8 U		6.8	2.03
75-15-0	Carbon Disulfide	6.8 U		6.8	1.96
56-23-5	Carbon Tetrachloride	6.8 U		6.8	0.629
108-90-7	Chlorobenzene	6.8 U		6.8	0.892
75-00-3	Chloroethane	6.8 U		6.8	1.82
67-66-3	Chloroform	6.8 U		6.8	0.602

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 12:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**69SB1C**	QC Batch:	90056 -117
Sample #:	**345740**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.35

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	6.8 U	6.8	1.13
110-82-7	Cyclohexane	14 U	14	0.427
10061-01-5	cis-1,3-Dichloropropene	6.8 U	6.8	0.663
10061-02-6	trans-1,3-Dichloropropene	6.8 U	6.8	0.703
75-71-8	Dichlorodifluoromethane	6.8 U	6.8	0.902
124-48-1	Chlorodibromomethane	6.8 U	6.8	0.698
100-41-4	Ethylbenzene	6.8 U	6.8	0.571
98-82-8	Isopropylbenzene	6.8 U	6.8	0.737
79-20-9	Methyl Acetate	14 U	UJ,C 14	4.68
108-87-2	Methylcyclohexane	14 U	14	1.14
1634-04-4	Methyl(tert)butyl Ether	6.8 U	6.8	0.865
75-09-2	Methylene Chloride	6.8 U	6.8	3.79
100-42-5	Styrene	6.8 U	6.8	0.597
127-18-4	Tetrachloroethene	6.8 U	6.8	0.828
108-88-3	**Toluene**	**0.89 J**	6.8	0.626
79-01-6	Trichloroethene	6.8 U	6.8	0.914
75-69-4	Trichlorofluoromethane	6.8 U	6.8	1.00
75-01-4	Vinyl Chloride	6.8 U	6.8	0.500
1330-20-7	Xylene (Total)	6.8 U	6.8	0.568

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 12:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**69SB1C**	QC Batch:	90056 -117
Sample #:	**345740**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	74
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/17/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**69SB3A**	QC Batch:	90056 -117
Sample #:	**345741**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.19

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.0 U		6.0	0.507
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.0 U		6.0	0.903
79-34-5	1,1,2,2-Tetrachloroethane	6.0 U		6.0	0.777
79-00-5	1,1,2-Trichloroethane	6.0 U		6.0	0.706
75-34-3	1,1-Dichloroethane	6.0 U		6.0	0.862
75-35-4	1,1-Dichloroethylene	6.0 U		6.0	0.872
106-93-4	1,2-Dibromoethane	6.0 U		6.0	0.815
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.48
95-50-1	1,2-Dichlorobenzene	6.0 U		6.0	0.576
107-06-2	1,2-Dichloroethane	6.0 U		6.0	0.513
156-59-2	cis-1,2-Dichloroethene	6.0 U		6.0	0.845
156-60-5	trans-1,2-Dichloroethene	6.0 U		6.0	0.837
78-87-5	1,2-Dichloropropane	6.0 U		6.0	0.697
87-61-6	1,2,3-Trichlorobenzene	6.0 U		6.0	0.647
120-82-1	1,2,4-Trichlorobenzene	6.0 U		6.0	0.488
541-73-1	1,3-Dichlorobenzene	6.0 U		6.0	0.319
106-46-7	1,4-Dichlorobenzene	6.0 U		6.0	0.845
78-93-3	**Methyl Ethyl Ketone**	**41**		12	5.95
591-78-6	2-Hexanone	12 U		12	2.69
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.74
67-64-1	**Acetone**	**160**	B,2	12	5.95
71-43-2	Benzene	6.0 U		6.0	0.627
74-97-5	Bromochloromethane	6.0 U		6.0	0.906
75-27-4	Dichlorobromomethane	6.0 U		6.0	0.596
75-25-2	Bromoform	6.0 U		6.0	0.688
74-83-9	Bromomethane	6.0 U		6.0	1.79
75-15-0	Carbon Disulfide	6.0 U		6.0	1.73
56-23-5	Carbon Tetrachloride	6.0 U		6.0	0.555
108-90-7	Chlorobenzene	6.0 U		6.0	0.787
75-00-3	Chloroethane	6.0 U		6.0	1.61
67-66-3	Chloroform	6.0 U		6.0	0.531

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**69SB3A**	QC Batch:	90056 -117
Sample #:	**345741**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.19

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.0 U		6.0	0.992
110-82-7	Cyclohexane	12 U		12	0.376
10061-01-5	cis-1,3-Dichloropropene	6.0 U		6.0	0.584
10061-02-6	trans-1,3-Dichloropropene	6.0 U		6.0	0.620
75-71-8	Dichlorodifluoromethane	6.0 U		6.0	0.795
124-48-1	Chlorodibromomethane	6.0 U		6.0	0.615
100-41-4	Ethylbenzene	6.0 U		6.0	0.503
98-82-8	Isopropylbenzene	6.0 U		6.0	0.650
79-20-9	Methyl Acetate	12 U	UJ,C	12	4.13
108-87-2	Methylcyclohexane	12 U		12	1.01
1634-04-4	Methyl(tert)butyl Ether	6.0 U		6.0	0.763
75-09-2	Methylene Chloride	6.0 U		6.0	3.34
100-42-5	Styrene	6.0 U		6.0	0.526
127-18-4	Tetrachloroethene	6.0 U		6.0	0.729
108-88-3	Toluene	6.0 U		6.0	0.552
79-01-6	Trichloroethene	6.0 U		6.0	0.806
75-69-4	Trichlorofluoromethane	6.0 U		6.0	0.884
75-01-4	Vinyl Chloride	6.0 U		6.0	0.440
1330-20-7	Xylene (Total)	6.0 U		6.0	0.501

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
Submittal #:	**36440-4**	Prepared:	n/a
Submittal:	Delivery Order 0046 RAAP	Prep. Method:	n/a
		Analyzed:	10/17/03 JDM
Sample ID:	**69SB3A**	Anal. Method:	USEPA-8260B
Sample #:	**345741**	QC Batch:	90056 -117
Matrix:	Soil	Anal. Batch:	208019
		Percent Solids:	84
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD7**	QC Batch:	90056 -117
Sample #:	**345742**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.19

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.0 U		6.0	0.507
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.0 U		6.0	0.903
79-34-5	1,1,2,2-Tetrachloroethane	6.0 U		6.0	0.777
79-00-5	1,1,2-Trichloroethane	6.0 U		6.0	0.706
75-34-3	1,1-Dichloroethane	6.0 U		6.0	0.862
75-35-4	1,1-Dichloroethylene	6.0 U		6.0	0.872
106-93-4	1,2-Dibromoethane	6.0 U		6.0	0.815
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.48
95-50-1	1,2-Dichlorobenzene	6.0 U		6.0	0.576
107-06-2	1,2-Dichloroethane	6.0 U		6.0	0.513
156-59-2	cis-1,2-Dichloroethene	6.0 U		6.0	0.845
156-60-5	trans-1,2-Dichloroethene	6.0 U		6.0	0.837
78-87-5	1,2-Dichloropropane	6.0 U		6.0	0.697
87-61-6	1,2,3-Trichlorobenzene	6.0 U		6.0	0.647
120-82-1	1,2,4-Trichlorobenzene	6.0 U		6.0	0.488
541-73-1	1,3-Dichlorobenzene	6.0 U		6.0	0.319
106-46-7	1,4-Dichlorobenzene	6.0 U		6.0	0.845
78-93-3	**Methyl Ethyl Ketone**	**35**		12	5.95
591-78-6	2-Hexanone	12 U		12	2.69
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.74
67-64-1	**Acetone**	**180**	B,Z	12	5.95
71-43-2	Benzene	6.0 U		6.0	0.627
74-97-5	Bromochloromethane	6.0 U		6.0	0.906
75-27-4	Dichlorobromomethane	6.0 U		6.0	0.596
75-25-2	Bromoform	6.0 U		6.0	0.688
74-83-9	Bromomethane	6.0 U		6.0	1.79
75-15-0	Carbon Disulfide	6.0 U		6.0	1.73
56-23-5	Carbon Tetrachloride	6.0 U		6.0	0.555
108-90-7	Chlorobenzene	6.0 U		6.0	0.787
75-00-3	Chloroethane	6.0 U		6.0	1.61
67-66-3	Chloroform	6.0 U		6.0	0.531

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD7**	QC Batch:	90056 -117
Sample #:	**345742**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.19

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.0 U		6.0	0.992
110-82-7	Cyclohexane	12 U		12	0.376
10061-01-5	cis-1,3-Dichloropropene	6.0 U		6.0	0.584
10061-02-6	trans-1,3-Dichloropropene	6.0 U		6.0	0.620
75-71-8	Dichlorodifluoromethane	6.0 U		6.0	0.795
124-48-1	Chlorodibromomethane	6.0 U		6.0	0.615
100-41-4	Ethylbenzene	6.0 U		6.0	0.503
98-82-8	Isopropylbenzene	6.0 U		6.0	0.650
79-20-9	Methyl Acetate	12 U	UJ,C	12	4.13
108-87-2	Methylcyclohexane	12 U		12	1.01
1634-04-4	Methyl(tert)butyl Ether	6.0 U		6.0	0.763
75-09-2	Methylene Chloride	6.0 U		6.0	3.34
100-42-5	Styrene	6.0 U		6.0	0.526
127-18-4	Tetrachloroethene	6.0 U		6.0	0.729
108-88-3	**Toluene**	**1.7 J**		6.0	0.552
79-01-6	Trichloroethene	6.0 U		6.0	0.806
75-69-4	Trichlorofluoromethane	6.0 U		6.0	0.884
75-01-4	Vinyl Chloride	6.0 U		6.0	0.440
1330-20-7	Xylene (Total)	6.0 U		6.0	0.501

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD7**	QC Batch:	90056 -117
Sample #:	**345742**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	84
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
4-Isopropyltoluene	99-87-6	1.8	Q	NJ,+
Hexanal	66-25-1	17	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**69SB3B**	QC Batch:	90056 -117
Sample #:	**345743**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.22

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.1 U	6.1	0.520
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.1 U	6.1	0.926
79-34-5	1,1,2,2-Tetrachloroethane	6.1 U	6.1	0.797
79-00-5	1,1,2-Trichloroethane	6.1 U	6.1	0.723
75-34-3	1,1-Dichloroethane	6.1 U	6.1	0.883
75-35-4	1,1-Dichloroethylene	6.1 U	6.1	0.894
106-93-4	1,2-Dibromoethane	6.1 U	6.1	0.836
96-12-8	1,2-Dibromo-3-chloropropane	12 U	12	2.54
95-50-1	1,2-Dichlorobenzene	6.1 U	6.1	0.590
107-06-2	1,2-Dichloroethane	6.1 U	6.1	0.526
156-59-2	cis-1,2-Dichloroethene	6.1 U	6.1	0.866
156-60-5	trans-1,2-Dichloroethene	6.1 U	6.1	0.858
78-87-5	1,2-Dichloropropane	6.1 U	6.1	0.715
87-61-6	1,2,3-Trichlorobenzene	6.1 U	6.1	0.664
120-82-1	1,2,4-Trichlorobenzene	6.1 U	6.1	0.500
541-73-1	1,3-Dichlorobenzene	6.1 U	6.1	0.327
106-46-7	1,4-Dichlorobenzene	6.1 U	6.1	0.866
78-93-3	**Methyl Ethyl Ketone**	**22**	12	6.10
591-78-6	2-Hexanone	12 U	12	2.76
108-10-1	4-Methyl-2-Pentanone	12 U	12	1.78
67-64-1	***Acetone**	**63 B**	12	6.10
71-43-2	Benzene	6.1 U	6.1	0.643
74-97-5	Bromochloromethane	6.1 U	6.1	0.928
75-27-4	Dichlorobromomethane	6.1 U	6.1	0.611
75-25-2	Bromoform	6.1 U	6.1	0.705
74-83-9	Bromomethane	6.1 U	6.1	1.83
75-15-0	Carbon Disulfide	6.1 U	6.1	1.77
56-23-5	Carbon Tetrachloride	6.1 U	6.1	0.569
108-90-7	Chlorobenzene	6.1 U	6.1	0.806
75-00-3	Chloroethane	6.1 U	6.1	1.65
67-66-3	Chloroform	6.1 U	6.1	0.544

Bz

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/17/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**69SB3B**	QC Batch:	90056 -117
Sample #:	**345743**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.22

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.1 U		6.1	1.02
110-82-7	Cyclohexane	12 U		12	0.386
10061-01-5	cis-1,3-Dichloropropene	6.1 U		6.1	0.599
10061-02-6	trans-1,3-Dichloropropene	6.1 U		6.1	0.636
75-71-8	Dichlorodifluoromethane	6.1 U		6.1	0.815
124-48-1	Chlorodibromomethane	6.1 U		6.1	0.631
100-41-4	Ethylbenzene	6.1 U		6.1	0.516
98-82-8	Isopropylbenzene	6.1 U		6.1	0.666
79-20-9	Methyl Acetate	12 U	UJ,c	12	4.23
108-87-2	Methylcyclohexane	12 U		12	1.03
1634-04-4	Methyl(tert)butyl Ether	6.1 U		6.1	0.782
75-09-2	Methylene Chloride	6.1 U		6.1	3.43
100-42-5	Styrene	6.1 U		6.1	0.539
127-18-4	Tetrachloroethene	6.1 U		6.1	0.748
108-88-3	Toluene	6.1 U		6.1	0.566
79-01-6	Trichloroethene	6.1 U		6.1	0.826
75-69-4	Trichlorofluoromethane	6.1 U		6.1	0.906
75-01-4	Vinyl Chloride	6.1 U		6.1	0.451
1330-20-7	Xylene (Total)	6.1 U		6.1	0.514

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/17/03 JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**69SB3B**	QC Batch:	90056 -117
Sample #:	**345743**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	82
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/17/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**69SB3C**	QC Batch:	90050 -117
Sample #:	**345744**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.35

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.8 U		6.8	0.575
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.8 U		6.8	1.02
79-34-5	1,1,2,2-Tetrachloroethane	6.8 U		6.8	0.882
79-00-5	1,1,2-Trichloroethane	6.8 U		6.8	0.801
75-34-3	1,1-Dichloroethane	6.8 U		6.8	0.977
75-35-4	1,1-Dichloroethylene	6.8 U		6.8	0.990
106-93-4	1,2-Dibromoethane	6.8 U		6.8	0.925
96-12-8	1,2-Dibromo-3-chloropropane	14 U		14	2.81
95-50-1	1,2-Dichlorobenzene	6.8 U		6.8	0.653
107-06-2	1,2-Dichloroethane	6.8 U		6.8	0.582
156-59-2	cis-1,2-Dichloroethene	6.8 U		6.8	0.959
156-60-5	trans-1,2-Dichloroethene	6.8 U		6.8	0.949
78-87-5	1,2-Dichloropropane	6.8 U		6.8	0.791
87-61-6	1,2,3-Trichlorobenzene	6.8 U		6.8	0.734
120-82-1	1,2,4-Trichlorobenzene	6.8 U		6.8	0.554
541-73-1	1,3-Dichlorobenzene	6.8 U		6.8	0.362
106-46-7	1,4-Dichlorobenzene	6.8 U		6.8	0.959
78-93-3	**Methyl Ethyl Ketone**	**30**		14	6.75
591-78-6	2-Hexanone	14 U		14	3.05
108-10-1	4-Methyl-2-Pentanone	14 U		14	1.97
67-64-1	***Acetone**	**74 B**	B,2	14	6.75
71-43-2	Benzene	6.8 U		6.8	0.711
74-97-5	Bromochloromethane	6.8 U		6.8	1.03
75-27-4	Dichlorobromomethane	6.8 U		6.8	0.676
75-25-2	Bromoform	6.8 U		6.8	0.780
74-83-9	Bromomethane	6.8 U		6.8	2.03
75-15-0	Carbon Disulfide	6.8 U		6.8	1.96
56-23-5	Carbon Tetrachloride	6.8 U		6.8	0.629
108-90-7	Chlorobenzene	6.8 U		6.8	0.892
75-00-3	Chloroethane	6.8 U		6.8	1.82
67-66-3	Chloroform	6.8 U		6.8	0.602

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**69SB3C**	QC Batch:	90050 -117
Sample #:	**345744**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.35

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	6.8 U	6.8	1.13
110-82-7	Cyclohexane	14 U	14	0.427
10061-01-5	cis-1,3-Dichloropropene	6.8 U	6.8	0.663
10061-02-6	trans-1,3-Dichloropropene	6.8 U	6.8	0.703
75-71-8	Dichlorodifluoromethane	6.8 U	6.8	0.902
124-48-1	Chlorodibromomethane	6.8 U	6.8	0.698
100-41-4	Ethylbenzene	6.8 U	6.8	0.571
98-82-8	Isopropylbenzene	6.8 U	6.8	0.737
79-20-9	Methyl Acetate	14 U	UJ,C 14	4.68
108-87-2	Methylcyclohexane	14 U	14	1.14
1634-04-4	Methyl(tert)butyl Ether	6.8 U	6.8	0.865
75-09-2	Methylene Chloride	6.8 U	6.8	3.79
100-42-5	Styrene	6.8 U	6.8	0.597
127-18-4	Tetrachloroethene	6.8 U	6.8	0.828
108-88-3	Toluene	6.8 U	6.8	0.626
79-01-6	Trichloroethene	6.8 U	6.8	0.914
75-69-4	Trichlorofluoromethane	6.8 U	6.8	1.00
75-01-4	Vinyl Chloride	6.8 U	6.8	0.500
1330-20-7	Xylene (Total)	6.8 U	6.8	0.568

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/17/03 JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**69SB3C**	QC Batch:	90050 -117
Sample #:	**345744**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	74
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/31/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB3A**	QC Batch:	90210 -110
Sample #:	**345619**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	200 U	200	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	200 U	200	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	200 U	200	1.58
95-95-4	2,4,5-Trichlorophenol	200 U	200	4.01
88-06-2	2,4,6-Trichlorophenol	200 U	200	3.14
120-83-2	2,4-Dichlorophenol	200 U	200	4.22
105-67-9	2,4-Dimethylphenol	200 U	200	9.53
51-28-5	2,4-Dinitrophenol	400 U	400	3.84
121-14-2	2,4-Dinitrotoluene	200 U	200	3.78
606-20-2	2,6-Dinitrotoluene	200 U	200	33.2
91-58-7	2-Chloronaphthalene	200 U	200	2.76
95-57-8	2-Chlorophenol	200 U	200	2.41
91-57-6	2-Methylnaphthalene	200 U	200	3.29
95-48-7	2-Methylphenol	200 U	200	5.81
88-74-4	2-Nitroaniline	200 U	200	5.52
88-75-5	2-Nitrophenol	200 U	200	2.04
91-94-1	3,3'-Dichlorobenzidine	200 U	200	66.5
99-09-2	3-Nitroaniline	200 U	200	22.0
534-52-1	4,6-Dinitro-2-Methylphenol	200 U	200	5.41
101-55-3	4-Bromophenyl Phenylether	200 U	200	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**35 J**	200	6.25
106-47-8	4-Chloroaniline	200 U	200	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	200 U	200	3.92
106-44-5	4-Methylphenol	200 U	200	7.64
100-01-6	4-Nitroaniline	200 U	200	8.70
100-02-7	4-Nitrophenol	400 U	400	3.40
83-32-9	Acenaphthene	200 U	200	2.06
208-96-8	Acenaphthylene	200 U	200	1.80
98-86-2	Acetophenone	200 U	200	2.28

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:10
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/31/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**68SB3A**	QC Batch:	90210 -110
Sample #:	**345619**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	200 U		200	5.54
1912-24-9	Atrazine	200 U		200	8.26
100-52-7	Benzaldehyde	200 U		200	4.86
56-55-3	Benzo (a) Anthracene	200 U		200	16.0
50-32-8	**Benzo (a) Pyrene**	**11 J**		200	6.85
205-99-2	**Benzo (b) Fluoranthene**	**23 J**		200	11.7
191-24-2	Benzo (g,h,i,) Perylene	200 U		200	10.5
207-08-9	Benzo (k) Fluoranthene	200 U		200	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	200 U		200	3.77
111-44-4	Bis (2-Chloroethyl) Ether	200 U		200	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**49 J**		200	2.48
85-68-7	Butyl Benzyl Phthalate	200 U		200	5.38
105-60-2	**Caprolactam**	**94 J**		400	7.66
86-74-8	Carbazole	200 U		200	7.32
218-01-9	**Chrysene**	**15 J**		200	12.2
53-70-3	Dibenzo (a,h) Anthracene	200 U		200	7.08
132-64-9	Dibenzofuran	200 U		200	3.79
84-66-2	**Diethylphthalate**	**13 J**	B,X	200	2.28
131-11-3	Dimethylphthalate	200 U		200	3.97
84-74-2	**Di-n-Butylphthalate**	**190 J**		200	4.58
117-84-0	Di-n-Octylphthalate	200 U		200	3.72
206-44-0	**Fluoranthene**	**23 J**		200	2.82
86-73-7	Fluorene	200 U		200	2.02
118-74-1	Hexachlorobenzene	200 U		200	3.01
87-68-3	Hexachlorobutadiene	200 U		200	4.64
77-47-4	Hexachlorocyclopentadiene	200 U		200	2.38
67-72-1	Hexachloroethane	200 U		200	2.80
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**9.0 J**		200	4.70
78-59-1	Isophorone	200 U		200	2.08
91-20-3	Naphthalene	200 U		200	3.30
98-95-3	Nitrobenzene	200 U		200	3.84

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/31/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB3A**	QC Batch:	90210 -110
Sample #:	**345619**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	200 U	200	3.95
86-30-6	N-Nitroso-di-Phenylamine	200 U	200	5.70
87-86-5	Pentachlorophenol	400 U	400	5.27
85-01-8	**Phenanthrene**	**12 J**	200	2.76
108-95-2	Phenol	200 U	200	4.75
129-00-0	**Pyrene**	**23 J**	200	1.78

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/31/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB3A**	QC Batch:	90210 -110
Sample #:	**345619**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	84
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, butyl 2-methylpropyl ester	17851-53-5	320	E	NJ,+
1-Hexadecanol	36653-82-4	120	E	NJ,+
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	140	E	NJ,+
3-Eicosene, (E)-	74685-33-9	140	E	NJ,+
Eicosane	112-95-8	100	E	NJ,+
Octadecanal	638-66-4	79	E	NJ,+
Phsophoric acid, tris(3-methylphenyl) ester	563-04-2	200	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB3B**	QC Batch:	90210 -110
Sample #:	**345620**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U	220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U	220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U	220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U	220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U	220	3.41
120-83-2	2,4-Dichlorophenol	220 U	220	4.58
105-67-9	2,4-Dimethylphenol	220 U	220	10.3
51-28-5	2,4-Dinitrophenol	430 U	430	4.16
121-14-2	2,4-Dinitrotoluene	220 U	220	4.10
606-20-2	2,6-Dinitrotoluene	220 U	220	36.0
91-58-7	2-Chloronaphthalene	220 U	220	2.99
95-57-8	2-Chlorophenol	220 U	220	2.61
91-57-6	2-Methylnaphthalene	220 U	220	3.56
95-48-7	2-Methylphenol	220 U	220	6.29
88-74-4	2-Nitroaniline	220 U	220	5.98
88-75-5	2-Nitrophenol	220 U	220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U	220	72.0
99-09-2	3-Nitroaniline	220 U	220	23.8
534-52-1	4,6-Dinitro-2-Methylphenol	220 U	220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U	220	4.39
59-50-7	**4-Chloro-3-Methylphenol**	**31 J**	220	6.77
106-47-8	4-Chloroaniline	220 U	220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U	220	4.25
106-44-5	4-Methylphenol	220 U	220	8.28
100-01-6	4-Nitroaniline	220 U	220	9.43
100-02-7	4-Nitrophenol	430 U	430	3.68
83-32-9	Acenaphthene	220 U	220	2.24
208-96-8	Acenaphthylene	220 U	220	1.95
98-86-2	Acetophenone	220 U	220	2.47

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**68SB3B**	QC Batch:	90210 -110
Sample #:	**345620**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	220 U		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U		220	5.27
56-55-3	Benzo (a) Anthracene	220 U		220	17.3
50-32-8	Benzo (a) Pyrene	220 U		220	7.42
205-99-2	Benzo (b) Fluoranthene	220 U		220	12.7
191-24-2	Benzo (g,h,i,) Perylene	220 U		220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**20 J**		220	2.69
85-68-7	**Butyl Benzyl Phthalate**	**11 J**		220	5.82
105-60-2	**Caprolactam**	**21 J**		400	8.29
86-74-8	Carbazole	220 U		220	7.93
218-01-9	Chrysene	220 U		220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U		220	7.67
132-64-9	Dibenzofuran	220 U		220	4.11
84-66-2	**Diethylphthalate**	**10 J**	B,X	220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**210 J**		220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	Fluoranthene	220 U		220	3.06
86-73-7	Fluorene	220 U		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U		220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	Indeno (1,2,3-cd) Pyrene	220 U		220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	Naphthalene	220 U		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB3B**	QC Batch:	90210 -110
Sample #:	**345620**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	N-Nitroso-di-Phenylamine	220 U	220	6.18
87-86-5	Pentachlorophenol	430 U	430	5.71
85-01-8	Phenanthrene	220 U	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	Pyrene	220 U	220	1.92

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**68SB3B**	QC Batch:	90210 -110
Sample #:	**345620**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	75
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	48	E	NJ,†
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	320	E	NJ,†
1-Heptadecanol	1454-85-9	42	E	NJ,†
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	120	E	NJ,†
2-Ethyl-1-Hexanol	104-76-7	36	E	NJ,†
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~360~~	~~E~~	
Stearic Acid	57-11-4	45	E	NJ,†

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:50
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**68SB3C**	QC Batch:	90210 -110
Sample #:	**345621**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	240 U	240	3.44
95-94-3	1,2,4,5-Tetrachloro-benzene	240 U	240	40.2
108-60-1	Bis (2-Chloroisopropyl)-Ether	240 U	240	1.85
95-95-4	2,4,5-Trichlorophenol	240 U	240	4.68
88-06-2	2,4,6-Trichlorophenol	240 U	240	3.67
120-83-2	2,4-Dichlorophenol	240 U	240	4.93
105-67-9	2,4-Dimethylphenol	240 U	240	11.1
51-28-5	2,4-Dinitrophenol	460 U	460	4.48
121-14-2	2,4-Dinitrotoluene	240 U	240	4.41
606-20-2	2,6-Dinitrotoluene	240 U	240	38.8
91-58-7	2-Chloronaphthalene	240 U	240	3.22
95-57-8	2-Chlorophenol	240 U	240	2.81
91-57-6	2-Methylnaphthalene	240 U	240	3.84
95-48-7	2-Methylphenol	240 U	240	6.78
88-74-4	2-Nitroaniline	240 U	240	6.44
88-75-5	2-Nitrophenol	240 U	240	2.38
91-94-1	3,3'-Dichlorobenzidine	240 U	240	77.6
99-09-2	3-Nitroaniline	240 U	240	25.6
534-52-1	4,6-Dinitro-2-Methylphenol	240 U	240	6.31
101-55-3	4-Bromophenyl Phenylether	240 U	240	4.73
59-50-7	**4-Chloro-3-Methylphenol**	**30 J**	240	7.29
106-47-8	4-Chloroaniline	240 U	240	1.76
7005-72-3	4-Chlorophenylphenyl-Ether	240 U	240	4.58
106-44-5	4-Methylphenol	240 U	240	8.92
100-01-6	4-Nitroaniline	240 U	240	10.2
100-02-7	4-Nitrophenol	460 U	460	3.96
83-32-9	Acenaphthene	240 U	240	2.41
208-96-8	Acenaphthylene	240 U	240	2.10
98-86-2	Acetophenone	240 U	240	2.66

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:50
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**68SB3C**	QC Batch:	90210 -110
Sample #:	**345621**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	240 U		240	6.47
1912-24-9	Atrazine	240 U		240	9.63
100-52-7	Benzaldehyde	240 U		240	5.67
56-55-3	Benzo (a) Anthracene	240 U		240	18.6
50-32-8	Benzo (a) Pyrene	240 U		240	7.99
205-99-2	Benzo (b) Fluoranthene	240 U		240	13.7
191-24-2	Benzo (g,h,i,) Perylene	240 U		240	12.2
207-08-9	Benzo (k) Fluoranthene	240 U		240	18.8
111-91-1	Bis (2-Chloroethoxy)-Methane	240 U		240	4.40
111-44-4	Bis (2-Chloroethyl) Ether	240 U		240	2.42
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**24 J**		240	2.90
85-68-7	**Butyl Benzyl Phthalate**	**14 J**		240	6.27
105-60-2	**Caprolactam**	**18 J**		460	8.93
86-74-8	Carbazole	240 U		240	8.54
218-01-9	Chrysene	240 U		240	14.3
53-70-3	Dibenzo (a,h) Anthracene	240 U		240	8.26
132-64-9	Dibenzofuran	240 U		240	4.42
84-66-2	**Diethylphthalate**	**11 J**	B,X	240	2.66
131-11-3	Dimethylphthalate	240 U		240	4.63
84-74-2	**Di-n-Butylphthalate**	**380**		240	5.35
117-84-0	Di-n-Octylphthalate	240 U		240	4.34
206-44-0	Fluoranthene	240 U		240	3.29
86-73-7	Fluorene	240 U		240	2.35
118-74-1	Hexachlorobenzene	240 U		240	3.51
87-68-3	Hexachlorobutadiene	240 U		240	5.42
77-47-4	Hexachlorocyclopentadiene	240 U		240	2.77
67-72-1	Hexachloroethane	240 U		240	3.27
193-39-5	Indeno (1,2,3-cd) Pyrene	240 U		240	5.49
78-59-1	Isophorone	240 U		240	2.42
91-20-3	Naphthalene	240 U		240	3.85
98-95-3	Nitrobenzene	240 U		240	4.48

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB3C**	QC Batch:	90210 -110
Sample #:	**345621**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	240 U	240	4.61
86-30-6	N-Nitroso-di-Phenylamine	240 U	240	6.65
87-86-5	Pentachlorophenol	460 U	460	6.15
85-01-8	Phenanthrene	240 U	240	3.22
108-95-2	Phenol	240 U	240	5.54
129-00-0	Pyrene	240 U	240	2.07

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB3C**	QC Batch:	90210 -110
Sample #:	**345621**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	73
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	41	E	NJ,+
1,2-Benzenedicarboxylic acid, butyl 2-methylpropyl ester	17851-53-5	530	E	NJ,+
1-Heptadecanol	1454-85-9	30	E	NJ,+
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	120	E	NJ,+
2-Ethyl-1-Hexanol	104-76-7	39	E	NJ,+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~600~~	~~E~~	
Stearic Acid	57-11-4	50	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**57SB1A**	QC Batch:	90210 -110
Sample #:	**345622**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	86
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	200 U		200	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	200 U		200	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	200 U		200	1.58
95-95-4	2,4,5-Trichlorophenol	200 U		200	4.01
88-06-2	2,4,6-Trichlorophenol	200 U		200	3.14
120-83-2	2,4-Dichlorophenol	200 U		200	4.22
105-67-9	2,4-Dimethylphenol	200 U		200	9.53
51-28-5	2,4-Dinitrophenol	400 U		400	3.84
121-14-2	2,4-Dinitrotoluene	200 U		200	3.78
606-20-2	2,6-Dinitrotoluene	200 U		200	33.2
91-58-7	2-Chloronaphthalene	200 U		200	2.76
95-57-8	2-Chlorophenol	200 U		200	2.41
91-57-6	2-Methylnaphthalene	200 U		200	3.29
95-48-7	2-Methylphenol	200 U		200	5.81
88-74-4	2-Nitroaniline	200 U		200	5.52
88-75-5	2-Nitrophenol	200 U		200	2.04
91-94-1	3,3'-Dichlorobenzidine	200 U		200	66.5
99-09-2	3-Nitroaniline	200 U		200	22.0
534-52-1	4,6-Dinitro-2-Methylphenol	200 U		200	5.41
101-55-3	4-Bromophenyl Phenylether	200 U		200	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**23 J**	B,X	200	6.25
106-47-8	4-Chloroaniline	200 U		200	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	200 U		200	3.92
106-44-5	4-Methylphenol	200 U		200	7.64
100-01-6	4-Nitroaniline	200 U		200	8.70
100-02-7	4-Nitrophenol	400 U		400	3.40
83-32-9	Acenaphthene	200 U		200	2.06
208-96-8	Acenaphthylene	200 U		200	1.80
98-86-2	Acetophenone	200 U		200	2.28

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**57SB1A**	QC Batch:	90210 -110
Sample #:	**345622**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	86
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	200 U		200	5.54
1912-24-9	Atrazine	200 U		200	8.26
100-52-7	Benzaldehyde	200 U		200	4.86
56-55-3	Benzo (a) Anthracene	200 U		200	16.0
50-32-8	**Benzo (a) Pyrene**	**12 J**		200	6.85
205-99-2	**Benzo (b) Fluoranthene**	**23 J**		200	11.7
191-24-2	Benzo (g,h,i,) Perylene	200 U		200	10.5
207-08-9	Benzo (k) Fluoranthene	200 U		200	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	200 U		200	3.77
111-44-4	Bis (2-Chloroethyl) Ether	200 U		200	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**27 J**		200	2.48
85-68-7	Butyl Benzyl Phthalate	200 U		200	5.38
105-60-2	**Caprolactam**	**15 J**		400	7.66
86-74-8	Carbazole	200 U		200	7.32
218-01-9	**Chrysene**	**17 J**		200	12.2
53-70-3	Dibenzo (a,h) Anthracene	200 U		200	7.08
132-64-9	Dibenzofuran	200 U		200	3.79
84-66-2	**Diethylphthalate**	**8.0 J**	B,X	200	2.28
131-11-3	Dimethylphthalate	200 U		200	3.97
84-74-2	**Di-n-Butylphthalate**	**330**		200	4.58
117-84-0	Di-n-Octylphthalate	200 U		200	3.72
206-44-0	**Fluoranthene**	**30 J**		200	2.82
86-73-7	Fluorene	200 U		200	2.02
118-74-1	Hexachlorobenzene	200 U		200	3.01
87-68-3	Hexachlorobutadiene	200 U		200	4.64
77-47-4	Hexachlorocyclopentadiene	200 U		200	2.38
67-72-1	Hexachloroethane	200 U		200	2.80
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**7.0 J**		200	4.70
78-59-1	Isophorone	200 U		200	2.08
91-20-3	Naphthalene	200 U		200	3.30
98-95-3	Nitrobenzene	200 U		200	3.84

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB1A**	QC Batch:	90210 -110
Sample #:	**345622**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	86
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	200 U	200	3.95
86-30-6	N-Nitroso-di-Phenylamine	200 U	200	5.70
87-86-5	Pentachlorophenol	400 U	400	5.27
85-01-8	**Phenanthrene**	**13 J**	200	2.76
108-95-2	Phenol	200 U	200	4.75
129-00-0	**Pyrene**	**29 J**	200	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**57SB1A**	QC Batch:	90210 -110
Sample #:	**345622**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	86
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	440	E	NJ+
2(5H)-Furanone, 5,5-dimethyl-	20019-64-1	260	E	NJ+
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	94	E	NJ+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~1100~~	~~E~~	

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB1B**	QC Batch:	90210 -110
Sample #:	**345623**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U	220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U	220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U	220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U	220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U	220	3.41
120-83-2	2,4-Dichlorophenol	220 U	220	4.58
105-67-9	2,4-Dimethylphenol	220 U	220	10.3
51-28-5	2,4-Dinitrophenol	430 U	430	4.16
121-14-2	2,4-Dinitrotoluene	220 U	220	4.10
606-20-2	2,6-Dinitrotoluene	220 U	220	36.0
91-58-7	2-Chloronaphthalene	220 U	220	2.99
95-57-8	2-Chlorophenol	220 U	220	2.61
91-57-6	2-Methylnaphthalene	220 U	220	3.56
95-48-7	2-Methylphenol	220 U	220	6.29
88-74-4	2-Nitroaniline	220 U	220	5.98
88-75-5	2-Nitrophenol	220 U	220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U	220	72.0
99-09-2	3-Nitroaniline	220 U	220	23.8
534-52-1	4,6-Dinitro-2-Methylphenol	220 U	220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U	220	4.39
59-50-7	**4-Chloro-3-Methylphenol**	**29 J**	220	6.77
106-47-8	4-Chloroaniline	220 U	220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U	220	4.25
106-44-5	4-Methylphenol	220 U	220	8.28
100-01-6	4-Nitroaniline	220 U	220	9.43
100-02-7	4-Nitrophenol	430 U	430	3.68
83-32-9	Acenaphthene	220 U	220	2.24
208-96-8	Acenaphthylene	220 U	220	1.95
98-86-2	Acetophenone	220 U	220	2.47

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**57SB1B**	QC Batch:	90210 -110
Sample #:	**345623**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	220 U		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U		220	5.27
56-55-3	Benzo (a) Anthracene	220 U		220	17.3
50-32-8	Benzo (a) Pyrene	220 U		220	7.42
205-99-2	Benzo (b) Fluoranthene	220 U		220	12.7
191-24-2	Benzo (g,h,i,) Perylene	220 U		220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**22 J**		220	2.69
85-68-7	**Butyl Benzyl Phthalate**	**10 J**		220	5.82
105-60-2	**Caprolactam**	**11 J**		430	8.29
86-74-8	Carbazole	220 U		220	7.93
218-01-9	Chrysene	220 U		220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U		220	7.67
132-64-9	Dibenzofuran	220 U		220	4.11
84-66-2	**Diethylphthalate**	**10 J**	B,X	220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**430**		220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	Fluoranthene	220 U		220	3.06
86-73-7	Fluorene	220 U		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U		220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	Indeno (1,2,3-cd) Pyrene	220 U		220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	Naphthalene	220 U		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB1B**	QC Batch:	90210 -110
Sample #:	**345623**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	N-Nitroso-di-Phenylamine	220 U	220	6.18
87-86-5	Pentachlorophenol	430 U	430	5.71
85-01-8	Phenanthrene	220 U	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	Pyrene	220 U	220	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**57SB1B**	QC Batch:	90210 -110
Sample #:	**345623**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	75
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	810	E	NJ,T
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	540	E	NJ,T
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	130	E	NJ,T
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~1700~~	~~E~~	
Stearic Acid	57-11-4	64	E	NJ,T

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB1C**	QC Batch:	90210 -110
Sample #:	**345624**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	260 U	260	3.69
95-94-3	1,2,4,5-Tetrachloro-benzene	260 U	260	43.1
108-60-1	Bis (2-Chloroisopropyl)-Ether	260 U	260	1.98
95-95-4	2,4,5-Trichlorophenol	260 U	260	5.01
88-06-2	2,4,6-Trichlorophenol	260 U	260	3.93
120-83-2	2,4-Dichlorophenol	260 U	260	5.28
105-67-9	2,4-Dimethylphenol	260 U	260	11.9
51-28-5	2,4-Dinitrophenol	500 U	500	4.80
121-14-2	2,4-Dinitrotoluene	260 U	260	4.73
606-20-2	2,6-Dinitrotoluene	260 U	260	41.6
91-58-7	2-Chloronaphthalene	260 U	260	3.45
95-57-8	2-Chlorophenol	260 U	260	3.02
91-57-6	2-Methylnaphthalene	260 U	260	4.11
95-48-7	2-Methylphenol	260 U	260	7.26
88-74-4	2-Nitroaniline	260 U	260	6.90
88-75-5	2-Nitrophenol	260 U	260	2.55
91-94-1	3,3'-Dichlorobenzidine	260 U	260	83.1
99-09-2	3-Nitroaniline	260 U	260	27.5
534-52-1	4,6-Dinitro-2-Methylphenol	260 U	260	6.77
101-55-3	4-Bromophenyl Phenylether	260 U	260	5.07
59-50-7	**4-Chloro-3-Methylphenol**	**44 J**	260	7.82
106-47-8	4-Chloroaniline	260 U	260	1.89
7005-72-3	4-Chlorophenylphenyl-Ether	260 U	260	4.91
106-44-5	4-Methylphenol	260 U	260	9.56
100-01-6	4-Nitroaniline	260 U	260	10.9
100-02-7	4-Nitrophenol	500 U	500	4.25
83-32-9	Acenaphthene	260 U	260	2.58
208-96-8	Acenaphthylene	260 U	260	2.25
98-86-2	Acetophenone	260 U	260	2.85

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**57SB1C**	QC Batch:	90210 -110
Sample #:	**345624**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	260 U		260	6.93
1912-24-9	Atrazine	260 U		260	10.3
100-52-7	Benzaldehyde	260 U		260	6.08
56-55-3	Benzo (a) Anthracene	260 U		260	20.0
50-32-8	Benzo (a) Pyrene	260 U		260	8.57
205-99-2	Benzo (b) Fluoranthene	260 U		260	14.6
191-24-2	Benzo (g,h,i,) Perylene	260 U		260	13.1
207-08-9	Benzo (k) Fluoranthene	260 U		260	20.1
111-91-1	Bis (2-Chloroethoxy)-Methane	260 U		260	4.71
111-44-4	Bis (2-Chloroethyl) Ether	260 U		260	2.60
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**63 J**		260	3.11
85-68-7	**Butyl Benzyl Phthalate**	**30 J**		260	6.72
105-60-2	**Caprolactam**	**36 J**		500	9.57
86-74-8	Carbazole	260 U		260	9.15
218-01-9	Chrysene	260 U		260	15.3
53-70-3	Dibenzo (a,h) Anthracene	260 U		260	8.85
132-64-9	Dibenzofuran	260 U		260	4.74
84-66-2	**Diethylphthalate**	**12 J**	B,X	260	2.85
131-11-3	Dimethylphthalate	260 U		260	4.97
84-74-2	**Di-n-Butylphthalate**	**410**		260	5.73
117-84-0	Di-n-Octylphthalate	260 U		260	4.65
206-44-0	Fluoranthene	260 U		260	3.53
86-73-7	Fluorene	260 U		260	2.52
118-74-1	Hexachlorobenzene	260 U		260	3.77
87-68-3	Hexachlorobutadiene	260 U		260	5.81
77-47-4	Hexachlorocyclopentadiene	260 U		260	2.97
67-72-1	Hexachloroethane	260 U		260	3.50
193-39-5	Indeno (1,2,3-cd) Pyrene	260 U		260	5.88
78-59-1	Isophorone	260 U		260	2.60
91-20-3	Naphthalene	260 U		260	4.13
98-95-3	Nitrobenzene	260 U		260	4.80

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**57SB1C**	QC Batch:	90210 -110
Sample #:	**345624**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	260 U	260	4.94
86-30-6	N-Nitroso-di-Phenylamine	260 U	260	7.13
87-86-5	Pentachlorophenol	500 U	500	6.59
85-01-8	Phenanthrene	260 U	260	3.45
108-95-2	Phenol	260 U	260	5.94
129-00-0	Pyrene	260 U	260	2.22

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB1C**	QC Batch:	90210 -110
Sample #:	**345624**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	67
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	79	E	NJ,+
1,2-Benzenedicarboxylic acid, butyl cyclohexyl ester	84-64-0	470	E	NJ,+
Bis(2-ethylhexyl)maleate	142-16-5	120	E	NJ,+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~2800~~	~~E~~	
Stearic Acid	57-11-4	110	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**57SB3A**	QC Batch:	90210 -110
Sample #:	**345625**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U	220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U	220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U	220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U	220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U	220	3.41
120-83-2	2,4-Dichlorophenol	220 U	220	4.58
105-67-9	2,4-Dimethylphenol	220 U	220	10.3
51-28-5	2,4-Dinitrophenol	430 U	430	4.16
121-14-2	2,4-Dinitrotoluene	220 U	220	4.10
606-20-2	2,6-Dinitrotoluene	220 U	220	36.0
91-58-7	2-Chloronaphthalene	220 U	220	2.99
95-57-8	2-Chlorophenol	220 U	220	2.61
91-57-6	**2-Methylnaphthalene**	**6.0 J**	220	3.56
95-48-7	2-Methylphenol	220 U	220	6.29
88-74-4	2-Nitroaniline	220 U	220	5.98
88-75-5	2-Nitrophenol	220 U	220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U	220	72.0
99-09-2	3-Nitroaniline	220 U	220	23.8
534-52-1	4,6-Dinitro-2-Methylphenol	220 U	220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U	220	4.39
59-50-7	**4-Chloro-3-Methylphenol**	**46 J**	220	6.77
106-47-8	4-Chloroaniline	220 U	220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U	220	4.25
106-44-5	4-Methylphenol	220 U	220	8.28
100-01-6	4-Nitroaniline	220 U	220	9.43
100-02-7	4-Nitrophenol	430 U	430	3.68
83-32-9	Acenaphthene	220 U	220	2.24
208-96-8	**Acenaphthylene**	**4.0 J**	220	1.95
98-86-2	**Acetophenone**	**36 J**	220	2.47

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**57SB3A**	QC Batch:	90210 -110
Sample #:	**345625**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	220 U		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U		220	5.27
56-55-3	Benzo (a) Anthracene	220 U		220	17.3
50-32-8	**Benzo (a) Pyrene**	**12 J**		220	7.42
205-99-2	**Benzo (b) Fluoranthene**	**20 J**		220	12.7
191-24-2	Benzo (g,h,i,) Perylene	220 U		220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**480**		220	2.69
85-68-7	Butyl Benzyl Phthalate	220 U		220	5.82
105-60-2	**Caprolactam**	**43 J**		430	8.29
86-74-8	Carbazole	220 U		220	7.93
218-01-9	**Chrysene**	**23 J**		220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U		220	7.67
132-64-9	Dibenzofuran	220 U		220	4.11
84-66-2	**Diethylphthalate**	**19 J**	B,X	220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**360**		220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	**Fluoranthene**	**40 J**		220	3.06
86-73-7	Fluorene	220 U		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U		220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**7.0 J**		220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	**Naphthalene**	**4.0 J**		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**57SB3A**	QC Batch:	90210 -110
Sample #:	**345625**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	N-Nitroso-di-Phenylamine	220 U	220	6.18
87-86-5	Pentachlorophenol	430 U	430	5.71
85-01-8	**Phenanthrene**	**27 J**	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	**Pyrene**	**40 J**	220	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB3A**	QC Batch:	90210 -110
Sample #:	**345625**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	77
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	1300	E	NJ,t
1,1'-Biphenyl, 2,3,3',4,4'-pentachloro-	32598-14-4	390	E	NJ,t
1,2-Benzenedicarboxylic acid, butyl cyclohexyl ester	84-64-0	330	E	NJ,t
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~4000~~	~~E~~	

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 00:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**SBD6**	QC Batch:	90210 -110
Sample #:	**345626**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U		220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U		220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U		220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U		220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U		220	3.41
120-83-2	2,4-Dichlorophenol	220 U		220	4.58
105-67-9	2,4-Dimethylphenol	220 U		220	10.3
51-28-5	2,4-Dinitrophenol	430 U		430	4.16
121-14-2	2,4-Dinitrotoluene	220 U		220	4.10
606-20-2	2,6-Dinitrotoluene	220 U		220	36.0
91-58-7	2-Chloronaphthalene	220 U		220	2.99
95-57-8	2-Chlorophenol	220 U		220	2.61
91-57-6	**2-Methylnaphthalene**	**12 J**		220	3.56
95-48-7	2-Methylphenol	220 U		220	6.29
88-74-4	2-Nitroaniline	220 U		220	5.98
88-75-5	2-Nitrophenol	220 U		220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U		220	72.0
99-09-2	3-Nitroaniline	220 U		220	23.8
534-52-1	4,6-Dinitro-2-Methylphenol	220 U		220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U		220	4.39
59-50-7	**4-Chloro-3-Methylphenol**	**38 J**		220	6.77
106-47-8	4-Chloroaniline	220 U	UJ,c	220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U		220	4.25
106-44-5	4-Methylphenol	220 U		220	8.28
100-01-6	4-Nitroaniline	220 U		220	9.43
100-02-7	4-Nitrophenol	430 U		430	3.68
83-32-9	Acenaphthene	220 U		220	2.24
208-96-8	**Acenaphthylene**	**9.0 J**		220	1.95
98-86-2	**Acetophenone**	**75 J**		220	2.47

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD6**	QC Batch:	90210 -110
Sample #:	**345626**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	**Anthracene**	**9.0 J**		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U		220	5.27
56-55-3	Benzo (a) Anthracene	220 U		220	17.3
50-32-8	**Benzo (a) Pyrene**	**20 J**		220	7.42
205-99-2	**Benzo (b) Fluoranthene**	**35 J**		220	12.7
191-24-2	**Benzo (g,h,i,) Perylene**	**15 J**		220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**62 J**		220	2.69
85-68-7	Butyl Benzyl Phthalate	220 U		220	5.82
105-60-2	**Caprolactam**	**25 J**		430	8.29
86-74-8	Carbazole	220 U		220	7.93
218-01-9	**Chrysene**	**22 J**		220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U		220	7.67
132-64-9	Dibenzofuran	220 U		220	4.11
84-66-2	**Diethylphthalate**	**21 J**	B,X	220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**230**		220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	**Fluoranthene**	**45 J**		220	3.06
86-73-7	**Fluorene**	**3.0 J**		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U		220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**12 J**		220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	**Naphthalene**	**6.0 J**		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD6**	QC Batch:	90210 -110
Sample #:	**345626**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	N-Nitroso-di-Phenylamine	220 U	220	6.18
87-86-5	Pentachlorophenol	430 U	430	5.71
85-01-8	**Phenanthrene**	**50 J**	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	**Pyrene**	**44 J**	220	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD6**	QC Batch:	90210 -110
Sample #:	**345626**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	76
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	760	E	NJ1+
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	530	E	NJ1+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~590~~	~~E~~	
Phosphoric acid, tris (3-methylphenyl) ester	78-30-8	1400	E	NJ1+
Phsophoric acid, tris(3-methylphenyl) ester	563-04-2	560	E	NJ1+
~~Total PCB's~~	~~XXX PCB~~	~~1100~~	~~E~~	

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB3B**	QC Batch:	90482 -114
Sample #:	**345627**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	63
Unit:	ug/kg dry	Dilution Factor:	1.6

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	270 U		270	3.94
95-94-3	1,2,4,5-Tetrachloro-benzene	270 U		270	45.9
108-60-1	Bis (2-Chloroisopropyl)-Ether	270 U		270	2.11
95-95-4	2,4,5-Trichlorophenol	270 U		270	5.34
88-06-2	2,4,6-Trichlorophenol	270 U		270	4.19
120-83-2	2,4-Dichlorophenol	270 U		270	5.63
105-67-9	2,4-Dimethylphenol	270 U		270	12.7
51-28-5	2,4-Dinitrophenol	530 U		530	5.12
121-14-2	2,4-Dinitrotoluene	270 U		270	5.04
606-20-2	2,6-Dinitrotoluene	270 U		270	44.3
91-58-7	2-Chloronaphthalene	270 U		270	3.68
95-57-8	2-Chlorophenol	270 U		270	3.22
91-57-6	2-Methylnaphthalene	270 U		270	4.38
95-48-7	2-Methylphenol	270 U		270	7.74
88-74-4	2-Nitroaniline	270 U		270	7.36
88-75-5	2-Nitrophenol	270 U		270	2.72
91-94-1	3,3'-Dichlorobenzidine	270 U		270	107
99-09-2	3-Nitroaniline	270 U		270	53.3
534-52-1	4,6-Dinitro-2-Methylphenol	270 U		270	7.22
101-55-3	4-Bromophenyl Phenylether	270 U		270	5.41
59-50-7	**4-Chloro-3-Methylphenol**	**16 J**	B,X	270	8.34
106-47-8	4-Chloroaniline	270 U	JJC	270	2.02
7005-72-3	4-Chlorophenylphenyl-Ether	270 U		270	5.23
106-44-5	4-Methylphenol	270 U		270	10.2
100-01-6	4-Nitroaniline	270 U		270	11.6
100-02-7	4-Nitrophenol	530 U		530	4.53
83-32-9	Acenaphthene	270 U		270	2.75
208-96-8	Acenaphthylene	270 U		270	2.40
98-86-2	Acetophenone	270 U		270	3.04

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/18/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**57SB3B**	QC Batch:	90482 -114
Sample #:	**345627**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	63
Unit:	ug/kg dry	Dilution Factor:	1.6

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	270 U		270	7.39
1912-24-9	Atrazine	270 U		270	11.0
100-52-7	Benzaldehyde	270 U	U,J,C	270	6.48
56-55-3	Benzo (a) Anthracene	270 U		270	21.3
50-32-8	Benzo (a) Pyrene	270 U		270	9.14
205-99-2	Benzo (b) Fluoranthene	270 U		270	15.6
191-24-2	Benzo (g,h,i,) Perylene	270 U		270	14.0
207-08-9	Benzo (k) Fluoranthene	270 U		270	21.4
111-91-1	Bis (2-Chloroethoxy)-Methane	270 U		270	5.02
111-44-4	Bis (2-Chloroethyl) Ether	270 U		270	2.77
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**60 J**	B,Z	270	3.31
85-68-7	Butyl Benzyl Phthalate	270 U		270	7.17
105-60-2	Caprolactam	530 U		530	10.2
86-74-8	Carbazole	270 U		270	9.76
218-01-9	Chrysene	270 U		270	16.3
53-70-3	Dibenzo (a,h) Anthracene	270 U		270	9.44
132-64-9	Dibenzofuran	270 U		270	5.06
84-66-2	Diethylphthalate	270 U		270	3.04
131-11-3	Dimethylphthalate	270 U		270	5.30
84-74-2	**Di-n-Butylphthalate**	**55 J**	B,Z	270	6.11
117-84-0	Di-n-Octylphthalate	270 U		270	4.96
206-44-0	Fluoranthene	270 U		270	3.76
86-73-7	Fluorene	270 U		270	2.69
118-74-1	Hexachlorobenzene	270 U		270	4.02
87-68-3	Hexachlorobutadiene	270 U		270	6.19
77-47-4	Hexachlorocyclopentadiene	270 U		270	3.17
67-72-1	Hexachloroethane	270 U		270	3.73
193-39-5	Indeno (1,2,3-cd) Pyrene	270 U		270	6.27
78-59-1	Isophorone	270 U		270	2.77
91-20-3	Naphthalene	270 U		270	4.40
98-95-3	Nitrobenzene	270 U		270	5.12

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB3B**	QC Batch:	90482 -114
Sample #:	**345627**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	63
Unit:	ug/kg dry	Dilution Factor:	1.6

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	270 U	270	5.26
86-30-6	N-Nitroso-di-Phenylamine	270 U	270	7.60
87-86-5	Pentachlorophenol	530 U	530	7.02
85-01-8	Phenanthrene	270 U	270	3.68
108-95-2	Phenol	270 U	270	6.34
129-00-0	Pyrene	270 U	270	2.37

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB3B**	QC Batch:	90482 -114
Sample #:	**345627**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	63
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	56	E	B,X
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	110	E	NJ,+
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,9-diene-2,8	1000143924 100014-39-24	28	E	NJ,+
Erucylamide	112-84-5	630	E	B,X
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~220~~	~~E~~	

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/18/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**57SB3C**	QC Batch:	90482 -114
Sample #:	**345628**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U		220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U		220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U		220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U		220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U		220	3.41
120-83-2	2,4-Dichlorophenol	220 U		220	4.58
105-67-9	2,4-Dimethylphenol	220 U		220	10.3
51-28-5	2,4-Dinitrophenol	430 U		430	4.16
121-14-2	2,4-Dinitrotoluene	220 U		220	4.10
606-20-2	2,6-Dinitrotoluene	220 U		220	36.0
91-58-7	2-Chloronaphthalene	220 U		220	2.99
95-57-8	2-Chlorophenol	220 U		220	2.61
91-57-6	2-Methylnaphthalene	220 U		220	3.56
95-48-7	2-Methylphenol	220 U		220	6.29
88-74-4	2-Nitroaniline	220 U		220	5.98
88-75-5	2-Nitrophenol	220 U		220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U		220	86.7
99-09-2	3-Nitroaniline	220 U		220	43.3
534-52-1	4,6-Dinitro-2-Methylphenol	220 U		220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U		220	4.39
59-50-7	4-Chloro-3-Methylphenol	220 U		220	6.77
106-47-8	4-Chloroaniline	220 U	UJ,c	220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U		220	4.25
106-44-5	4-Methylphenol	220 U		220	8.28
100-01-6	4-Nitroaniline	220 U		220	9.43
100-02-7	4-Nitrophenol	430 U		430	3.68
83-32-9	Acenaphthene	220 U		220	2.24
208-96-8	Acenaphthylene	220 U		220	1.95
98-86-2	Acetophenone	220 U		220	2.47

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/18/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**57SB3C**	QC Batch:	90482 -114
Sample #:	**345628**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	220 U		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U	UJC	220	5.27
56-55-3	Benzo (a) Anthracene	220 U		220	17.3
50-32-8	Benzo (a) Pyrene	220 U		220	7.42
205-99-2	Benzo (b) Fluoranthene	220 U		220	12.7
191-24-2	Benzo (g,h,i,) Perylene	220 U		220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**52 J**	B,Z	220	2.69
85-68-7	Butyl Benzyl Phthalate	220 U		220	5.82
105-60-2	Caprolactam	430 U		430	8.29
86-74-8	Carbazole	220 U		220	7.93
218-01-9	Chrysene	220 U		220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U		220	7.67
132-64-9	Dibenzofuran	220 U		220	4.11
84-66-2	**Diethylphthalate**	**7.0 J**	B,X	220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**38 J**	B,Z	220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	Fluoranthene	220 U		220	3.06
86-73-7	Fluorene	220 U		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U		220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	Indeno (1,2,3-cd) Pyrene	220 U		220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	Naphthalene	220 U		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB3C**	QC Batch:	90482 -114
Sample #:	**345628**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	N-Nitroso-di-Phenylamine	220 U	220	6.18
87-86-5	Pentachlorophenol	430 U	430	5.71
85-01-8	Phenanthrene	220 U	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	Pyrene	220 U	220	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/18/03 JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**57SB3C**	QC Batch:	90482 -114
Sample #:	**345628**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	75
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	60	E	NJ,t
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	32	E	NJ,t
1-Heptadecanol	1454-85-9	37	E	NJ,t
Erucylamide	112-84-5	340	E	B,X
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~250~~	~~E~~	

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB2A**	QC Batch:	90482 -114
Sample #:	**345629**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U		220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U		220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U		220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U		220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U		220	3.41
120-83-2	2,4-Dichlorophenol	220 U		220	4.58
105-67-9	2,4-Dimethylphenol	220 U		220	10.3
51-28-5	2,4-Dinitrophenol	430 U		430	4.16
121-14-2	2,4-Dinitrotoluene	220 U		220	4.10
606-20-2	2,6-Dinitrotoluene	220 U		220	36.0
91-58-7	2-Chloronaphthalene	220 U		220	2.99
95-57-8	2-Chlorophenol	220 U		220	2.61
91-57-6	2-Methylnaphthalene	220 U		220	3.56
95-48-7	2-Methylphenol	220 U		220	6.29
88-74-4	2-Nitroaniline	220 U		220	5.98
88-75-5	2-Nitrophenol	220 U		220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U		220	86.7
99-09-2	3-Nitroaniline	220 U		220	43.3
534-52-1	4,6-Dinitro-2-Methylphenol	220 U		220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U		220	4.39
59-50-7	**4-Chloro-3-Methylphenol**	**19 J**	BX	220	6.77
106-47-8	4-Chloroaniline	220 U	UJ,c	220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U		220	4.25
106-44-5	4-Methylphenol	220 U		220	8.28
100-01-6	4-Nitroaniline	220 U		220	9.43
100-02-7	4-Nitrophenol	430 U		430	3.68
83-32-9	Acenaphthene	220 U		220	2.24
208-96-8	**Acenaphthylene**	**2.0 J**	J,1	220	1.95
98-86-2	Acetophenone	220 U		220	2.47

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB2A**	QC Batch:	90482 -114
Sample #:	**345629**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	220 U		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U	UJ,C	220	5.27
56-55-3	Benzo (a) Anthracene	220 U		220	17.3
50-32-8	**Benzo (a) Pyrene**	**30 J**		220	7.42
205-99-2	**Benzo (b) Fluoranthene**	**55 J**	J,1	220	12.7
191-24-2	Benzo (g,h,i,) Perylene	220 U		220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**62 J**	B,Z	220	2.69
85-68-7	**Butyl Benzyl Phthalate**	**44 J**		220	5.82
105-60-2	Caprolactam	430 U		430	8.29
86-74-8	Carbazole	220 U		220	7.93
218-01-9	Chrysene	220 U		220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U		220	7.67
132-64-9	Dibenzofuran	220 U		220	4.11
84-66-2	**Diethylphthalate**	**7.0 J**	B,X	220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**55 J**	B,Z	220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	**Fluoranthene**	**26 J**		220	3.06
86-73-7	Fluorene	220 U		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U		220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**42 J**	J,1	220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	Naphthalene	220 U		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB2A**	QC Batch:	90482 -114
Sample #:	**345629**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	N-Nitroso-di-Phenylamine	220 U	220	6.18
87-86-5	Pentachlorophenol	430 U	430	5.71
85-01-8	**Phenanthrene**	**18 J**	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	**Pyrene**	**38 J**	220	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB2A**	QC Batch:	90482 -114
Sample #:	**345629**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	76
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, butyl 2-methylpropyl ester	17851-53-5	51	E	NJ+
Erucylamide	112-84-5	600	E	B,X
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~460~~	~~E~~	

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:20
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**57SB2B**	QC Batch:	90572 -114
Sample #:	**345630**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U		220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U		220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U		220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U		220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U		220	3.41
120-83-2	2,4-Dichlorophenol	220 U		220	4.58
105-67-9	2,4-Dimethylphenol	220 U		220	10.3
51-28-5	2,4-Dinitrophenol	430 U		430	4.16
121-14-2	2,4-Dinitrotoluene	220 U		220	4.10
606-20-2	2,6-Dinitrotoluene	220 U		220	36.0
91-58-7	2-Chloronaphthalene	220 U		220	2.99
95-57-8	2-Chlorophenol	220 U		220	2.61
91-57-6	2-Methylnaphthalene	220 U		220	3.56
95-48-7	2-Methylphenol	220 U		220	6.29
88-74-4	2-Nitroaniline	220 U		220	5.98
88-75-5	2-Nitrophenol	220 U		220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U		220	72.0
99-09-2	3-Nitroaniline	220 U		220	23.8
534-52-1	4,6-Dinitro-2-Methylphenol	220 U		220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U		220	4.39
59-50-7	**4-Chloro-3-Methylphenol**	**16 J**	BX	220	6.77
106-47-8	4-Chloroaniline	220 U	UJ,C	220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U		220	4.25
106-44-5	4-Methylphenol	220 U		220	8.28
100-01-6	4-Nitroaniline	220 U		220	9.43
100-02-7	4-Nitrophenol	430 U		430	3.68
83-32-9	Acenaphthene	220 U		220	2.24
208-96-8	Acenaphthylene	220 U		220	1.95
98-86-2	Acetophenone	220 U		220	2.47

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB2B**	QC Batch:	90572 -114
Sample #:	**345630**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	220 U		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U		220	5.27
56-55-3	Benzo (a) Anthracene	220 U		220	17.3
50-32-8	Benzo (a) Pyrene	220 U		220	7.42
205-99-2	Benzo (b) Fluoranthene	220 U		220	12.7
191-24-2	Benzo (g,h,i,) Perylene	220 U		220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**20 J**		220	2.69
85-68-7	Butyl Benzyl Phthalate	220 U		220	5.82
105-60-2	Caprolactam	430 U		430	8.29
86-74-8	Carbazole	220 U		220	7.93
218-01-9	Chrysene	220 U		220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U		220	7.67
132-64-9	Dibenzofuran	220 U		220	4.11
84-66-2	**Diethylphthalate**	**12 J**	B,X	220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**44 J**		220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	Fluoranthene	220 U		220	3.06
86-73-7	Fluorene	220 U		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U		220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	Indeno (1,2,3-cd) Pyrene	220 U		220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	Naphthalene	220 U		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB2B**	QC Batch:	90572 -114
Sample #:	**345630**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	N-Nitroso-di-Phenylamine	220 U	220	6.18
87-86-5	Pentachlorophenol	430 U	430	5.71
85-01-8	Phenanthrene	220 U	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	Pyrene	220 U	220	1.92

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:20
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**57SB2B**	QC Batch:	90572 -114
Sample #:	**345630**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	76
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	38	E	B,X
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	68	E	NJ+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~290~~	~~E~~	

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:40
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB2C**	QC Batch:	90482 -114
Sample #:	**345631**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U		220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U		220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U		220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U		220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U		220	3.41
120-83-2	2,4-Dichlorophenol	220 U		220	4.58
105-67-9	2,4-Dimethylphenol	220 U		220	10.3
51-28-5	2,4-Dinitrophenol	430 U		430	4.16
121-14-2	2,4-Dinitrotoluene	220 U		220	4.10
606-20-2	2,6-Dinitrotoluene	220 U		220	36.0
91-58-7	2-Chloronaphthalene	220 U		220	2.99
95-57-8	2-Chlorophenol	220 U		220	2.61
91-57-6	2-Methylnaphthalene	220 U		220	3.56
95-48-7	2-Methylphenol	220 U		220	6.29
88-74-4	2-Nitroaniline	220 U		220	5.98
88-75-5	2-Nitrophenol	220 U		220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U		220	86.7
99-09-2	3-Nitroaniline	220 U		220	43.3
534-52-1	4,6-Dinitro-2-Methylphenol	220 U		220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U		220	4.39
59-50-7	4-Chloro-3-Methylphenol	220 U		220	6.77
106-47-8	4-Chloroaniline	220 U	UJ,c	220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U		220	4.25
106-44-5	4-Methylphenol	220 U		220	8.28
100-01-6	4-Nitroaniline	220 U		220	9.43
100-02-7	4-Nitrophenol	430 U		430	3.68
83-32-9	Acenaphthene	220 U		220	2.24
208-96-8	Acenaphthylene	220 U		220	1.95
98-86-2	Acetophenone	220 U		220	2.47

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:40
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/18/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**57SB2C**	QC Batch:	90482 -114
Sample #:	**345631**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	220 U		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U	UJ,c	220	5.27
56-55-3	Benzo (a) Anthracene	220 U		220	17.3
50-32-8	Benzo (a) Pyrene	220 U		220	7.42
205-99-2	Benzo (b) Fluoranthene	220 U		220	12.7
191-24-2	Benzo (g,h,i,) Perylene	220 U		220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**48 J**	B,z	220	2.69
85-68-7	Butyl Benzyl Phthalate	220 U		220	5.82
105-60-2	Caprolactam	430 U		430	8.29
86-74-8	Carbazole	220 U		220	7.93
218-01-9	Chrysene	220 U		220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U		220	7.67
132-64-9	Dibenzofuran	220 U		220	4.11
84-66-2	**Diethylphthalate**	**5.0 J**	B,X	220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**38 J**	B,z	220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	Fluoranthene	220 U		220	3.06
86-73-7	Fluorene	220 U		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U		220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	Indeno (1,2,3-cd) Pyrene	220 U		220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	Naphthalene	220 U		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:40
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB2C**	QC Batch:	90482 -114
Sample #:	**345631**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	N-Nitroso-di-Phenylamine	220 U	220	6.18
87-86-5	Pentachlorophenol	430 U	430	5.71
85-01-8	Phenanthrene	220 U	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	Pyrene	220 U	220	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:40
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB2C**	QC Batch:	90482 -114
Sample #:	**345631**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	76
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	80	E	NJ,t
1,2-Benzenedicarboxylic acid, butyl 8-methylnonyl ester	89-18-9	34	E	NJ,t
1-Hexadecanol	36653-82-4	31	E	NJ,t
1-Pentadecanol	629-76-5	52	E	NJ,t
Erucylamide	112-84-5	330	E	B,x
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~210~~	~~E~~	

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 09:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB4A**	QC Batch:	90482 -114
Sample #:	**345737**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	240 U		240	3.44
95-94-3	1,2,4,5-Tetrachloro-benzene	240 U		240	40.2
108-60-1	Bis (2-Chloroisopropyl)-Ether	240 U		240	1.85
95-95-4	2,4,5-Trichlorophenol	240 U		240	4.68
88-06-2	2,4,6-Trichlorophenol	240 U		240	3.67
120-83-2	2,4-Dichlorophenol	240 U		240	4.93
105-67-9	2,4-Dimethylphenol	240 U		240	11.1
51-28-5	2,4-Dinitrophenol	460 U		460	4.48
121-14-2	2,4-Dinitrotoluene	240 U		240	4.41
606-20-2	2,6-Dinitrotoluene	240 U		240	38.8
91-58-7	2-Chloronaphthalene	240 U		240	3.22
95-57-8	2-Chlorophenol	240 U		240	2.81
91-57-6	2-Methylnaphthalene	240 U		240	3.84
95-48-7	2-Methylphenol	240 U		240	6.78
88-74-4	2-Nitroaniline	240 U		240	6.44
88-75-5	2-Nitrophenol	240 U		240	2.38
91-94-1	3,3'-Dichlorobenzidine	240 U		240	77.6
99-09-2	3-Nitroaniline	240 U		240	25.6
534-52-1	4,6-Dinitro-2-Methylphenol	240 U		240	6.31
101-55-3	4-Bromophenyl Phenylether	240 U		240	4.73
59-50-7	**4-Chloro-3-Methylphenol**	**17 J**	B,X	240	7.29
106-47-8	4-Chloroaniline	240 U	UJ,C	240	1.76
7005-72-3	4-Chlorophenylphenyl-Ether	240 U		240	4.58
106-44-5	4-Methylphenol	240 U		240	8.92
100-01-6	4-Nitroaniline	240 U		240	10.2
100-02-7	4-Nitrophenol	460 U		460	3.96
83-32-9	Acenaphthene	240 U		240	2.41
208-96-8	Acenaphthylene	240 U		240	2.10
98-86-2	Acetophenone	240 U		240	2.66

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 09:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**57SB4A**	QC Batch:	90482 -114
Sample #:	**345737**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	240 U		240	6.47
1912-24-9	Atrazine	240 U		240	9.63
100-52-7	Benzaldehyde	240 U		240	5.67
56-55-3	Benzo (a) Anthracene	240 U		240	18.6
50-32-8	Benzo (a) Pyrene	240 U		240	7.99
205-99-2	Benzo (b) Fluoranthene	240 U		240	13.7
191-24-2	Benzo (g,h,i,) Perylene	240 U		240	12.2
207-08-9	Benzo (k) Fluoranthene	240 U		240	18.8
111-91-1	Bis (2-Chloroethoxy)-Methane	240 U		240	4.40
111-44-4	Bis (2-Chloroethyl) Ether	240 U		240	2.42
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**21 J**	B/Z	240	2.90
85-68-7	Butyl Benzyl Phthalate	240 U		240	6.27
105-60-2	Caprolactam	460 U		460	8.93
86-74-8	Carbazole	240 U		240	8.54
218-01-9	Chrysene	240 U		240	14.3
53-70-3	Dibenzo (a,h) Anthracene	240 U		240	8.26
132-64-9	Dibenzofuran	240 U		240	4.42
84-66-2	**Diethylphthalate**	**11 J**	B/X	240	2.66
131-11-3	Dimethylphthalate	240 U		240	4.63
84-74-2	**Di-n-Butylphthalate**	**41 J**	B/Z	240	5.35
117-84-0	Di-n-Octylphthalate	240 U		240	4.34
206-44-0	Fluoranthene	240 U		240	3.29
86-73-7	Fluorene	240 U		240	2.35
118-74-1	Hexachlorobenzene	240 U		240	3.51
87-68-3	Hexachlorobutadiene	240 U		240	5.42
77-47-4	Hexachlorocyclopentadiene	240 U		240	2.77
67-72-1	Hexachloroethane	240 U		240	3.27
193-39-5	Indeno (1,2,3-cd) Pyrene	240 U		240	5.49
78-59-1	Isophorone	240 U		240	2.42
91-20-3	Naphthalene	240 U		240	3.85
98-95-3	Nitrobenzene	240 U		240	4.48

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 09:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**57SB4A**	QC Batch:	90482 -114
Sample #:	**345737**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	240 U	240	4.61
86-30-6	N-Nitroso-di-Phenylamine	240 U	240	6.65
87-86-5	Pentachlorophenol	460 U	460	6.15
85-01-8	Phenanthrene	240 U	240	3.22
108-95-2	Phenol	240 U	240	5.54
129-00-0	Pyrene	240 U	240	2.07

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 09:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**57SB4A**	QC Batch:	90482 -114
Sample #:	**345737**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	71
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	41	E	B,X
1-Octadecanol	112-92-5	31	E	NJ,t
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	65	E	NJ,t
Erucylamide	112-84-5	320	E	B,X
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~400~~	~~E~~	
Oxirane, hexadecyl-	7390-81-0	58	E	NJ,t
Phenol, (1,1,3,3-tetramethylbutyl)-	27193-28-8	29	E	NJ,t
Stearic Acid	57-11-4	40	E	NJ,t

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 11:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**69SB1A**	QC Batch:	90482 -114
Sample #:	**345738**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U	220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U	220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U	220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U	220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U	220	3.41
120-83-2	2,4-Dichlorophenol	220 U	220	4.58
105-67-9	2,4-Dimethylphenol	220 U	220	10.3
51-28-5	2,4-Dinitrophenol	420 U	420	4.16
121-14-2	2,4-Dinitrotoluene	220 U	220	4.10
606-20-2	2,6-Dinitrotoluene	220 U	220	36.0
91-58-7	2-Chloronaphthalene	220 U	220	2.99
95-57-8	2-Chlorophenol	220 U	220	2.61
91-57-6	2-Methylnaphthalene	220 U	220	3.56
95-48-7	2-Methylphenol	220 U	220	6.29
88-74-4	2-Nitroaniline	220 U	220	5.98
88-75-5	2-Nitrophenol	220 U	220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U	220	72.0
99-09-2	3-Nitroaniline	220 U	220	23.8
534-52-1	4,6-Dinitro-2-Methylphenol	220 U	220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U	220	4.39
59-50-7	**4-Chloro-3-Methylphenol**	**10 J** B,X	220	6.77
106-47-8	4-Chloroaniline	220 U UJ,C	220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U	220	4.25
106-44-5	4-Methylphenol	220 U	220	8.28
100-01-6	4-Nitroaniline	220 U	220	9.43
100-02-7	4-Nitrophenol	420 U	420	3.68
83-32-9	Acenaphthene	220 U	220	2.24
208-96-8	Acenaphthylene	220 U	220	1.95
98-86-2	Acetophenone	220 U	220	2.47

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 11:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**69SB1A**	QC Batch:	90482 -114
Sample #:	**345738**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	220 U		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U		220	5.27
56-55-3	Benzo (a) Anthracene	220 U		220	17.3
50-32-8	Benzo (a) Pyrene	220 U		220	7.42
205-99-2	Benzo (b) Fluoranthene	220 U		220	12.7
191-24-2	Benzo (g,h,i,) Perylene	220 U		220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**21 J**	B/2	220	2.69
85-68-7	Butyl Benzyl Phthalate	220 U		220	5.82
105-60-2	Caprolactam	420 U		420	8.29
86-74-8	Carbazole	220 U		220	7.93
218-01-9	Chrysene	220 U		220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U		220	7.67
132-64-9	Dibenzofuran	220 U		220	4.11
84-66-2	**Diethylphthalate**	**8.0 J**	B/X	220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**300**		220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	Fluoranthene	220 U		220	3.06
86-73-7	Fluorene	220 U		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U		220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	Indeno (1,2,3-cd) Pyrene	220 U		220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	Naphthalene	220 U		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 11:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**69SB1A**	QC Batch:	90482 -114
Sample #:	**345738**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	N-Nitroso-di-Phenylamine	220 U	220	6.18
87-86-5	Pentachlorophenol	420 U	420	5.71
85-01-8	Phenanthrene	220 U	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	Pyrene	220 U	220	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 11:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**69SB1A**	QC Batch:	90482 -114
Sample #:	**345738**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	78
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	28	E	B,X
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	43	E	NJ,I
Erucylamide	112-84-5	190	E	B,X
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~300~~	~~E~~	

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 11:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**69SB1B**	QC Batch:	90482 -114
Sample #:	**345739**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	210 U		210	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	210 U		210	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	210 U		210	1.58
95-95-4	2,4,5-Trichlorophenol	210 U		210	4.01
88-06-2	2,4,6-Trichlorophenol	210 U		210	3.14
120-83-2	2,4-Dichlorophenol	210 U		210	4.22
105-67-9	2,4-Dimethylphenol	210 U		210	9.53
51-28-5	2,4-Dinitrophenol	400 U		400	3.84
121-14-2	2,4-Dinitrotoluene	210 U		210	3.78
606-20-2	2,6-Dinitrotoluene	210 U		210	33.2
91-58-7	2-Chloronaphthalene	210 U		210	2.76
95-57-8	2-Chlorophenol	210 U		210	2.41
91-57-6	2-Methylnaphthalene	210 U		210	3.29
95-48-7	2-Methylphenol	210 U		210	5.81
88-74-4	2-Nitroaniline	210 U		210	5.52
88-75-5	2-Nitrophenol	210 U		210	2.04
91-94-1	3,3'-Dichlorobenzidine	210 U		210	66.5
99-09-2	3-Nitroaniline	210 U		210	22.0
534-52-1	4,6-Dinitro-2-Methylphenol	210 U		210	5.41
101-55-3	4-Bromophenyl Phenylether	210 U		210	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**27 J**		210	6.25
106-47-8	4-Chloroaniline	210 U	UJ,c	210	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	210 U		210	3.92
106-44-5	4-Methylphenol	210 U		210	7.64
100-01-6	4-Nitroaniline	210 U		210	8.70
100-02-7	4-Nitrophenol	400 U		400	3.40
83-32-9	Acenaphthene	210 U		210	2.06
208-96-8	Acenaphthylene	210 U		210	1.80
98-86-2	Acetophenone	210 U		210	2.28

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 11:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**69SB1B**	QC Batch:	90482 -114
Sample #:	**345739**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	210 U		210	5.54
1912-24-9	Atrazine	210 U		210	8.26
100-52-7	Benzaldehyde	210 U		210	4.86
56-55-3	Benzo (a) Anthracene	210 U		210	16.0
50-32-8	Benzo (a) Pyrene	210 U		210	6.85
205-99-2	Benzo (b) Fluoranthene	210 U		210	11.7
191-24-2	Benzo (g,h,i,) Perylene	210 U		210	10.5
207-08-9	Benzo (k) Fluoranthene	210 U		210	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	210 U		210	3.77
111-44-4	Bis (2-Chloroethyl) Ether	210 U		210	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**19 J**	B,Z	210	2.48
85-68-7	Butyl Benzyl Phthalate	210 U		210	5.38
105-60-2	Caprolactam	400 U		400	7.66
86-74-8	Carbazole	210 U		210	7.32
218-01-9	Chrysene	210 U		210	12.2
53-70-3	Dibenzo (a,h) Anthracene	210 U		210	7.08
132-64-9	Dibenzofuran	210 U		210	3.79
84-66-2	**Diethylphthalate**	**8.0 J**	B,X	210	2.28
131-11-3	Dimethylphthalate	210 U		210	3.97
84-74-2	**Di-n-Butylphthalate**	**63 J**	B,Z	210	4.58
117-84-0	Di-n-Octylphthalate	210 U		210	3.72
206-44-0	Fluoranthene	210 U		210	2.82
86-73-7	Fluorene	210 U		210	2.02
118-74-1	Hexachlorobenzene	210 U		210	3.01
87-68-3	Hexachlorobutadiene	210 U		210	4.64
77-47-4	Hexachlorocyclopentadiene	210 U		210	2.38
67-72-1	Hexachloroethane	210 U		210	2.80
193-39-5	Indeno (1,2,3-cd) Pyrene	210 U		210	4.70
78-59-1	Isophorone	210 U		210	2.08
91-20-3	Naphthalene	210 U		210	3.30
98-95-3	Nitrobenzene	210 U		210	3.84

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 11:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**69SB1B**	QC Batch:	90482 -114
Sample #:	**345739**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	210 U	210	3.95
86-30-6	N-Nitroso-di-Phenylamine	210 U	210	5.70
87-86-5	Pentachlorophenol	400 U	400	5.27
85-01-8	Phenanthrene	210 U	210	2.76
108-95-2	Phenol	210 U	210	4.75
129-00-0	Pyrene	210 U	210	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 11:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**69SB1B**	QC Batch:	90482 -114
Sample #:	**345739**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	82
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,1'-Biphenyl, bis(1-methylethyl)-	69009-90-1	65	E	NJ+
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	52	E	B,X
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	74	E	NJ+
Erucylamide	112-84-5	410	E	B,X
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~370~~	~~E~~	
Phenol, (1,1,3,3-tetramethylbutyl)-	27193-28-8	380	E	NJ+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 12:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**69SB1C**	QC Batch:	90482 -114
Sample #:	**345740**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	230 U		230	3.44
95-94-3	1,2,4,5-Tetrachloro-benzene	230 U		230	40.2
108-60-1	Bis (2-Chloroisopropyl)-Ether	230 U		230	1.85
95-95-4	2,4,5-Trichlorophenol	230 U		230	4.68
88-06-2	2,4,6-Trichlorophenol	230 U		230	3.67
120-83-2	2,4-Dichlorophenol	230 U		230	4.93
105-67-9	2,4-Dimethylphenol	230 U		230	11.1
51-28-5	2,4-Dinitrophenol	440 U		440	4.48
121-14-2	2,4-Dinitrotoluene	230 U		230	4.41
606-20-2	2,6-Dinitrotoluene	230 U		230	38.8
91-58-7	2-Chloronaphthalene	230 U		230	3.22
95-57-8	2-Chlorophenol	230 U		230	2.81
91-57-6	2-Methylnaphthalene	230 U		230	3.84
95-48-7	2-Methylphenol	230 U		230	6.78
88-74-4	2-Nitroaniline	230 U		230	6.44
88-75-5	2-Nitrophenol	230 U		230	2.38
91-94-1	3,3'-Dichlorobenzidine	230 U		230	77.6
99-09-2	3-Nitroaniline	230 U		230	25.6
534-52-1	4,6-Dinitro-2-Methylphenol	230 U		230	6.31
101-55-3	4-Bromophenyl Phenylether	230 U		230	4.73
59-50-7	4-Chloro-3-Methylphenol	230 U		230	7.29
106-47-8	4-Chloroaniline	230 U	UJ,c	230	1.76
7005-72-3	4-Chlorophenylphenyl-Ether	230 U		230	4.58
106-44-5	**4-Methylphenol**	**10 J**		230	8.92
100-01-6	4-Nitroaniline	230 U		230	10.2
100-02-7	4-Nitrophenol	440 U		440	3.96
83-32-9	Acenaphthene	230 U		230	2.41
208-96-8	Acenaphthylene	230 U		230	2.10
98-86-2	Acetophenone	230 U		230	2.66

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 12:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**69SB1C**	QC Batch:	90482 -114
Sample #:	**345740**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	230 U		230	6.47
1912-24-9	Atrazine	230 U		230	9.63
100-52-7	Benzaldehyde	230 U		230	5.67
56-55-3	Benzo (a) Anthracene	230 U		230	18.6
50-32-8	Benzo (a) Pyrene	230 U		230	7.99
205-99-2	Benzo (b) Fluoranthene	230 U		230	13.7
191-24-2	Benzo (g,h,i,) Perylene	230 U		230	12.2
207-08-9	Benzo (k) Fluoranthene	230 U		230	18.8
111-91-1	Bis (2-Chloroethoxy)-Methane	230 U		230	4.40
111-44-4	Bis (2-Chloroethyl) Ether	230 U		230	2.42
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**15 J**	B,2	230	2.90
85-68-7	Butyl Benzyl Phthalate	230 U		230	6.27
105-60-2	Caprolactam	440 U		440	8.93
86-74-8	Carbazole	230 U		230	8.54
218-01-9	Chrysene	230 U		230	14.3
53-70-3	Dibenzo (a,h) Anthracene	230 U		230	8.26
132-64-9	Dibenzofuran	230 U		230	4.42
84-66-2	**Diethylphthalate**	**9.0 J**	B,X	230	2.66
131-11-3	Dimethylphthalate	230 U		230	4.63
84-74-2	**Di-n-Butylphthalate**	**38 J**	B,2	230	5.35
117-84-0	Di-n-Octylphthalate	230 U		230	4.34
206-44-0	Fluoranthene	230 U		230	3.29
86-73-7	Fluorene	230 U		230	2.35
118-74-1	Hexachlorobenzene	230 U		230	3.51
87-68-3	Hexachlorobutadiene	230 U		230	5.42
77-47-4	Hexachlorocyclopentadiene	230 U		230	2.77
67-72-1	Hexachloroethane	230 U		230	3.27
193-39-5	Indeno (1,2,3-cd) Pyrene	230 U		230	5.49
78-59-1	Isophorone	230 U		230	2.42
91-20-3	Naphthalene	230 U		230	3.85
98-95-3	Nitrobenzene	230 U		230	4.48

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 12:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**69SB1C**	QC Batch:	90482 -114
Sample #:	**345740**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	230 U	230	4.61
86-30-6	N-Nitroso-di-Phenylamine	230 U	230	6.65
87-86-5	Pentachlorophenol	440 U	440	6.15
85-01-8	Phenanthrene	230 U	230	3.22
108-95-2	Phenol	230 U	230	5.54
129-00-0	Pyrene	230 U	230	2.07

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 12:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**69SB1C**	QC Batch:	90482 -114
Sample #:	**345740**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	74
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	200	E	NJ,+
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	38	E	B,X
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	45	E	NJ,+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~560~~	~~E~~	

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**69SB3A**	QC Batch:	90482 -114
Sample #:	**345741**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	200 U		200	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	200 U		200	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	200 U		200	1.58
95-95-4	2,4,5-Trichlorophenol	200 U		200	4.01
88-06-2	2,4,6-Trichlorophenol	200 U		200	3.14
120-83-2	2,4-Dichlorophenol	200 U		200	4.22
105-67-9	2,4-Dimethylphenol	200 U		200	9.53
51-28-5	2,4-Dinitrophenol	390 U		390	3.84
121-14-2	2,4-Dinitrotoluene	200 U		200	3.78
606-20-2	2,6-Dinitrotoluene	200 U		200	33.2
91-58-7	2-Chloronaphthalene	200 U		200	2.76
95-57-8	2-Chlorophenol	200 U		200	2.41
91-57-6	2-Methylnaphthalene	200 U		200	3.29
95-48-7	2-Methylphenol	200 U		200	5.81
88-74-4	2-Nitroaniline	200 U		200	5.52
88-75-5	2-Nitrophenol	200 U		200	2.04
91-94-1	3,3'-Dichlorobenzidine	200 U		200	66.5
99-09-2	3-Nitroaniline	200 U		200	22.0
534-52-1	4,6-Dinitro-2-Methylphenol	200 U		200	5.41
101-55-3	4-Bromophenyl Phenylether	200 U		200	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**23 J**	B,X	200	6.25
106-47-8	4-Chloroaniline	200 U	UJ,C	200	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	200 U		200	3.92
106-44-5	4-Methylphenol	200 U		200	7.64
100-01-6	4-Nitroaniline	200 U		200	8.70
100-02-7	4-Nitrophenol	390 U		390	3.40
83-32-9	Acenaphthene	200 U		200	2.06
208-96-8	Acenaphthylene	200 U		200	1.80
98-86-2	Acetophenone	200 U		200	2.28

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**69SB3A**	QC Batch:	90482 -114
Sample #:	**345741**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	200 U		200	5.54
1912-24-9	Atrazine	200 U		200	8.26
100-52-7	Benzaldehyde	200 U		200	4.86
56-55-3	Benzo (a) Anthracene	200 U		200	16.0
50-32-8	Benzo (a) Pyrene	200 U		200	6.85
205-99-2	Benzo (b) Fluoranthene	200 U		200	11.7
191-24-2	Benzo (g,h,i,) Perylene	200 U		200	10.5
207-08-9	Benzo (k) Fluoranthene	200 U		200	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	200 U		200	3.77
111-44-4	Bis (2-Chloroethyl) Ether	200 U		200	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**19 J**	B,Z	200	2.48
85-68-7	**Butyl Benzyl Phthalate**	**6.0 J**		200	5.38
105-60-2	**Caprolactam**	**14 J**		390	7.66
86-74-8	Carbazole	200 U		200	7.32
218-01-9	Chrysene	200 U		200	12.2
53-70-3	Dibenzo (a,h) Anthracene	200 U		200	7.08
132-64-9	Dibenzofuran	200 U		200	3.79
84-66-2	**Diethylphthalate**	**8.0 J**	B,X	200	2.28
131-11-3	Dimethylphthalate	200 U		200	3.97
84-74-2	**Di-n-Butylphthalate**	**61 J**	B,Z	200	4.58
117-84-0	Di-n-Octylphthalate	200 U		200	3.72
206-44-0	**Fluoranthene**	**27 J**		200	2.82
86-73-7	Fluorene	200 U		200	2.02
118-74-1	Hexachlorobenzene	200 U		200	3.01
87-68-3	Hexachlorobutadiene	200 U		200	4.64
77-47-4	Hexachlorocyclopentadiene	200 U		200	2.38
67-72-1	Hexachloroethane	200 U		200	2.80
193-39-5	Indeno (1,2,3-cd) Pyrene	200 U		200	4.70
78-59-1	Isophorone	200 U		200	2.08
91-20-3	Naphthalene	200 U		200	3.30
98-95-3	Nitrobenzene	200 U		200	3.84

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**69SB3A**	QC Batch:	90482 -114
Sample #:	**345741**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	200 U	200	3.95
86-30-6	N-Nitroso-di-Phenylamine	200 U	200	5.70
87-86-5	Pentachlorophenol	390 U	390	5.27
85-01-8	**Phenanthrene**	**5.0 J**	200	2.76
108-95-2	Phenol	200 U	200	4.75
129-00-0	**Pyrene**	**14 J**	200	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**69SB3A**	QC Batch:	90482 -114
Sample #:	**345741**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	84
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	48	E	B/X
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	59	E	NJ,+
3-Carene	13466-78-9	48	E	NJ,+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~770~~	~~E~~	
Phenol, 2,6-dimethoxy-4-(2-propenyl)-	6627-88-9	58	E	NJ,+
beta-Pinene	127-91-3	120	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 00:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**SBD7**	QC Batch:	90482 -114
Sample #:	**345742**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	210 U		210	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	210 U		210	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	210 U		210	1.58
95-95-4	2,4,5-Trichlorophenol	210 U		210	4.01
88-06-2	2,4,6-Trichlorophenol	210 U		210	3.14
120-83-2	2,4-Dichlorophenol	210 U		210	4.22
105-67-9	2,4-Dimethylphenol	210 U		210	9.53
51-28-5	2,4-Dinitrophenol	400 U	UJ,C	400	3.84
121-14-2	2,4-Dinitrotoluene	210 U		210	3.78
606-20-2	2,6-Dinitrotoluene	210 U		210	33.2
91-58-7	2-Chloronaphthalene	210 U		210	2.76
95-57-8	2-Chlorophenol	210 U		210	2.41
91-57-6	2-Methylnaphthalene	210 U		210	3.29
95-48-7	2-Methylphenol	210 U		210	5.81
88-74-4	2-Nitroaniline	210 U		210	5.52
88-75-5	2-Nitrophenol	210 U		210	2.04
91-94-1	3,3'-Dichlorobenzidine	210 U		210	66.5
99-09-2	3-Nitroaniline	210 U		210	22.0
534-52-1	4,6-Dinitro-2-Methylphenol	210 U		210	5.41
101-55-3	4-Bromophenyl Phenylether	210 U		210	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**21 J**	B,X	210	6.25
106-47-8	4-Chloroaniline	210 U		210	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	210 U		210	3.92
106-44-5	4-Methylphenol	210 U		210	7.64
100-01-6	4-Nitroaniline	210 U		210	8.70
100-02-7	4-Nitrophenol	400 U		400	3.40
83-32-9	Acenaphthene	210 U		210	2.06
208-96-8	Acenaphthylene	210 U		210	1.80
98-86-2	Acetophenone	210 U		210	2.28

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD7**	QC Batch:	90482 -114
Sample #:	**345742**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	210 U		210	5.54
1912-24-9	Atrazine	210 U		210	8.26
100-52-7	Benzaldehyde	210 U		210	4.86
56-55-3	Benzo (a) Anthracene	210 U		210	16.0
50-32-8	Benzo (a) Pyrene	210 U		210	6.85
205-99-2	Benzo (b) Fluoranthene	210 U		210	11.7
191-24-2	Benzo (g,h,i,) Perylene	210 U		210	10.5
207-08-9	Benzo (k) Fluoranthene	210 U		210	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	210 U		210	3.77
111-44-4	Bis (2-Chloroethyl) Ether	210 U		210	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**19 J**	B,Z	210	2.48
85-68-7	Butyl Benzyl Phthalate	210 U		210	5.38
105-60-2	Caprolactam	400 U		400	7.66
86-74-8	Carbazole	210 U		210	7.32
218-01-9	Chrysene	210 U		210	12.2
53-70-3	Dibenzo (a,h) Anthracene	210 U		210	7.08
132-64-9	Dibenzofuran	210 U		210	3.79
84-66-2	**Diethylphthalate**	**5.0 J**	B,X	210	2.28
131-11-3	Dimethylphthalate	210 U		210	3.97
84-74-2	**Di-n-Butylphthalate**	**63 J**	B,Z	210	4.58
117-84-0	Di-n-Octylphthalate	210 U		210	3.72
206-44-0	**Fluoranthene**	**6.0 J**		210	2.82
86-73-7	Fluorene	210 U		210	2.02
118-74-1	Hexachlorobenzene	210 U		210	3.01
87-68-3	Hexachlorobutadiene	210 U		210	4.64
77-47-4	Hexachlorocyclopentadiene	210 U	UJ,C	210	2.38
67-72-1	Hexachloroethane	210 U		210	2.80
193-39-5	Indeno (1,2,3-cd) Pyrene	210 U		210	4.70
78-59-1	Isophorone	210 U		210	2.08
91-20-3	Naphthalene	210 U		210	3.30
98-95-3	Nitrobenzene	210 U		210	3.84

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD7**	QC Batch:	90482 -114
Sample #:	**345742**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	210 U	210	3.95
86-30-6	N-Nitroso-di-Phenylamine	210 U	210	5.70
87-86-5	Pentachlorophenol	400 U	400	5.27
85-01-8	**Phenanthrene**	**7.0 J**	210	2.76
108-95-2	Phenol	210 U	210	4.75
129-00-0	**Pyrene**	**7.0 J**	210	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD7**	QC Batch:	90482 -114
Sample #:	**345742**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	84
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	48	E	B,X
2,4-bis(1,1-Dimethylethy-1)-phenol	96-76-4	20	E	NJ,T
Erucylamide	112-84-5	460	E	B,X
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~260~~	~~E~~	

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**69SB3B**	QC Batch:	90482 -114
Sample #:	**345743**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	210 U		210	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	210 U		210	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	210 U		210	1.58
95-95-4	2,4,5-Trichlorophenol	210 U		210	4.01
88-06-2	2,4,6-Trichlorophenol	210 U		210	3.14
120-83-2	2,4-Dichlorophenol	210 U		210	4.22
105-67-9	2,4-Dimethylphenol	210 U		210	9.53
51-28-5	2,4-Dinitrophenol	400 U		400	3.84
121-14-2	2,4-Dinitrotoluene	210 U		210	3.78
606-20-2	2,6-Dinitrotoluene	210 U		210	33.2
91-58-7	2-Chloronaphthalene	210 U		210	2.76
95-57-8	2-Chlorophenol	210 U		210	2.41
91-57-6	2-Methylnaphthalene	210 U		210	3.29
95-48-7	2-Methylphenol	210 U		210	5.81
88-74-4	2-Nitroaniline	210 U		210	5.52
88-75-5	2-Nitrophenol	210 U		210	2.04
91-94-1	3,3'-Dichlorobenzidine	210 U		210	66.5
99-09-2	3-Nitroaniline	210 U		210	22.0
534-52-1	4,6-Dinitro-2-Methylphenol	210 U		210	5.41
101-55-3	4-Bromophenyl Phenylether	210 U		210	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**28 J**		210	6.25
106-47-8	4-Chloroaniline	210 U	UJ/c	210	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	210 U		210	3.92
106-44-5	4-Methylphenol	210 U		210	7.64
100-01-6	4-Nitroaniline	210 U		210	8.70
100-02-7	4-Nitrophenol	400 U		400	3.40
83-32-9	Acenaphthene	210 U		210	2.06
208-96-8	Acenaphthylene	210 U		210	1.80
98-86-2	Acetophenone	210 U		210	2.28

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**69SB3B**	QC Batch:	90482 -114
Sample #:	**345743**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	210 U		210	5.54
1912-24-9	Atrazine	210 U		210	8.26
100-52-7	Benzaldehyde	210 U		210	4.86
56-55-3	Benzo (a) Anthracene	210 U		210	16.0
50-32-8	Benzo (a) Pyrene	210 U		210	6.85
205-99-2	Benzo (b) Fluoranthene	210 U		210	11.7
191-24-2	Benzo (g,h,i,) Perylene	210 U		210	10.5
207-08-9	Benzo (k) Fluoranthene	210 U		210	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	210 U		210	3.77
111-44-4	Bis (2-Chloroethyl) Ether	210 U		210	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**20 J**	B,Z	210	2.48
85-68-7	Butyl Benzyl Phthalate	210 U		210	5.38
105-60-2	Caprolactam	400 U		400	7.66
86-74-8	Carbazole	210 U		210	7.32
218-01-9	Chrysene	210 U		210	12.2
53-70-3	Dibenzo (a,h) Anthracene	210 U		210	7.08
132-64-9	Dibenzofuran	210 U		210	3.79
84-66-2	**Diethylphthalate**	**6.0 J**	B,X	210	2.28
131-11-3	Dimethylphthalate	210 U		210	3.97
84-74-2	**Di-n-Butylphthalate**	**65 J**	B,Z	210	4.58
117-84-0	Di-n-Octylphthalate	210 U		210	3.72
206-44-0	Fluoranthene	210 U		210	2.82
86-73-7	Fluorene	210 U		210	2.02
118-74-1	Hexachlorobenzene	210 U		210	3.01
87-68-3	Hexachlorobutadiene	210 U		210	4.64
77-47-4	Hexachlorocyclopentadiene	210 U		210	2.38
67-72-1	Hexachloroethane	210 U		210	2.80
193-39-5	Indeno (1,2,3-cd) Pyrene	210 U		210	4.70
78-59-1	Isophorone	210 U		210	2.08
91-20-3	Naphthalene	210 U		210	3.30
98-95-3	Nitrobenzene	210 U		210	3.84

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**69SB3B**	QC Batch:	90482 -114
Sample #:	**345743**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	210 U	210	3.95
86-30-6	N-Nitroso-di-Phenylamine	210 U	210	5.70
87-86-5	Pentachlorophenol	400 U	400	5.27
85-01-8	Phenanthrene	210 U	210	2.76
108-95-2	Phenol	210 U	210	4.75
129-00-0	Pyrene	210 U	210	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**69SB3B**	QC Batch:	90482 -114
Sample #:	**345743**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	82
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	620	E	NJ,+
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	63	E	B,X
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	78	E	NJ,+
2,4-bis(1,1-Dimethylethy-1)-phenol	96-76-4	24	E	NJ,+
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,9-diene-2,8	1000143924 100014-39-24	21	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**69SB3C**	QC Batch:	90482 -114
Sample #:	**345744**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	230 U		230	3.44
95-94-3	1,2,4,5-Tetrachloro-benzene	230 U		230	40.2
108-60-1	Bis (2-Chloroisopropyl)-Ether	230 U		230	1.85
95-95-4	2,4,5-Trichlorophenol	230 U		230	4.68
88-06-2	2,4,6-Trichlorophenol	230 U		230	3.67
120-83-2	2,4-Dichlorophenol	230 U		230	4.93
105-67-9	2,4-Dimethylphenol	230 U		230	11.1
51-28-5	2,4-Dinitrophenol	440 U		440	4.48
121-14-2	2,4-Dinitrotoluene	230 U		230	4.41
606-20-2	2,6-Dinitrotoluene	230 U		230	38.8
91-58-7	2-Chloronaphthalene	230 U		230	3.22
95-57-8	2-Chlorophenol	230 U		230	2.81
91-57-6	2-Methylnaphthalene	230 U		230	3.84
95-48-7	2-Methylphenol	230 U		230	6.78
88-74-4	2-Nitroaniline	230 U		230	6.44
88-75-5	2-Nitrophenol	230 U		230	2.38
91-94-1	3,3'-Dichlorobenzidine	230 U		230	77.6
99-09-2	3-Nitroaniline	230 U		230	25.6
534-52-1	4,6-Dinitro-2-Methylphenol	230 U		230	6.31
101-55-3	4-Bromophenyl Phenylether	230 U		230	4.73
59-50-7	**4-Chloro-3-Methylphenol**	**11 J**	B/X	230	7.29
106-47-8	4-Chloroaniline	230 U	UJ,C	230	1.76
7005-72-3	4-Chlorophenylphenyl-Ether	230 U		230	4.58
106-44-5	4-Methylphenol	230 U		230	8.92
100-01-6	4-Nitroaniline	230 U		230	10.2
100-02-7	4-Nitrophenol	440 U		440	3.96
83-32-9	Acenaphthene	230 U		230	2.41
208-96-8	Acenaphthylene	230 U		230	2.10
98-86-2	Acetophenone	230 U		230	2.66

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**69SB3C**	QC Batch:	90482 -114
Sample #:	**345744**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	230 U		230	6.47
1912-24-9	Atrazine	230 U		230	9.63
100-52-7	Benzaldehyde	230 U		230	5.67
56-55-3	Benzo (a) Anthracene	230 U		230	18.6
50-32-8	Benzo (a) Pyrene	230 U		230	7.99
205-99-2	Benzo (b) Fluoranthene	230 U		230	13.7
191-24-2	Benzo (g,h,i,) Perylene	230 U		230	12.2
207-08-9	Benzo (k) Fluoranthene	230 U		230	18.8
111-91-1	Bis (2-Chloroethoxy)-Methane	230 U		230	4.40
111-44-4	Bis (2-Chloroethyl) Ether	230 U		230	2.42
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**17 J**	B,Z	230	2.90
85-68-7	Butyl Benzyl Phthalate	230 U		230	6.27
105-60-2	Caprolactam	440 U		440	8.93
86-74-8	Carbazole	230 U		230	8.54
218-01-9	Chrysene	230 U		230	14.3
53-70-3	Dibenzo (a,h) Anthracene	230 U		230	8.26
132-64-9	Dibenzofuran	230 U		230	4.42
84-66-2	**Diethylphthalate**	**6.0 J**	B,X	230	2.66
131-11-3	Dimethylphthalate	230 U		230	4.63
84-74-2	**Di-n-Butylphthalate**	**80 J**	B,Z	230	5.35
117-84-0	Di-n-Octylphthalate	230 U		230	4.34
206-44-0	Fluoranthene	230 U		230	3.29
86-73-7	Fluorene	230 U		230	2.35
118-74-1	Hexachlorobenzene	230 U		230	3.51
87-68-3	Hexachlorobutadiene	230 U		230	5.42
77-47-4	Hexachlorocyclopentadiene	230 U		230	2.77
67-72-1	Hexachloroethane	230 U		230	3.27
193-39-5	Indeno (1,2,3-cd) Pyrene	230 U		230	5.49
78-59-1	Isophorone	230 U		230	2.42
91-20-3	Naphthalene	230 U		230	3.85
98-95-3	Nitrobenzene	230 U		230	4.48

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**69SB3C**	QC Batch:	90482 -114
Sample #:	**345744**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	230 U	230	4.61
86-30-6	N-Nitroso-di-Phenylamine	230 U	230	6.65
87-86-5	Pentachlorophenol	440 U	440	6.15
85-01-8	Phenanthrene	230 U	230	3.22
108-95-2	Phenol	230 U	230	5.54
129-00-0	Pyrene	230 U	230	2.07

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**69SB3C**	QC Batch:	90482 -114
Sample #:	**345744**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	74
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	63	E	NJ,+
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	48	E	B,X
1-Decanol, 2-hexyl-	2425-77-6	39	E	NJ,+
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	46	E	NJ,+
Squalene	7683-64-9	61	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/29/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**68SB3A**	QC Batch:	90709 -114
Sample #:	**345619**	Anal. Batch:	209056
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	120 U	UL,S	120	11.3
208-96-8	Acenaphthylene	250 U		250	13.9
120-12-7	Anthracene	25 U		25	0.840
56-55-3	Benzo (a) Anthracene	25 U		25	0.960
50-32-8	Benzo (a) Pyrene	25 U		25	1.20
205-99-2	Benzo (b) Fluoranthene	25 U		25	1.56
191-24-2	Benzo (g,h,i,) Perylene	25 U		25	15.0
207-08-9	Benzo (k) Fluoranthene	25 U		25	1.20
218-01-9	**Chrysene**	**2.0 J**	L,S	25	1.44
53-70-3	Dibenzo (a,h) Anthracene	25 U	UL,S	25	1.68
206-44-0	**Fluoranthene**	**5.2 J**	L,S	25	2.04
86-73-7	Fluorene	25 U	UL,S	25	1.56
193-39-5	Indeno (1,2,3-cd) Pyrene	25 U		25	0.840
91-20-3	Naphthalene	120 U		120	9.48
85-01-8	Phenanthrene	25 U		25	0.720
129-00-0	**Pyrene**	**5.8 J**	L,S	25	1.08

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/29/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**68SB3B**	QC Batch:	90709 -114
Sample #:	**345620**	Anal. Batch:	209056
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	VL,S	130	12.2
208-96-8	Acenaphthylene	280 U		280	15.1
120-12-7	Anthracene	28 U		28	0.910
56-55-3	Benzo (a) Anthracene	28 U		28	1.04
50-32-8	Benzo (a) Pyrene	28 U		28	1.30
205-99-2	Benzo (b) Fluoranthene	28 U		28	1.69
191-24-2	Benzo (g,h,i,) Perylene	28 U		28	16.3
207-08-9	Benzo (k) Fluoranthene	28 U		28	1.30
218-01-9	Chrysene	28 U		28	1.56
53-70-3	Dibenzo (a,h) Anthracene	28 U		28	1.82
206-44-0	Fluoranthene	28 U		28	2.21
86-73-7	Fluorene	28 U		28	1.69
193-39-5	Indeno (1,2,3-cd) Pyrene	28 U		28	0.910
91-20-3	Naphthalene	130 U		130	10.3
85-01-8	Phenanthrene	28 U		28	0.780
129-00-0	Pyrene	28 U		28	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/30/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**68SB3C**	QC Batch:	90709 -114
Sample #:	**345621**	Anal. Batch:	209056
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	VL,S	130	12.2
208-96-8	Acenaphthylene	270 U		270	15.1
120-12-7	Anthracene	27 U		27	0.910
56-55-3	Benzo (a) Anthracene	27 U		27	1.04
50-32-8	Benzo (a) Pyrene	27 U		27	1.30
205-99-2	Benzo (b) Fluoranthene	27 U		27	1.69
191-24-2	Benzo (g,h,i,) Perylene	27 U		27	16.3
207-08-9	Benzo (k) Fluoranthene	27 U		27	1.30
218-01-9	Chrysene	27 U		27	1.56
53-70-3	Dibenzo (a,h) Anthracene	27 U		27	1.82
206-44-0	Fluoranthene	27 U		27	2.21
86-73-7	Fluorene	27 U		27	1.69
193-39-5	Indeno (1,2,3-cd) Pyrene	27 U		27	0.910
91-20-3	Naphthalene	130 U		130	10.3
85-01-8	Phenanthrene	27 U		27	0.780
129-00-0	Pyrene	27 U		27	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/30/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**57SB1A**	QC Batch:	90709 -114
Sample #:	**345622**	Anal. Batch:	209056
Matrix:	Soil	Percent Solids:	86
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	120 U	VL,S	120	11.3
208-96-8	Acenaphthylene	240 U	⊥	240	13.9
120-12-7	**Anthracene**	**1.9 J**	L,S	24	0.840
56-55-3	Benzo (a) Anthracene	24 U	VL,S	24	0.960
50-32-8	**Benzo (a) Pyrene**	**18 J**	L,S	24	1.20
205-99-2	**Benzo (b) Fluoranthene**	**14 J**	L,S	24	1.56
191-24-2	**Benzo (g,h,i,) Perylene**	**27**	L,S	24	15.0
207-08-9	**Benzo (k) Fluoranthene**	**8.5 J**	L,S	24	1.20
218-01-9	**Chrysene**	**11 J**	L,S	24	1.44
53-70-3	Dibenzo (a,h) Anthracene	24 U	VL,S	24	1.68
206-44-0	**Fluoranthene**	**57**	L,S	24	2.04
86-73-7	Fluorene	24 U	VL,S	24	1.56
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**11 J**	L,S	24	0.840
91-20-3	Naphthalene	120 U	VL,S	120	9.48
85-01-8	**Phenanthrene**	**24**	L,S	24	0.720
129-00-0	**Pyrene**	**82**	L,S	24	1.08

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/30/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**57SB1B**	QC Batch:	90709 -114
Sample #:	**345623**	Anal. Batch:	209056
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	UL,S	130	12.2
208-96-8	Acenaphthylene	280 U		280	15.1
120-12-7	Anthracene	28 U		28	0.910
56-55-3	Benzo (a) Anthracene	28 U		28	1.04
50-32-8	Benzo (a) Pyrene	28 U		28	1.30
205-99-2	Benzo (b) Fluoranthene	28 U		28	1.69
191-24-2	Benzo (g,h,i,) Perylene	28 U		28	16.3
207-08-9	Benzo (k) Fluoranthene	28 U		28	1.30
218-01-9	Chrysene	28 U		28	1.56
53-70-3	Dibenzo (a,h) Anthracene	28 U		28	1.82
206-44-0	Fluoranthene	28 U		28	2.21
86-73-7	Fluorene	28 U		28	1.69
193-39-5	Indeno (1,2,3-cd) Pyrene	28 U		28	0.910
91-20-3	Naphthalene	130 U		130	10.3
85-01-8	Phenanthrene	28 U		28	0.780
129-00-0	Pyrene	28 U		28	1.17

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/30/03 by TAJ
		Anal. Method:	USEPA-8310
Sample ID:	**57SB1C**	QC Batch:	90709 -114
Sample #:	**345624**	Anal. Batch:	209213
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	150 U	150	14.1
208-96-8	Acenaphthylene	310 U	310	17.4
120-12-7	Anthracene	31 U	31	1.05
56-55-3	Benzo (a) Anthracene	31 U	31	1.20
50-32-8	Benzo (a) Pyrene	31 U	31	1.50
205-99-2	Benzo (b) Fluoranthene	31 U	31	1.95
191-24-2	Benzo (g,h,i,) Perylene	31 U	31	18.8
207-08-9	Benzo (k) Fluoranthene	31 U	31	1.50
218-01-9	Chrysene	31 U	31	1.80
53-70-3	Dibenzo (a,h) Anthracene	31 U	31	2.10
206-44-0	Fluoranthene	31 U	31	2.55
86-73-7	Fluorene	31 U	31	1.95
193-39-5	Indeno (1,2,3-cd) Pyrene	31 U	31	1.05
91-20-3	Naphthalene	150 U	150	11.9
85-01-8	Phenanthrene	31 U	31	0.900
129-00-0	Pyrene	31 U	31	1.35

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/19/03 by TAJ
		Anal. Method:	USEPA-8310
Sample ID:	**57SB3A**	QC Batch:	90709 -114
Sample #:	**345625**	Anal. Batch:	209783
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	110 U	110	10.3
208-96-8	Acenaphthylene	240 U	240	12.8
120-12-7	**Anthracene**	**1.6 J**	24	0.770
56-55-3	Benzo (a) Anthracene	24 U	24	0.880
50-32-8	Benzo (a) Pyrene	24 U	24	1.10
205-99-2	Benzo (b) Fluoranthene	24 U	24	1.43
191-24-2	Benzo (g,h,i,) Perylene	24 U	24	13.8
207-08-9	Benzo (k) Fluoranthene	24 U	24	1.10
218-01-9	**Chrysene**	**5.2 J**	24	1.32
53-70-3	Dibenzo (a,h) Anthracene	24 U	24	1.54
206-44-0	**Fluoranthene**	**46**	24	1.87
86-73-7	Fluorene	24 U	24	1.43
193-39-5	Indeno (1,2,3-cd) Pyrene	24 U	24	0.770
91-20-3	Naphthalene	110 U	110	8.69
85-01-8	**Phenanthrene**	**18 J**	24	0.660
129-00-0	**Pyrene**	**31**	24	0.990

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/30/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**SBD6**	QC Batch:	90709 -114
Sample #:	**345626**	Anal. Batch:	209056
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	UL,S	130	12.2
208-96-8	Acenaphthylene	280 U	〃	280	15.1
120-12-7	**Anthracene**	**3.0 J**	L,S	28	0.910
56-55-3	Benzo (a) Anthracene	28 U	UL,S	28	1.04
50-32-8	Benzo (a) Pyrene	28 U	|	28	1.30
205-99-2	Benzo (b) Fluoranthene	28 U	|	28	1.69
191-24-2	Benzo (g,h,i,) Perylene	28 U	|	28	16.3
207-08-9	Benzo (k) Fluoranthene	28 U	〃	28	1.30
218-01-9	**Chrysene**	**12 J**	L,S	28	1.56
53-70-3	Dibenzo (a,h) Anthracene	28 U	UL,S	28	1.82
206-44-0	**Fluoranthene**	**84**	L,S	28	2.21
86-73-7	Fluorene	28 U	UL,S	28	1.69
193-39-5	Indeno (1,2,3-cd) Pyrene	28 U	|	28	0.910
91-20-3	Naphthalene	130 U	〃	130	10.3
85-01-8	**Phenanthrene**	**30**	L,S	28	0.780
129-00-0	**Pyrene**	**54**	〃	28	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**57SB3B**	QC Batch:	90834 -115
Sample #:	**345627**	Anal. Batch:	209212
Matrix:	Soil	Percent Solids:	63
Unit:	ug/kg dry	Dilution Factor:	1.6

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	160 U	UL,S	160	15.0
208-96-8	Acenaphthylene	330 U		330	18.6
120-12-7	Anthracene	33 U		33	1.12
56-55-3	Benzo (a) Anthracene	33 U		33	1.28
50-32-8	Benzo (a) Pyrene	33 U		33	1.60
205-99-2	Benzo (b) Fluoranthene	33 U		33	2.08
191-24-2	Benzo (g,h,i,) Perylene	33 U		33	20.0
207-08-9	Benzo (k) Fluoranthene	33 U		33	1.60
218-01-9	Chrysene	33 U		33	1.92
53-70-3	Dibenzo (a,h) Anthracene	33 U		33	2.24
206-44-0	Fluoranthene	33 U		33	2.72
86-73-7	Fluorene	33 U		33	2.08
193-39-5	Indeno (1,2,3-cd) Pyrene	33 U		33	1.12
91-20-3	Naphthalene	160 U		160	12.6
85-01-8	Phenanthrene	33 U		33	0.960
129-00-0	Pyrene	33 U		33	1.44

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by TAJ
		Anal. Method:	USEPA-8310
Sample ID:	**57SB3C**	QC Batch:	90834 -115
Sample #:	**345628**	Anal. Batch:	209212
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	130	12.2
208-96-8	Acenaphthylene	280 U	280	15.1
120-12-7	Anthracene	28 U	28	0.910
56-55-3	Benzo (a) Anthracene	28 U	28	1.04
50-32-8	Benzo (a) Pyrene	28 U	28	1.30
205-99-2	Benzo (b) Fluoranthene	28 U	28	1.69
191-24-2	Benzo (g,h,i,) Perylene	28 U	28	16.3
207-08-9	Benzo (k) Fluoranthene	28 U	28	1.30
218-01-9	Chrysene	28 U	28	1.56
53-70-3	Dibenzo (a,h) Anthracene	28 U	28	1.82
206-44-0	Fluoranthene	28 U	28	2.21
86-73-7	Fluorene	28 U	28	1.69
193-39-5	Indeno (1,2,3-cd) Pyrene	28 U	28	0.910
91-20-3	Naphthalene	130 U	130	10.3
85-01-8	Phenanthrene	28 U	28	0.780
129-00-0	Pyrene	28 U	28	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by TAJ
		Anal. Method:	USEPA-8310
Sample ID:	**57SB2A**	QC Batch:	90834 -115
Sample #:	**345629**	Anal. Batch:	209212
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	130	12.2
208-96-8	Acenaphthylene	280 U	280	15.1
120-12-7	**Anthracene**	**1.5 J**	28	0.910
56-55-3	**Benzo (a) Anthracene**	**7.1 J**	28	1.04
50-32-8	**Benzo (a) Pyrene**	**10 J**	28	1.30
205-99-2	Benzo (b) Fluoranthene	28 U	28	1.69
191-24-2	Benzo (g,h,i,) Perylene	28 U	28	16.3
207-08-9	Benzo (k) Fluoranthene	28 U	28	1.30
218-01-9	**Chrysene**	**9.2 J**	28	1.56
53-70-3	Dibenzo (a,h) Anthracene	28 U	28	1.82
206-44-0	**Fluoranthene**	**29**	28	2.21
86-73-7	Fluorene	28 U	28	1.69
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**7.2 J**	28	0.910
91-20-3	Naphthalene	130 U	130	10.3
85-01-8	**Phenanthrene**	**11 J**	28	0.780
129-00-0	**Pyrene**	**20 J**	28	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**57SB2B**	QC Batch:	90834 -115
Sample #:	**345630**	Anal. Batch:	209212
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	130	12.2
208-96-8	Acenaphthylene	280 U	280	15.1
120-12-7	Anthracene	28 U	28	0.910
56-55-3	Benzo (a) Anthracene	28 U	28	1.04
50-32-8	Benzo (a) Pyrene	28 U	28	1.30
205-99-2	Benzo (b) Fluoranthene	28 U	28	1.69
191-24-2	Benzo (g,h,i,) Perylene	28 U	28	16.3
207-08-9	Benzo (k) Fluoranthene	28 U	28	1.30
218-01-9	Chrysene	28 U	28	1.56
53-70-3	Dibenzo (a,h) Anthracene	28 U	28	1.82
206-44-0	Fluoranthene	28 U	28	2.21
86-73-7	Fluorene	28 U	28	1.69
193-39-5	Indeno (1,2,3-cd) Pyrene	28 U	28	0.910
91-20-3	Naphthalene	130 U	130	10.3
85-01-8	Phenanthrene	28 U	28	0.780
129-00-0	Pyrene	28 U	28	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:40
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**57SB2C**	QC Batch:	90834 -115
Sample #:	**345631**	Anal. Batch:	209212
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.32

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	UL,S	130	12.4
208-96-8	Acenaphthylene	280 U		280	15.3
120-12-7	Anthracene	28 U		28	0.924
56-55-3	Benzo (a) Anthracene	28 U		28	1.06
50-32-8	Benzo (a) Pyrene	28 U		28	1.32
205-99-2	Benzo (b) Fluoranthene	28 U		28	1.72
191-24-2	Benzo (g,h,i,) Perylene	28 U		28	16.5
207-08-9	Benzo (k) Fluoranthene	28 U		28	1.32
218-01-9	Chrysene	28 U		28	1.58
53-70-3	Dibenzo (a,h) Anthracene	28 U		28	1.85
206-44-0	Fluoranthene	28 U		28	2.24
86-73-7	Fluorene	28 U		28	1.72
193-39-5	Indeno (1,2,3-cd) Pyrene	28 U		28	0.924
91-20-3	Naphthalene	130 U		130	10.4
85-01-8	Phenanthrene	28 U		28	0.792
129-00-0	Pyrene	28 U		28	1.19

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 09:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**57SB4A**	QC Batch:	90834 -115
Sample #:	**345737**	Anal. Batch:	209212
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	140 U	140	13.2
208-96-8	Acenaphthylene	300 U	300	16.2
120-12-7	Anthracene	30 U	30	0.980
56-55-3	Benzo (a) Anthracene	30 U	30	1.12
50-32-8	Benzo (a) Pyrene	30 U	30	1.40
205-99-2	Benzo (b) Fluoranthene	30 U	30	1.82
191-24-2	Benzo (g,h,i,) Perylene	30 U	30	17.5
207-08-9	Benzo (k) Fluoranthene	30 U	30	1.40
218-01-9	Chrysene	30 U	30	1.68
53-70-3	Dibenzo (a,h) Anthracene	30 U	30	1.96
206-44-0	Fluoranthene	30 U	30	2.38
86-73-7	Fluorene	30 U	30	1.82
193-39-5	Indeno (1,2,3-cd) Pyrene	30 U	30	0.980
91-20-3	Naphthalene	140 U	140	11.1
85-01-8	Phenanthrene	30 U	30	0.840
129-00-0	Pyrene	30 U	30	1.26

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 11:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**69SB1A**	QC Batch:	90834 -115
Sample #:	**345738**	Anal. Batch:	209212
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	UL,S	130	12.2
208-96-8	Acenaphthylene	270 U		270	15.1
120-12-7	Anthracene	27 U		27	0.910
56-55-3	Benzo (a) Anthracene	27 U		27	1.04
50-32-8	Benzo (a) Pyrene	27 U		27	1.30
205-99-2	Benzo (b) Fluoranthene	27 U		27	1.69
191-24-2	Benzo (g,h,i,) Perylene	27 U		27	16.3
207-08-9	Benzo (k) Fluoranthene	27 U		27	1.30
218-01-9	Chrysene	27 U		27	1.56
53-70-3	Dibenzo (a,h) Anthracene	27 U		27	1.82
206-44-0	Fluoranthene	27 U		27	2.21
86-73-7	Fluorene	27 U		27	1.69
193-39-5	Indeno (1,2,3-cd) Pyrene	27 U		27	0.910
91-20-3	Naphthalene	130 U		130	10.3
85-01-8	Phenanthrene	27 U		27	0.780
129-00-0	Pyrene	27 U		27	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 11:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**69SB1B**	QC Batch:	90834 -115
Sample #:	**345739**	Anal. Batch:	209212
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	120 U	120	11.3
208-96-8	Acenaphthylene	260 U	260	13.9
120-12-7	Anthracene	26 U	26	0.840
56-55-3	Benzo (a) Anthracene	26 U	26	0.960
50-32-8	Benzo (a) Pyrene	26 U	26	1.20
205-99-2	Benzo (b) Fluoranthene	26 U	26	1.56
191-24-2	Benzo (g,h,i,) Perylene	26 U	26	15.0
207-08-9	Benzo (k) Fluoranthene	26 U	26	1.20
218-01-9	Chrysene	26 U	26	1.44
53-70-3	Dibenzo (a,h) Anthracene	26 U	26	1.68
206-44-0	Fluoranthene	26 U	26	2.04
86-73-7	Fluorene	26 U	26	1.56
193-39-5	Indeno (1,2,3-cd) Pyrene	26 U	26	0.840
91-20-3	Naphthalene	120 U	120	9.48
85-01-8	Phenanthrene	26 U	26	0.720
129-00-0	Pyrene	26 U	26	1.08

UL,S

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 12:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by TAJ
		Anal. Method:	USEPA-8310
Sample ID:	**69SB1C**	QC Batch:	90834 -115
Sample #:	**345740**	Anal. Batch:	209212
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	140 U	UL,S	140	13.2
208-96-8	Acenaphthylene	280 U		280	16.2
120-12-7	Anthracene	28 U		28	0.980
56-55-3	Benzo (a) Anthracene	28 U		28	1.12
50-32-8	Benzo (a) Pyrene	28 U		28	1.40
205-99-2	Benzo (b) Fluoranthene	28 U		28	1.82
191-24-2	Benzo (g,h,i,) Perylene	28 U		28	17.5
207-08-9	Benzo (k) Fluoranthene	28 U		28	1.40
218-01-9	Chrysene	28 U		28	1.68
53-70-3	Dibenzo (a,h) Anthracene	28 U		28	1.96
206-44-0	Fluoranthene	28 U		28	2.38
86-73-7	Fluorene	28 U		28	1.82
193-39-5	Indeno (1,2,3-cd) Pyrene	28 U		28	0.980
91-20-3	Naphthalene	140 U		140	11.1
85-01-8	Phenanthrene	28 U		28	0.840
129-00-0	Pyrene	28 U		28	1.26

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**
Project:	Richmond, VA
	RAAP
Submittal #:	**36440-4**
Submittal:	Delivery Order 0046
	RAAP
Sample ID:	**69SB3A**
Sample #:	**345741**
Matrix:	Soil
Unit:	ug/kg dry

Sampled:	10/08/03 @ 14:15
Sampler:	B.F. & J.S.
Received:	10/09/03 @ 08:40
Prepared:	10/15/03 by DJM
Prep. Method:	USEPA-8310
Analyzed:	10/28/03 by TAJ
Anal. Method:	USEPA-8310
QC Batch:	90834 -115
Anal. Batch:	208739
Percent Solids:	84
Dilution Factor:	1.2

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	120 U	120	11.3
208-96-8	Acenaphthylene	250 U	250	13.9
120-12-7	Anthracene	25 U	25	0.840
56-55-3	Benzo (a) Anthracene	25 U	25	0.960
50-32-8	Benzo (a) Pyrene	25 U	25	1.20
205-99-2	Benzo (b) Fluoranthene	25 U	25	1.56
191-24-2	Benzo (g,h,i,) Perylene	25 U	25	15.0
207-08-9	Benzo (k) Fluoranthene	25 U	25	1.20
218-01-9	Chrysene	25 U	25	1.44
53-70-3	Dibenzo (a,h) Anthracene	25 U	25	1.68
206-44-0	**Fluoranthene**	**3.8 J**	25	2.04
86-73-7	Fluorene	25 U	25	1.56
193-39-5	Indeno (1,2,3-cd) Pyrene	25 U	25	0.840
91-20-3	Naphthalene	120 U	120	9.48
85-01-8	**Phenanthrene**	**1.6 J**	25	0.720
129-00-0	**Pyrene**	**2.9 J**	25	1.08

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/28/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**SBD7**	QC Batch:	90834 -115
Sample #:	**345742**	Anal. Batch:	208739
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	120 U	VL,S	120	11.3
208-96-8	Acenaphthylene	250 U		250	13.9
120-12-7	Anthracene	25 U		25	0.840
56-55-3	Benzo (a) Anthracene	25 U		25	0.960
50-32-8	Benzo (a) Pyrene	25 U		25	1.20
205-99-2	Benzo (b) Fluoranthene	25 U		25	1.56
191-24-2	Benzo (g,h,i,) Perylene	25 U		25	15.0
207-08-9	Benzo (k) Fluoranthene	25 U		25	1.20
218-01-9	Chrysene	25 U		25	1.44
53-70-3	Dibenzo (a,h) Anthracene	25 U		25	1.68
206-44-0	Fluoranthene	25 U		25	2.04
86-73-7	Fluorene	25 U		25	1.56
193-39-5	Indeno (1,2,3-cd) Pyrene	25 U		25	0.840
91-20-3	Naphthalene	120 U		120	9.48
85-01-8	Phenanthrene	25 U		25	0.720
129-00-0	Pyrene	25 U		25	1.08

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**69SB3B**	QC Batch:	90834 -115
Sample #:	**345743**	Anal. Batch:	209212
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	120 U	VL,S	120	11.3
208-96-8	Acenaphthylene	260 U		260	13.9
120-12-7	Anthracene	26 U		26	0.840
56-55-3	Benzo (a) Anthracene	26 U		26	0.960
50-32-8	Benzo (a) Pyrene	26 U		26	1.20
205-99-2	Benzo (b) Fluoranthene	26 U		26	1.56
191-24-2	Benzo (g,h,i,) Perylene	26 U		26	15.0
207-08-9	Benzo (k) Fluoranthene	26 U		26	1.20
218-01-9	Chrysene	26 U		26	1.44
53-70-3	Dibenzo (a,h) Anthracene	26 U		26	1.68
206-44-0	Fluoranthene	26 U		26	2.04
86-73-7	Fluorene	26 U		26	1.56
193-39-5	Indeno (1,2,3-cd) Pyrene	26 U		26	0.840
91-20-3	Naphthalene	120 U		120	9.48
85-01-8	Phenanthrene	26 U		26	0.720
129-00-0	Pyrene	26 U		26	1.08

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Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**69SB3C**	QC Batch:	90834 -115
Sample #:	**345744**	Anal. Batch:	209212
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	140 U	140	13.2
208-96-8	Acenaphthylene	280 U	280	16.2
120-12-7	Anthracene	28 U	28	0.980
56-55-3	Benzo (a) Anthracene	28 U	28	1.12
50-32-8	Benzo (a) Pyrene	28 U	28	1.40
205-99-2	Benzo (b) Fluoranthene	28 U	28	1.82
191-24-2	Benzo (g,h,i,) Perylene	28 U	28	17.5
207-08-9	Benzo (k) Fluoranthene	28 U	28	1.40
218-01-9	Chrysene	28 U	28	1.68
53-70-3	Dibenzo (a,h) Anthracene	28 U	28	1.96
206-44-0	Fluoranthene	28 U	28	2.38
86-73-7	Fluorene	28 U	28	1.82
193-39-5	Indeno (1,2,3-cd) Pyrene	28 U	28	0.980
91-20-3	Naphthalene	140 U	140	11.1
85-01-8	Phenanthrene	28 U	28	0.840
129-00-0	Pyrene	28 U	28	1.26

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:10
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/27/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**68SB3A**	QC Batch:	90259 -115
Sample #:	**345619**	Anal. Batch:	208354
Matrix:	Soil	Percent Solids:	84
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/27/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**68SB3B**	QC Batch:	90259 -115
Sample #:	**345620**	Anal. Batch:	208354
Matrix:	Soil	Percent Solids:	75
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:50
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/27/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**68SB3C**	QC Batch:	90259 -115
Sample #:	**345621**	Anal. Batch:	208354
Matrix:	Soil	Percent Solids:	73
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/27/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**57SB1A**	QC Batch:	90259 -115
Sample #:	**345622**	Anal. Batch:	208354
Matrix:	Soil	Percent Solids:	86
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	UJ,C	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/22/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**57SB1B**	QC Batch:	90259 -115
Sample #:	**345623**	Anal. Batch:	208166
Matrix:	Soil	Percent Solids:	75
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U		1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	UJ,c	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,c	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**
Project:	Richmond, VA
	RAAP
Submittal #:	**36440-4**
Submittal:	Delivery Order 0046
	RAAP
Sample ID:	**57SB1C**
Sample #:	**345624**
Matrix:	Soil
Unit:	mg/kg dry

Sampled:	10/07/03 @ 10:30
Sampler:	B.F. & J.S.
Received:	10/08/03 @ 08:50
Prepared:	10/15/03 by DJM
Prep. Method:	USEPA-8330
Analyzed:	10/27/03 by JMK1
Anal. Method:	USEPA-8330
QC Batch:	90259 -115
Anal. Batch:	208354
Percent Solids:	67
Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	UJ,C	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**57SB3A**	QC Batch:	90508 -116
Sample #:	**345625**	Anal. Batch:	208166
Matrix:	Soil	Percent Solids:	77
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U		1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,c	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 00:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/27/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**SBD6**	QC Batch:	90259 -115
Sample #:	**345626**	Anal. Batch:	208354
Matrix:	Soil	Percent Solids:	76
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	UJ,C	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**57SB3B**	QC Batch:	90508 -116
Sample #:	**345627**	Anal. Batch:	208166
Matrix:	Soil	Percent Solids:	63
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U		1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	VJ,c	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**57SB3C**	QC Batch:	90508 -116
Sample #:	**345628**	Anal. Batch:	208166
Matrix:	Soil	Percent Solids:	75
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**57SB2A**	QC Batch:	90508 -116
Sample #:	**345629**	Anal. Batch:	208166
Matrix:	Soil	Percent Solids:	76
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:20
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**57SB2B**	QC Batch:	90508 -116
Sample #:	**345630**	Anal. Batch:	208166
Matrix:	Soil	Percent Solids:	76
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:40
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**57SB2C**	QC Batch:	90508 -116
Sample #:	**345631**	Anal. Batch:	208166
Matrix:	Soil	Percent Solids:	76
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 09:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**57SB4A**	QC Batch:	90508 -116
Sample #:	**345737**	Anal. Batch:	208166
Matrix:	Soil	Percent Solids:	71
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 11:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
Submittal #:	**36440-4**	Prepared:	10/16/03 by DJM
Submittal:	Delivery Order 0046 RAAP	Prep. Method:	USEPA-8330
		Analyzed:	10/23/03 by JMK1
Sample ID:	**69SB1A**	Anal. Method:	USEPA-8330
Sample #:	**345738**	QC Batch:	90508 -116
Matrix:	Soil	Anal. Batch:	208166
Unit:	mg/kg dry	Percent Solids:	78
		Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 11:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**69SB1B**	QC Batch:	90508 -116
Sample #:	**345739**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	82
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 12:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**69SB1C**	QC Batch:	90508 -116
Sample #:	**345740**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	74
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	VJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	VJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**69SB3A**	QC Batch:	90508 -116
Sample #:	**345741**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	84
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	VJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	VJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 00:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**SBD7**	QC Batch:	90508 -116
Sample #:	**345742**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	84
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**69SB3B**	QC Batch:	90508 -116
Sample #:	**345743**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	82
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**69SB3C**	QC Batch:	90508 -116
Sample #:	**345744**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	74
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 09:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/16/03 by JRR
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/31/03 by JLRM
	RAAP	Anal. Method:	USEPA-8081A
Sample ID:	**57SB4A**	QC Batch:	90181 -116
Sample #:	**345737**	Anal. Batch:	208635
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Chlorinated Pesticides OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
72-54-8	4,4'-DDD	28 U	28	0.357
72-55-9	4,4'-DDE	28 U	28	0.263
50-29-3	4,4'-DDT	28 U	28	0.270
309-00-2	Aldrin	28 U	28	0.456
319-84-6	Alpha-BHC	28 U	28	0.455
57-74-9	A-Chlordane	28 U	28	0.651
5103-74-2	G-Chlordane	28 U	28	1.05
319-85-7	Beta-BHC	28 U	28	1.70
319-86-8	Delta-BHC	28 U	28	1.23
60-57-1	Dieldrin	28 U	28	0.464
115-29-7	Endosulfan I	28 U	28	1.37
33213-65-9	Endosulfan II	28 U	28	0.321
1031-07-8	Endosulfan Sulfate	28 U	28	0.755
72-20-8	Endrin	28 U	28	0.447
7421-93-4	Endrin Aldehyde	28 U	28	1.67
53494-70-5	Endrin Ketone	28 U	28	0.413
58-89-9	Lindane	28 U	28	0.291
76-44-8	Heptachlor	28 U	28	1.06
1024-57-3	Heptachlor Epoxide	28 U	28	0.683
72-43-5	Methoxychlor	28 U	28	0.420
8001-35-2	Toxaphene	240 U	240	35.0

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 09:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/16/03 by JRR
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by JLRM
	RAAP	Anal. Method:	USEPA-8082
Sample ID:	**57SB4A**	QC Batch:	89881 -116
Sample #:	**345737**	Anal. Batch:	208229
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Polychlorinated Biphenyls OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
12674-11-2	PCB-1016	93 U		93	22.4
11104-28-2	PCB-1221	46 U		46	2.80
11141-16-5	PCB-1232	46 U		46	7.00
53469-21-9	PCB-1242	46 U		46	4.20
12672-29-6	PCB-1248	46 U		46	7.00
11097-69-1	**PCB-1254**	**12 J**	J,g	46	4.20
11096-82-5	PCB-1260	46 U		46	9.80

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 09:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8151A
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/14/03 by MSN
		Anal. Method:	USEPA-8151A
Sample ID:	**57SB4A**	QC Batch:	90218 -110
Sample #:	**345737**	Anal. Batch:	208309
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Herbicides	Analytical Result	Reporting Limit	MDL
93-76-5	2,4,5-T	70 U	70	2.80
93-72-1	2,4,5-TP (Silvex)	70 U	70	5.60
94-75-7	2,4-D	280 U	280	22.4
94-82-6	2,4-DB	280 U	280	86.8
75-99-0	Dalapon	350 U	350	79.8
1918-00-9	Dicamba	280 U	280	2.80
120-36-5	Dichlorprop	280 U	280	23.8
~~88-85-7~~	~~*Dinoseb~~	~~280 R~~	~~280~~	~~29.4~~
94-74-6	MCPA	28000 U	28000	1950
93-65-2	MCPP	28000 U	28000	7080

AS 2/12/04

* See attached Statement of Data Qualifications.

See re-extraction

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 09:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8151A
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/28/03 by JLRM
		Anal. Method:	USEPA-8151A
Sample ID:	**57SB4A**	QC Batch:	90218 -110
Sample #:	**345737DL**	Anal. Batch:	208365
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Herbicides	Analytical Result	Reporting Limit	MDL
~~93-76-5~~	~~2,4,5-T~~	~~70 U~~	~~70~~	~~2.80~~
93-72-1	2,4,5-TP (Silvex)	70 U	70	5.60
94-75-7	2,4-D	~~280 U~~	280	22.4
94-82-6	2,4-DB	280 U	280	86.8
75-99-0	Dalapon	350 U	350	79.8
1918-00-9	Dicamba	280 U	280	2.80
~~120-36-5~~	~~Dichlorprop~~	~~280 U~~	~~280~~	~~23.8~~
88-85-7	Dinoseb	280 U	280	29.4
~~94-74-6~~	~~MCPA~~	~~28000 U~~	~~28000~~	~~1950~~
~~93-65-2~~	~~MCPP~~	~~28000 U~~	~~28000~~	~~7080~~

Use only Dinoseb result, ~~TS~~ 2/12/04

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/07/03 @ 08:10
Sampler: B.F. & J.S.
Received: 10/08/03 @ 08:50

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **68SB3A**
Sample #: **345619**
Matrix: Soil

Percent Solids: 84

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	12200		50	1.83	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Antimony, Total	13		0.50	0.0518	mg/kg dry	10/22/03	MSG	USEPA-6020
Arsenic, Total	2.1		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	111		5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	0.63 J	J,S	1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	5.6		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	1600		250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	40		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	10	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	8.6		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	16600		250	17.9	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	23		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	789		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	939		25	2.06	mg/kg dry	10/23/03	DSC	USEPA-6010B
Mercury, Total	0.028 J		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	8.8		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	640	J,S	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.65 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.054 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	28 J	B,P	100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.16 J		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	31		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	128		20	2.59	mg/kg dry	10/22/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/07/03 @ 08:30
Sampler: B.F. & J.S.
Received: 10/08/03 @ 08:50

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **68SB3B**
Sample #: **345620**
Matrix: Soil

Percent Solids: 75

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	20400		50	1.83	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Antimony, Total	1.7		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	6.9		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	25		5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	0.91 J	J,S	1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	1.4		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	248 J		250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	18		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	9.8	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	20		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	45100		1000	71.6	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	8.6		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	1220		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	135		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.040 J		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	20		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1360	J,S	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.67 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.040 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	151		100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.14 J		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	44		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	21		4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/07/03 @ 08:50
Sampler: B.F. & J.S.
Received: 10/08/03 @ 08:50

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **68SB3C**
Sample #: **345621**
Matrix: Soil

Percent Solids: 73

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	28600		250	9.15	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Antimony, Total	0.094 J		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	7.9		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	70		5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	2.7	J,S	1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	1.6		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	250 U		250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	31		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	20	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	21		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	42700		1000	71.6	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	10		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	20600		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	497		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.030 J		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	46		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	4130	J,S	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.78 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.11 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	69 J		100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.23 J		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	57		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	38		4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/07/03 @ 10:00
Sampler: B.F. & J.S.
Received: 10/08/03 @ 08:50

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **57SB1A**
Sample #: **345622**
Matrix: Soil

Percent Solids: 86

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	11900		50	1.83	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Antimony, Total	1.2		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	1.6		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	99		5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	0.44 J	J,S	1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	1.5		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	4440		250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	20		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	5.8	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	4.9		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	13400		250	17.9	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	19		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	2700		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	699		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.049 J		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	6.0		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	528	J,S	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.51 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.054 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	33 J	B,P	100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.17 J		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	29		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	52		4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/07/03 @ 10:15
Sampler: B.F. & J.S.
Received: 10/08/03 @ 08:50

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **57SB1B**
Sample #: **345623**
Matrix: Soil

Percent Solids: 75

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	23800		50	1.83	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Antimony, Total	0.21 J		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	1.6		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	56		5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	0.58 J	J,S	1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	2.8		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	1030		250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	28		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	8.7	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	13		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	41300		500	35.8	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	29		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	1430		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	264		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.035 J		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	14		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1240	J,S	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.33 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.028 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	74 J	B,P	100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.18 J		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	69		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	54		4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/07/03 @ 10:30
Sampler: B.F. & J.S.
Received: 10/08/03 @ 08:50

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **57SB1C**
Sample #: **345624**
Matrix: Soil

Percent Solids: 67

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	38900		250	9.15	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Antimony, Total	0.15 J		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	3.1		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	73		5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	0.84 J	J,S	1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	4.0		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	250 U		250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	88		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	12	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	28		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	37300		500	35.8	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	19		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	5120		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	354		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.053 J		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	18		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	3290	J,S	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.71 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.11 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	343		100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.24 J		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	58		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	97		4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/07/03 @ 11:00
Sampler: B.F. & J.S.
Received: 10/08/03 @ 08:50

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **57SB3A**
Sample #: **345625**
Matrix: Soil

Percent Solids: 77

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	28900		250	9.15	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Antimony, Total	102		0.50	1.30	mg/kg dry	10/22/03	MSG	USEPA-6020
Arsenic, Total	5.1		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	107	J,f	5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	0.45 J	J,s	1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	27	J,f	1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	1750	J,f	250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	268	J,f	25	4.56	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Cobalt, Total	75	J,s	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	27		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	47100		500	35.8	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	175		25	0.545	mg/kg dry	10/24/03	DWJ	USEPA-6020
Magnesium, Total	1420		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	544		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.11		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	13		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	967	J,s	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.57 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.11 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	76 J	B,P	100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.24 J		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	69		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	895	J,f	40	5.17	mg/kg dry	10/22/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/07/03 @ 00:00
Sampler: B.F. & J.S.
Received: 10/08/03 @ 08:50

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **SBD6**
Sample #: **345626**
Matrix: Soil

Percent Solids: 76

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	33000		250	9.15	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Antimony, Total	104		0.50	1.30	mg/kg dry	10/22/03	MSC	USEPA-6020
Arsenic, Total	5.3		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	154	J,f	5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	0.39 J	J,s	1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	41	J,f	1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	2760	J,f	250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	454	J,f	25	4.56	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Cobalt, Total	8.0	J,s	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	38		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	46500		1000	71.6	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	268		50	1.09	mg/kg dry	10/28/03	JMF	USEPA-6020
Magnesium, Total	1990		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	514		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.13		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	14		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1060	J,s	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.64 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.15 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	97 J	B,p	100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.24 J		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	67		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	1370	J,f	100	12.9	mg/kg dry	10/22/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/07/03 @ 11:15
Sampler: B.F. & J.S.
Received: 10/08/03 @ 08:50

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **57SB3B**
Sample #: **345627**
Matrix: Soil

Percent Solids: 63

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	37400	250	9.15	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Antimony, Total	0.29 J	0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	12	0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	62	5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	1.4 J,S	1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	1.2	1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	250 U	250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	43	5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	23 J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	38	1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	53400	1000	71.6	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	19	1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	4280	250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	518	5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.023 J	0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	28	0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	3020 J,S	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.55 J	1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.11 J	3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	339	100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.28 J	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	59	1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	53	4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/07/03 @ 11:30
Sampler: B.F. & J.S.
Received: 10/08/03 @ 08:50

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **57SB3C**
Sample #: **345628**
Matrix: Soil

Percent Solids: 75

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	29600		250	9.15	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Antimony, Total	0.50 U		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	5.9		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	52		5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	2.0	J,S	1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	0.87 J		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	294		250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	31		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	18	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	17		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	35200		500	35.8	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	9.2		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	35000		1250	16.1	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Manganese, Total	828		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.10 U		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	50		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	5900	J,S	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.88 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.15 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	169		100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.22 J		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	59		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	52		4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/07/03 @ 14:00
Sampler: B.F. & J.S.
Received: 10/08/03 @ 08:50

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **57SB2A**
Sample #: **345629**
Matrix: Soil

Percent Solids: 76

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	32200		250	9.15	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Antimony, Total	3.6		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	3.6		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	80		5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	0.48 J	J,S	1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	6.7		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	1530		250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	70		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	6.1	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	18		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	39700		500	35.8	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	49		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	1560		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	361		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.16		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	12		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	968	J,S	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.69 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.10 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	312		100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.25 J		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	76		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	160		20	2.59	mg/kg dry	10/22/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/07/03 @ 14:20
Sampler: B.F. & J.S.
Received: 10/08/03 @ 08:50

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **57SB2B**
Sample #: **345630**
Matrix: Soil

Percent Solids: 76

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	13900		50	1.83	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Antimony, Total	0.50 U		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	1.1		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	39		5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	1.1	J,S	1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	0.46 J		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	250 U		250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	9.3		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	26	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	15		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	34500		500	35.8	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	2.6		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
* Magnesium, Total	487		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
* Manganese, Total	1090		25	1.32	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Mercury, Total	0.013 J		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	11		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	999	J,S	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.55 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.034 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	161		100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
* Thallium, Total	0.11 J		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	18		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	9.3		4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/07/03 @ 14:40
Sampler: B.F. & J.S.
Received: 10/08/03 @ 08:50

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **57SB2C**
Sample #: **345631**
Matrix: Soil

Percent Solids: 76

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	21800		50	1.83	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Antimony, Total	0.073 J		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	7.1		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	42		5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	3.2	J,S	1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	1.3		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	207 J		250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	33		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	19	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	23		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	39500		500	35.8	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	9.8		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	22300		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	632		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.10 U		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	75		5.0	0.356	mg/kg dry	10/24/03	DWJ	USEPA-6020
Potassium, Total	4570	J,S	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.75 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.12 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	84 J	B,P	100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.18 J		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	50		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	43		4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/08/03 @ 09:15
Sampler: B.F. & J.S.
Received: 10/09/03 @ 08:40

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **57SB4A**
Sample #: **345737**
Matrix: Soil

Percent Solids: 71

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	30100		250	9.15	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Antimony, Total	6.3		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	4.7		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	149		5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	0.60 J	J,S	1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	1.5		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	1420		250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	43		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	9.7	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	26		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	78700		1000	71.6	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	19		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	923		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	3200		25	1.32	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Mercury, Total	0.14		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	8.7		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	908	J,S	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.57 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.076 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	127		100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.30 J		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	84		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	281		20	2.59	mg/kg dry	10/22/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/08/03 @ 11:30
Sampler: B.F. & J.S.
Received: 10/09/03 @ 08:40

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **69SB1A**
Sample #: **345738**
Matrix: Soil

Percent Solids: 78

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	23700		50	1.83	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Antimony, Total	0.35 J		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	3.8		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	76		5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	0.34 J	J,S	1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	0.53 J		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	346		250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	36		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	14	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	10		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	34600		500	35.8	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	19		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	793		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	1470		25	1.32	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Mercury, Total	0.13		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	10		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	810	J,S	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.36 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.043 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	27 J	B,P	100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.30 J		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	63		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	38		4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/08/03 @ 11:45
Sampler: B.F. & J.S.
Received: 10/09/03 @ 08:40

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **69SB1B**
Sample #: **345739**
Matrix: Soil

Percent Solids: 82

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	17200		50	1.83	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Antimony, Total	9.3		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	2.9		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	50		5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	0.30 J	J/S	1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	0.97 J		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	332		250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	34		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	15	J/S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	9.4		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	26500		500	35.8	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	15		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	934		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	511		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.052 J		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	11		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1100	J/S	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.38 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.036 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	2010		500	90.5	mg/kg dry	10/23/03	DSC	USEPA-6010B
Thallium, Total	0.20 J		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	53		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	28		4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/08/03 @ 12:00
Sampler: B.F. & J.S.
Received: 10/09/03 @ 08:40

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **69SB1C**
Sample #: **345740**
Matrix: Soil

Percent Solids: 74

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	28400		250	9.15	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Antimony, Total	1.7		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	12		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	65		5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	1.1	J/S	1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	1.2		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	155 J		250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	35		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	9.9	J/S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	25		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	32200		500	35.8	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	17		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	34600		1250	16.1	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Manganese, Total	247		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.042 J		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	33		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	8480	J/S	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.66 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.15 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	2460		500	90.5	mg/kg dry	10/23/03	DSC	USEPA-6010B
Thallium, Total	0.43 J		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	66		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	55		4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/08/03 @ 14:15
Sampler: B.F. & J.S.
Received: 10/09/03 @ 08:40

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **69SB3A**
Sample #: **345741**
Matrix: Soil

Percent Solids: 84

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	14000	J,f	50	1.83	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Antimony, Total	19		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	2.9		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	71		5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	0.26 J	J,s	1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	2.1		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	721		250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	22		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	11	J,s	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	8.7		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	17100	J,f	250	17.9	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	25		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	997		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	914		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.041 J		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	8.5		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	813	J,s	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.40 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.051 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	110		100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.26 J		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	35		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	45		4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/08/03 @ 00:00
Sampler: B.F. & J.S.
Received: 10/09/03 @ 08:40

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **SBD7**
Sample #: **345742**
Matrix: Soil

Percent Solids: 84

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	20400	J,f	50	1.83	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Antimony, Total	14		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	3.3		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	90		5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	0.48 J	J,s	1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	2.5		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	835		250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	38		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	10	J,s	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	12		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	24800	J,f	500	35.8	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	22		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	1040		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	1010		25	1.32	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Mercury, Total	0.078 J		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	11		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	879	J,s	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.60 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.050 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	116		100	18.1	mg/kg dry	10/23/03	DSC	USEPA-6010B
Thallium, Total	0.23 J		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	49		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	61		4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/08/03 @ 14:30
Sampler: B.F. & J.S.
Received: 10/09/03 @ 08:40

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **69SB3B**
Sample #: **345743**
Matrix: Soil

Percent Solids: 82

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	21700		50	1.83	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Antimony, Total	12		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	4.4		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	54		5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	0.37 J	J,S	1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	0.77 J		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	521		250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	49		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	23	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	14		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	33600		500	35.8	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	17		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	2240		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	1020		25	1.32	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Mercury, Total	0.069 J		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	15		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1510	J,S	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.29 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.045 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	393		100	18.1	mg/kg dry	10/23/03	DSC	USEPA-6010B
Thallium, Total	0.26 J		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	55		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	38		4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/08/03 @ 14:45
Sampler: B.F. & J.S.
Received: 10/09/03 @ 08:40

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **69SB3C**
Sample #: **345744**
Matrix: Soil

Percent Solids: 74

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	30400		250	5.10	mg/kg dry	10/23/03	DSC	USEPA-6010B
Antimony, Total	6.1		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	8.3		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	63		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	1.7	J,S	1.0	0.167	mg/kg dry	11/03/03	KLVM	USEPA-6010B
Cadmium, Total	0.48 J		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	417		250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	56		5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	16	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	27		2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	46900		1000	71.6	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	13		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	17800		250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	491		5.0	0.264	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Mercury, Total	0.046 J		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	37		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	4180	J,S	100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.74 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.11 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	544		100	8.92	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Thallium, Total	0.26 J		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	59		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	48		4.0	0.517	mg/kg dry	10/23/03	KLVM	USEPA-6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:10
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
Submittal #:	**36440-4**		
Submittal:	Delivery Order 0046 RAAP		
Sample ID:	**68SB3A**		
Sample #:	**345619**		
Matrix:	Soil	Percent Solids:	84

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	84	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.16 J	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
Submittal #:	**36440-4**		
Submittal:	Delivery Order 0046 RAAP		
Sample ID:	**68SB3B**		
Sample #:	**345620**		
Matrix:	Soil	Percent Solids:	75

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	75	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
Submittal #:	**36440-4**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**68SB3C**		
Sample #:	**345621**		
Matrix:	Soil	Percent Solids:	73

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	73	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/07/03 @ 10:00
Sampler: B.F. & J.S.
Received: 10/08/03 @ 08:50

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **57SB1A**
Sample #: **345622**
Matrix: Soil

Percent Solids: 86

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	86	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.10 J	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
Submittal #:	**36440-4**		
Submittal:	Delivery Order 0046 RAAP		
Sample ID:	**57SB1B**		
Sample #:	**345623**		
Matrix:	Soil	Percent Solids:	75

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	75	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
Submittal #:	**36440-4**		
Submittal:	Delivery Order 0046 RAAP		
Sample ID:	**57SB1C**		
Sample #:	**345624**		
Matrix:	Soil	Percent Solids:	67

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	67	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
Submittal #:	**36440-4**		
Submittal:	Delivery Order 0046 RAAP		
Sample ID:	**57SB3A**		
Sample #:	**345625**		
Matrix:	Soil	Percent Solids:	77

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	77	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.17 J	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 00:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
Submittal #:	**36440-4**		
Submittal:	Delivery Order 0046 RAAP		
Sample ID:	**SBD6**		
Sample #:	**345626**		
Matrix:	Soil	Percent Solids:	76

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	76	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.16 J	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
Submittal #:	**36440-4**		
Submittal:	Delivery Order 0046 RAAP		
Sample ID:	**57SB3B**		
Sample #:	**345627**		
Matrix:	Soil	Percent Solids:	63

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	63	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.08 J	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
Submittal #:	**36440-4**		
Submittal:	Delivery Order 0046 RAAP		
Sample ID:	**57SB3C**		
Sample #:	**345628**		
Matrix:	Soil	Percent Solids:	75

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	75	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
Submittal #:	**36440-4**		
Submittal:	Delivery Order 0046 RAAP		
Sample ID:	**57SB2A**		
Sample #:	**345629**		
Matrix:	Soil	Percent Solids:	76

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	76	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.09 J	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:20
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
Submittal #:	**36440-4**		
Submittal:	Delivery Order 0046 RAAP		
Sample ID:	**57SB2B**		
Sample #:	**345630**		
Matrix:	Soil	Percent Solids:	76

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	76	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
* Cyanide, Total	0.08 J	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

* See attached Statement of Data Qualifications.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:40
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
Submittal #:	**36440-4**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**57SB2C**		
Sample #:	**345631**		
Matrix:	Soil	Percent Solids:	76

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	76	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/08/03 @ 09:15
Sampler: B.F. & J.S.
Received: 10/09/03 @ 08:40

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **57SB4A**
Sample #: **345737**
Matrix: Soil

Percent Solids: 71

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	71	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.05 J	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/08/03 @ 11:30
Sampler: B.F. & J.S.
Received: 10/09/03 @ 08:40

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **69SB1A**
Sample #: **345738**
Matrix: Soil

Percent Solids: 78

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	78	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/08/03 @ 11:45
Sampler: B.F. & J.S.
Received: 10/09/03 @ 08:40

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **69SB1B**
Sample #: **345739**
Matrix: Soil

Percent Solids: 82

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	82	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 12:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
Submittal #:	**36440-4**		
Submittal:	Delivery Order 0046 RAAP		
Sample ID:	**69SB1C**		
Sample #:	**345740**		
Matrix:	Soil	Percent Solids:	74

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	74	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.07 J	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/08/03 @ 14:15
Sampler: B.F. & J.S.
Received: 10/09/03 @ 08:40

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **69SB3A**
Sample #: **345741**
Matrix: Soil

Percent Solids: 84

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	84	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.11 J	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 00:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
Submittal #:	**36440-4**		
Submittal:	Delivery Order 0046 RAAP		
Sample ID:	**SBD7**		
Sample #:	**345742**		
Matrix:	Soil	Percent Solids:	84

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	84	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.11 J	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
Submittal #:	**36440-4**		
Submittal:	Delivery Order 0046 RAAP		
Sample ID:	**69SB3B**		
Sample #:	**345743**		
Matrix:	Soil	Percent Solids:	82

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	82	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.06 J	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/08/03 @ 14:45
Sampler: B.F. & J.S.
Received: 10/09/03 @ 08:40

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **69SB3C**
Sample #: **345744**
Matrix: Soil

Percent Solids: 74

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	74	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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DATA VALIDATION WORKSHEET

Volatile Organic Analysis by GC/MS

Reviewer: AS
Date: February-04
DV Level: II III IV
Review Document:
X NFG - Region III Modifications
X Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-4
Test Name: 8260B
Method No.: VOC

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Do sample preservation, collection and storage condition meet method requirement?	x		
	If the temperature of the cooler was elevated (> 10 °C) or bubble size in aqueous sample was too big (tiny bubble is OK.), then flag all positive results with a "L" and all non-detects "UL".			
1.5	Do any soil samples contain more than 50% water?		x	
	If any sample analyzed as a soil, other than TCLP, contains % moisture greater than 50%, noted in the DV report.			

Notes: four coolers @ 2.1C, 8.6C, 0.9C, & 0.8C

2.0 Holding Times		Yes	No	NA
2.1	Were sample preserved as specified in the method or project QAPP?	see above		
2.2	Have any technical holding times, determined from date of sampling to date of analysis, been exceeded? If yes, L(+)/UL(-). For aqueous unpreserved - 7 days for aromatic compounds All others - 14 days.		x	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, L(+)/R(-) .		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per GCMS, 20 samples, batch, matrix, and level)?	x		
3.2	Do any method blanks have positive results? Action: If yes, positive sample results should be reported and qualified "B", if the concentration of the compound in the sample is less than or equal to 5 times (or 10 times for the common volatile lab contaminants - methylene chloride, acetone, and 2-butanone) the amount in the associated blank.	x acetone		
3.3	Do any field equipment blanks/trip blanks have positive results? If Yes, use same rules above.	x		
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, noted in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If no, use professional judgement to determine the effect on the data and note in the reviewer narrative.	x		
4.3	Has a continuing calibration standard been analyzed for every 12 hours of sample analysis per instrument?	x		
4.4	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 15% and %D < ± 20%		x	
	For initial Calibration: for %RSD > ±15%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 20% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >20%, J(+).			
4.5	Do any SPCC compounds have an RRF < control limit? Control limits: >0.10 for chloromethane, 1,1-dichloroethane, & bromoform or >0.30 for chlorobenzene & 1,1,2,2-tetrachloroethane. If yes, L(+)/R(-).		x	

Notes: The second source for methyl acetate was analyzed after sample analyses, but passed at 89% - no action was taken.

5.0 GC/MS Instrument Performance Check		Yes	No	NA
5.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?	x		
5.2	Are BFB enchanced bar graph spectrum and mass/charge (m/z) listing provided for each 12-hour shift?	x		
5.3	Have all samples been analyzed within twelve hours of the BFB tune?	x		
	If twelve hours have elapsed according to the system clock, and the laboratory had analyzed standards, blanks, field samples or QC samples after twelve (12) hours, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
5.4	Have ion abundance criteria for BFB been met for each instrument used?	x		
	If the BFB criteria were not met prior to the analyses of the standards, blanks, field samples and QC samples, all standards, blanks, field samples and QC samples are rejected "R".			

Notes:

6.0 Surrogate Recovery							Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?						x		
6.2	Are surrogate recoveries within acceptance criteria (not to exceed 50-150%) for all samples and method blanks?						x		
6.3	If No in Section 6.2, are these sample(s) or method blank(s) reanalyzed?								x
	If any system monitoring compound(s) in the volatile fraction is out of specification, there should be a reanalysis to confirm that the non-compliance is because of sample matrix effects rather than laboratory deficiencies.								
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? DV report should indicate that extraction efficiency/ method accuracy cannot be verified.								x
		1 or more <10%	1 high/low	2 or 3 high/low	2 or 3 all low	2 or 3 all high			
	Positives	L	J	J	L	K			
	Non-detects	R	UJ	UJ	UL	NONE			
	Note: The B qualifier remains over surrogate flagging.								

Notes:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 50-150%?	x		
7.4	Are there any RPD outside the QC limits not to exceed 50%?	x		
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

57SB2B CE MSD 74% (79), CS2 33/37% (53), Styrene MSD 48% (50), methylacetate 47/52% (70)

8.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)		Yes	No	NA
8.1	Is the LCS/LCSD recovery form present?	x		
8.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
8.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 50-150%?	x		
	If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
8.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 50%?			x
	If Yes, J(+) only.			

Notes:

9.0 Internal Standard		Yes	No	NA
9.1	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration? If not, J(+)/UJ(-).	x		
	If extremely low area counts are reported, or performance exhibits a major abrupt drop-off, then a severe loss of sensitivity is indicated. Non-detect target compounds should then be qualified as unusable (R).			
9.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	x		
	The chromatographic profile for that sample must be examined to determine if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction. Positive results should not needed to be qualified as "R", if the mass spectral criteria are met.			

Notes:

10.0 Field Duplicate		Yes	No	NA
10.1	Was a field duplicate prepared and analyzed at the correct frequency (one per 20 samples, matrix, and level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
10.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

11.0 Tentatively Identified Compounds (TICs) and Detection Limit Verification		Yes	No	NA
11.1	Are any TICs detected in the field samples? If Yes, all TIC results should be flagged "NJ" (tentatively identified, and approximate concentration).	x		
11.2	Do detection limits meet those required by the project QAPP and were they properly adjusted to reflect all sample dilutions and dry weight factors?	x		
11.3	Were sample concentrations above the highest standard run at a dilution? If not, for ion saturation flag "L", unsaturated results "J".			x

Notes:

12.0 Data Completeness		Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit 90%)	x		
	Number of samples: 21			
	Number of target compounds in each analysis:50			
	Number of results rejected and not reported:0			
	% Completeness = (12.1.1 x 12.1.2 - 12.1.3) x 100/(12.1.1 x 12.1.2)			
	% Completeness = 100.0%			

Notes:

DATA VALIDATION WORKSHEET

Semivolatile Organic Analysis

Reviewer: AS
Date: February-04
DV Level: II III IV
Review Document:
X NFG - Region III Modifications
X Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-4
Test Name: SVOC
Method No.: 8270C

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	
1.4	Do sample preservation, collection and storage condition meet method requirement?		x	
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 20 ^{o}C), then flag all positive results with a "L" and all non-detects "UL".			
1.5	Do any soil samples contain more than 50% water?		x	
	If any sample analyzed as a soil, other than TCLP, contains % moisture greater than 50%, noted in the DV report.			

Notes: four coolers @ 2.1C, 8.6C, 0.9C, & 0.8C

2.0 Holding Times		Yes	No	NA
2.1	Were sample preserved as specified in the method or project QAPP?	x		
2.2	Have any technical holding times, determined from date of sampling to date of analysis, been exceeded? If yes L(+)/UL(-). For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, L(+)/R(-) .		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x		
3.2	Do any preparation/instrument/reagent blanks have positive results? Action: If yes, positive sample results should be reported and qualified "B", if the concentrationof the compound in the sample is less than or equal to 5 times (or 10 times for the common phthalate contaminants) the amount in the associated blank.	x		
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.	x		
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, noted in the Dv report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If no, use professional judgement to determine the effect on the data and note in the reviewer narrative.	x		
4.3	Has a continuing calibration standard been analyzed for every 12 hours of sample analysis per instrument?	x		
4.4	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD ≤ 15%, ICV %D < 30%, and CCV %D ≤ 20%.		x	
	For initial Calibration: for %RSD > ±15%, but < ± 50%, J(+) only. for %RSD > ±50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 20% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >20%, J(+).			
4.5	Do any SPCC compounds have an RRF < 0.05? (n-nitroso-di-n-propylamine,hexachlorocyclopentadiene,2,4-dinitrophenol, & 4-nitrophenol) If yes, J(+)/R(-).		x	

Notes:

5.0 GC/MS Instrument Performance Check		Yes	No	NA
5.1	Are GC/MS Tuning and Mass Calibration forms present for decafluorotriphenylphosphine (DFTPP)?	x		
5.2	Are DFTPP enchanced bar graph spectrum and mass/charge (m/z) listing provided for each 12-hour shift?	x		
	If DFTPP was analyzed simultaneously with any calibration standard or blank, the instrument performance check (IPC) is rejected "R" as well as all associated data.			
5.3	Have all samples been analyzed within twelve hours of the DFTPP tune?	x		
	If twelve hours have elapsed according to the system clock, and the laboratory had analyzed standards, blanks, field samples or QC samples after twelve (12) hours, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
5.4	Have ion abundance criteria for DFTPP been met for each instrument used?	x		
	If the DFTPP criteria were not met prior to the analyses of the standards, blanks, field samples and QC samples, all standards, blanks, field samples and QC samples are rejected "R".			

Notes:

6.0 Surrogate Recovery		Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
6.2	Are surrogate recoveries within acceptance criteria not to exceed 10-150% for all samples and method blanks?		x	
6.3	If No in Section 6.2, are these sample(s) or method blank(s) reanalyzed?		x	
	If any two base/neutral or acid fraction are out of specification, or if any one base/neutral or acid extractable surrogate has a recovery of less than 10%, then there should be a reanalysis to confirm that the non-compliance is because of sample matrix effects rather than laboratory deficiencies.			
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? (recoveries may be diluted out.)		x	
	1 or more <10% / 2 or 3 high/low / 2 or 3 all low / 2 or 3 all high Positives: L / J / L / K Non-detects: R / UJ / UL / NONE			
	Note: The B qualifier remains over surrogate flagging.			

Notes:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 10-150%?	x		
7.4	Are there any RPDs outside the QC limits not to exceed 60%?		x	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

8.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)		Yes	No	NA
8.1	Is the LCS/LCSD recovery form present?	x		
8.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
8.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 10-150%?		x	
	If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
8.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 50%?		x	
	If Yes, J(+) only.			

Notes:

9.0 Internal Standard		Yes	No	NA
9.1	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration? If not, J(+)/UJ(-).	x		
	If extremely low area counts are reported, or performance exhibits a major abrupt drop-off, then a severe loss of sensitivity is indicated. Non-detect target compounds should then be qualified as unusable (R).			
9.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	x		
	The chromatographic profile for that sample must be examined to determine if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction. Positive results should not needed to be qualified as "R", if the mass spectral criteria are met.			

Notes:

10.0 Field Duplicate		Yes	No	NA
10.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
10.2	Are all analyte duplicate results within control limits? Generally, no action is taken on the basis of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

11.0 Tentatively Identified Compounds (TICs) and Detection Limit Verification		Yes	No	NA
11.1	Are any TICs detected in the field samples? If Yes, all TIC results should be flagged "NJ" (tentativelyidenified, and approximate concentration).	x		
11.2	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture?	x		
11.3	Were sample concentrations above the highest standard run at a dilution? If not, for ion saturation flag "L", unsaturated results "J".			x

Notes:

12.0 Data Completeness		Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit 90%)	x		
	Number of samples: 21			
	Number of target compounds in each analysis:66			
	Number of results rejected and not reported:0			
	% Completeness = (12.1.1 x 12.1.2 - 12.1.3) x 100/(12.1.1 x 12.1.2)			
	% Completeness = 100.0%			

Notes:

DATA VALIDATION WORKSHEET

Polyaromatic Hydrocarbons

Reviewer: AS
Date: February-04
DV Level: II III IV

Review Document:

__X__ Region III Modified for National Functional Guidelines
____ NFG for organic Data review (February 1994)
__X__ Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-4
Test Name: PAH
Method No.: 8310-HPLC

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. % solids		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes: four coolers @ 2.1C, 8.6C, 0.9C, & 0.8C

2.0 Holding Times		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?		see above	
	Action: If the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyses, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%	x		
	For initial Calibration: for %RSD > ±20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?		x	
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?			x
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.			x
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 40-150%?	x		
	Are there any RPDs outside the QC limits not to exceed 60%?		x	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

7.0 Laboratory Control Sample (LCS)

		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 40-150%?		x	
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?		x	
	Action: If Yes, J(+) only.			

Notes:

8.0 Field Duplicate

		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.	x		
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.			x
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	x		

Notes:

10.0 Data Completeness			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		x		
	Number of samples:	21			
	Number of target compounds in each analysis:	16			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

DATA VALIDATION WORKSHEET

Reviewer: AS
Date: February-04
DV Level: II III IV
Review Document:
_X_ Region III Modified for National Functional Guidelines
___ NFG for organic Data review (February 1994)
_X_ Project QAPP/SAP

Explosives

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-4
Test Name: Explosives
Method No.: 8330-HPLC

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. % solids		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes: four coolers @ 2.1C, 8.6C, 0.9C, & 0.8C

2.0 Holding Times		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?		see above	
	Action: If the temperature of the cooler was elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyese, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%		x	
	For initial Calibration: for %RSD > ±20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?	x		
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?			x
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.			x
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 40-150%?		x	
6.4	Are there any RPDs outside the QC limits not to exceed 60%?		x	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

7.0 Laboratory Control Sample (LCS)		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 40-150%?		x	
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?			x
	Action: If Yes, J(+) only.			

Notes:

8.0 Field Duplicate		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.	x		
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.			x
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	x		

Notes:

10.0 Data Completeness			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		x		
	Number of samples:	21			
	Number of target compounds in each analysis:	14			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

DATA VALIDATION WORKSHEET

Pesticides/PCBs

Reviewer:	AS	**Project Name:**	Radford SSP
Date:	February-04	**Project Number:**	15291974.30000
DV Level:	II III IV	**Laboratory:**	TriMatrix
Review Document:		**SDG No.:**	36440-4
X SW-846 - 8081/8082		**Test Name:**	PEST/PCB
X NFG - Region III Modifications		**Method No.:**	8081A/8082
___ CLP			

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Do any soil samples contain more than 50% water?		x	
	If any sample analyzed as a soil, other than TCLP, contains % moisture greater than 50%, noted in the DV report.			

Notes: four coolers @ 2.1C, 8.6C, 0.9C, & 0.8C

2.0 Preservation/ Holding Times		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?		see above	
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 20 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampleing to date of analysis, been exceeded? If yes, J(+)/UJ(-). For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, J(+)/R(-) .		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix)?	x		
3.2	Do any preparation/instrument/reagent blanks have positive results? Action: If yes, positive sample results should be reported and qualified "B", if the concentration of the compound in the sample is less than or equal to five times the amount in the associated blank.		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note it in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards included in the calibration curve? 1016 and 1260 need at least three peaks at five concentrations. The multi-component target compounds (the other Aroclors, Toxaphene, & Chlordane) must each be analyzed separately at a single concentration level during the initial calibration sequence.	x		
4.2	Has a continuing calibration standard been analyzed for every 12 hours or twenty samples?	x		
4.3	Are all calibration standard (IC and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r>0.99, %RSD < ± 20% and %D < ± 15%	x		
	For initial Calibration: for %RSD > ± 20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Do all standard retention times in the continuing calibration fall within the RT windows established during the initial calibration sequence? If No, the associated sample result should be carefully evaluated.	x		

Notes:

5.0 GC/ECD Instrument Performance Check for Pesticides		Yes	No	NA
5.1	Is the 4,4'-DDT breakdown </= to 15%? If No, for positive DDT results, DDT-L(+), DDD/DDE - NJ(+). For non-detect DDT results, DDD/DDE - R(+).	x		
5.2	Is the endrin breakdown </= to 15%? If No, for positive endrin results, endrin-L(+), endrin aldehyde/ketone - NJ(+). For non-detect DDT results, endrin aldehyde/ketone - R(+).	x		

Notes:

6.0 Surrogate Recovery					Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?				x		
6.2	Do all surrogate retention times fall within the RT windows established during the initial calibration sequence? If No, the associated sample result should be carefully evaluated.				x		
6.3	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?				x		
6.4	If No in Section 6.3, are these sample(s) or method blank(s) reanalyzed?						x
6.5	If No in Section 6.4, is any sample dilution factor greater than 10? (recoveries may be diluted out.)						x
	# of outliers	Recovery	Sample result from column with non-conformance	Sample result from column without non-conformance			
	1 out	high/low	No action	No action			
	2 out	2 high same column	K	No action			
		2 low same column	L, UL	No action			
		mixed same column	J, UJ	No action			
		2 high diff columns	J	Not applicable			
		2 low diff columns	J, UJ	Not applicable			
		mixed diff columns	Professional judgement	Not applicable			
	3 out	All high	K	Not applicable			
		All low	L, UL	Not applicable			
		2 high, 1 low	K (2 high)	J (1 low 2nd column)			
		2 low, 1 high	L, UJ (2 low)	J (1 high 2nd column)			
		other mixed	J, UJ	Not applicable			
	4 out	All high	K	Not applicable			
		All low	L, UL	Not applicable			
		Mixed	J, UJ	Not applicable			
	If any recovery is >0% and <10% then L(+)/R(-).						
	If any recovery is 0% then R(+/-).						

Notes:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 30-150%?	pest	pcb	
7.4	Are there any RPDs outside the QC limits not to exceed 60%?	pest	pcb	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes: MS/MSD from SDG 36440-1

8.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)		Yes	No	NA
8.1	Is the LCS/LCSD recovery form present?	x		
8.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
8.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 30-150%?		x	
	If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
8.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?			x
	If Yes, J(+) only.			

Notes:

9.0 Field Duplicate		Yes	No	NA
9.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
9.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes: QSB1A/SBD1 submitted in SDG 36440-2, BDL for pest and 0.053/0.051 for Aroclor 1254.

10.0 Compound Identification and Detection Limit Verification		Yes	No	NA
10.1	Is the percent difference calculated for the positive sample results on both columns < 40%? If No, J(+).		x	
10.2	Do detection limits meet those required by the project QAPP and were properly adjusted for dilution factors and moisture?	x		

Notes:

11.0 Pesticide Cleanup Checks		Yes	No	NA
11.1	Is Form IX PEST-1 present and complete for each lot of Florisil Cartridges used? (Florisil Cleanup is required for all Pest/PCB extracts to reduce matrix interference caused by polar compounds.)			x
	Every lot number of Florisil cartridges used for sample cleanup must be checked by spiking with 2,4,5-trichlorophenol and the midpoint concentration of Individual Standard Mixture A.			
11.2	Are all samples listed on the Pesticide Florisil cartridge Check Form?			
11.3	Are percent recoveries of pesticide and surrogate compounds within control limit, 80-120%(if the recovery of 2,4,5-trichlorophenol < 5%), for the florisil cartridge check? If No, the raw data should be examined for the presence of polar interferences and professional judgement should be used in qualifying the data.			

Notes:

Florisil cleanup was performed, no laboratory submission for these CLP descriptors was provided.

12.0 Data Completeness				Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit 90%)	Pest	PCB	x		
	Number of samples:	1	1			
	Number of target compounds in each analysis:	21	7			
	Number of results rejected and not reported:	0	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)					
	% Completeness =	100%	100%			

Notes:

DATA VALIDATION WORKSHEET

Herbicides

Reviewer: AS
Date: February-04
DV Level: II III IV

Review Document:

__X__ Region III Modified for National Functional Guidelines
____ NFG for organic Data review (February 1994)
__X__ Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-4
Test Name: Herbicides
Method No.: 8151A

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. % solids		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes: four coolers @ 2.1C, 8.6C, 0.9C, & 0.8C

2.0 Holding Times		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?		see above	
	Action: If the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyese, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes:

57SB4A collected on 10/08/03, re-extracted on 10/17/03

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%		x	
	For initial Calibration: for %RSD > ±20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 25-150% for all samples and method blanks?		x	
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?		x	
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.		x	
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 25-150%?	x		
6.4	Are there any RPDs outside the QC limits not to exceed 60%?	x		
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes: MS/MSD see SDG 36440-1

7.0 Laboratory Control Sample (LCS)		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 25-150%?	x		
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?		x	
	Action: If Yes, J(+) only.			

Notes: original extraction Dinoseb LCS recovery low, re-extraction passed.

8.0 Field Duplicate		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes: QSB1A and SDB-3 submitted in SDG 36440-2 were both non-detect.

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.	x		
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.			x
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	x		

Notes:

10.0 Data Completeness			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		x		
	Number of samples:	1			
	Number of target compounds in each analysis:	10			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

DATA VALIDATION WORKSHEET
INORGANIC - ICP, CVAA, AND CYANIDE
REGION III - NATIONAL FUNCTIONAL GUIDELINES

Project Name: Radford SSP
SDG No.: 36440-4
Reviewer: AS
Project No.: 15291974.30000
Date: February-04

1.0 Chain of Custody/Sample Condition/Raw Data		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples which were analyzed?	x			x			x			x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x			x			x			x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x			x			x			x	
1.4	Does sample preservation, collection and storage meet method requirement? (For metal: water samples: with Nitric Acid to pH < 2, and soil/sediment samples: 4 $^{O}C \pm 2\ ^{O}C$)		x			x			x			x	
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes. % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	x			x			x			x		

Note: four coolers @ 2.1C, 8.6C, 0.9C, & 0.8C

2.0 Holding Time		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, CN: 14 days, other metals: 6 months) Action:L(+)/UL(-). If the holding time is grossly exceeded (twice the holding time criteria), L(+)/R(-).		x			x			x			x	

Note:

3.0 Instrument Calibration		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? (ICP& ICPMS: blank + one standard & a RL standard OR 3 standards and a blank with one standard at the RL; CVAA: blank + five standards with one standard at the RL). If not, qualify with "R".	7 + BLK			4 + BLK			5 + BLK			6 + BLK		
3.2	Are the correlation coefficients > 0.99? Action: J(+)/UJ(-).	x			x			x			x		
3.3	Once per calibration, did a high and low distilled standard recovery within 85-115%? If no, follow 3.6.										x		
3.4	Was an initial calibration check standard (labelled LCS by TriMatrix) analyzed immediately after instrument system had been calibrated? Action: If no, all associated data are rejected "R".	x			x			x			x		
3.5	Was continuing calibration standard (CCS) analyzed at a minimum frequency of 10% (every 10 samples) during an analytical run and at the end of the analytical run? If not, document and flag based on professional judgement.	x			x			x			x		
3.6	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? FOR ICP 90%-110%, FOR Hg 80-120%, FOR CN 85-115%.	x			x			x			x		
	ICV and CCV: Action: L(+)/R(-) L(+)/UL(-) K(+) Mercury < 65% 65% - 79% > 120% Cyanide < 65% 65% - 84% > 115% Other Metals < 75% 75% - 89% > 110%												
3.7	For ICP & ICPMS, did the CRDL standard recover between 80-120%?	x					x	x			x		
	<50% 50%-79% >120% 2xCRDL>[sample]>IDL L(+)/R(-) L(+)/UL(-) K							passed within 70-130%			passed within 80-120%		

Note: A high point added to Al, Ba, Ca, Fe, Mg, Mn, & K curves and the RLs were elevated by 5.

4.0 Blanks

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were method blank (MB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x			x			x			x		
4.2	Were calibration blanks (ICB and CCBs) analyzed immediately after each and every ICV and CCVs? Action: If no ICB was run, all associated data are rejected. If the frequency of the CCBs does not follow requirement, all associated data are qualified "J".	x			x			x			x		
4.3	Are there reported MB or ICB/CCBs values > RL?	x			x				x			x	
	Sample Results > RL												
	< 5X Blank Contamination B												
4.4	Are there negative blank results with the absolute value > RL?		x			x			x			x	
	Sample Results Non-detects > RL												
	< 5X absolute Blank Contamination UL L												
4.5	Are there reported field blank > ± RL?	x			x				x			x	
	Sample Results > RL												
	< 5X Blank Contamination B												

Note: _____

5.0 ICP Interference Check Sample (ICS)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1	Was ICS analyzed at beginning of each ICP run?	x			x								
5.2	Are the ICS AB recoveries within 80% - 120%?	x			x								
5.3	Are the results for unspiked analytes (in ICS A) < ± RL?	x			x								
5.4	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?			x			x						
	If not...												
	Action: Not Spiked Analytes Spiked analytes (ICS AB analytes)												
	< -IDL > IDL < 50% 50% - 79% >120%												
	L(+)/UL(-) K(+) L(+)/R(-) L(+)/UL(-) K(+)												

Note: _____

6.0 Laboratory Control Sample (LCS)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	x			x			x			x		
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)		x			x			x			x	
	Action: Solid: < LCL L(+)/UL(-); > UCL K(+). Aqueous: < 50% L(+)/R(-); 50% - 79% L(+)/UL(-); > 120% K(+)												

Note:

7.0 Laboratory Duplicates (MSD)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), using professional judgement, analytes not associated with duplicate results.	x			x			x			x		
	For aqueous 6010B and Hg - RPD< 25%, aqueous CN - RPD < 20%, aqueous 6020 - RPD < 20%, and for soil - use laboratory generated limits for MS/MSD.												
7.2	Are all analyte duplicate results within control limits? If no, qualify all associated field samples J(+)/UJ(-) for the analyte with results that fall outside criteria.	x			x			x			x		

Note:

8.0 Spike Sample Analysis -Pre-Digestion/Post-Digestion

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
8.1	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, batch, matrix and level)? If not, J(+) with professional judgement.	x			x			x			x		
8.2	For all analytes with sample concentration > 4 x spike concentration, are spike recoveries within the control limit of 75-125% for aqueous and lab limits for soil?												
	%R > 125% 30%< %R < 74% < 30%		x			x		x				x	
	Positive K L L												
	Non-detect None UL R												
8.3	Where pre-digestion matrix spike analytes were outside the acceptable recovery limits(except Ag), was a post-digestion spike performed? Note any failures in DV report, but no data qualifying action is required.	x			x			x					x

Note: 57SB2B Mg by 6010B MSD 121% (111), Tl MSD 84% (87), CN 74% (80)

9.0 Instrument Detection Limits (IDL)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1	Are all IDLs/RLs equal to or less than the reporting limits specified?	x			x			x			x		

Note:

10.0 ICP/AA Serial Dilutions (Not for Mercury Analysis)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	x			x								
10.2	Was a five-fold dilution performed?	x			x								
10.3	Did the serial dilution results agree within 10% for ICP analyte concentration > 5 X the RL for 6010 or > 20 X the RL for 6020 in the original sample? If no, J(+).	x				x							

Note: Serial Dilution: 57SB2B - Be, Co, K; post digestion spike recovery passes

11.0 Field Duplicate Samples		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?	x			x			x			x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.												
11.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report	x				x		x			x		

Note: _____

12.0 Result Verification/ Internal Standards/ Tune		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?	x			x			x			x		
12.2	Were all dilution reflected in the positive results and detection limits?	x			x			x			x		
12.3	Were the Internal Standard recoveries within 30-120%	x			x								
12.4	Were the tunes run at a minimum of four times with RSD < 5% for analytes in solution?	x											
12.5	Were the tune mass calibrations < 0.1 amu from the true value?	x											
12.6	Was the resolution check peak width < 0.9 amu at 10% peak height?	x											

Note: *69SB3C displayed yttrium internal at 148%. The sample was reanalyzed at DF5 elevating MDL but not RL as MDLx3 is still <RL.*

13.0 Completeness Calculation		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
13.1	Is % completeness within the control limits? (Control limit 90%)	x			x			x			x		
13.1.1	Number of samples: 21												
13.1.2	Number of target compounds in each analysis: various												
13.1.3	Number of results rejected and not reported: 0												
	% Completeness = (13.1.1 x 13.1.2 - 13.1.3) x 100/(13.1.1 x 13.1.2)												
	% Completeness = 100%	100%			100%			100%			100%		

Note: _____

Vol Soil Fridge
Big Cart

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1152

Project Number	Project Name
07604517	RFHAP

Project Contact (Name and Phone Number): Darren Renne (804) 765-9000

Samplers: Brett Fisher / John Spangler

LAB: Tri-Matrix

AIRBILL No: 000034

Courier:

ANALYSES

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, [redacted])	Dioxin/Furan(8290)	TAL Metals (Including Mercury)/CN	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	~~Paint Filter (9095B)~~ NERB	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
68SB3 A	10/7/03 810	S		X	5	F	/	5	X	X	X			X		X							345619
68SB3 B	10/7/03 830	S		X	5	F	/	5	X	X	X			X		X							345620
68SB3 C	10/7/03 850	S		X	5	F	/	5	X	X	X			X		X							345621
57SB1 A	10/7/03 1000	S		X	5	F	/	5	X	X	X			X		X							345622
57SB1 B	10/7/03 1015	S		X	5	F	/	5	X	X	X			X		X							345623
57SB1 C	10/7/03 1030	S		X	5	F	/	5	X	X	X			X		X							345624
57SB3 A	10/7/03 1100	S		X	5	F	/	5	X	X	X			X		X							345625
SBD6	10/7/03 —	S		X	5	F	/	5	X	X	X			X		X							345626
57SB3 B	10/7/03 1115	S		X	5	F	/	5	X	X	X			X		X							345627
57SB3 C	10/7/03 1130	S		X	5	F	/	5	X	X	X			X		X							345628
57SB2 A	10/7/03 1400	S		X	5	F	/	5	X	X	X			X		X							345629
57SB2 B	10/7/03 1420	S		X	5	F	/	5	X	X	X			X		X							345630
57SB2B MS/MSD	10/7/03 1420	S		X	5	F	/	6	X	X	X			X		X							—
57SB2 C	10/7/03 1440	S		X	5	F	/	5	X	X	X			X		X							345631

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
Brett Fisher	10/7/03 1800				
Relinquished by:	Date/time	Received by: (for lab) [signature]	Date/Time 10/8/03 8:50	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

TMO136 17-5 36440-4

TM0172 Cart 5
Volatile Soil

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1148

Project Number	Project Name
0960317	RFNAP

Project Contact (Name and Phone Number): Darren Penne (804) 765 9000

Samplers: Brett Fisher / John Spangler

LAB: Tri-Matrix

AIRBILL No: 000039

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330)	Dioxin/Furan(8290)	TAL Metals (Including Mercury) /Li/N	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	[redacted] Herb	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
575B4A	10/8/03 915	5		X	S	F	/	7	X	X	X	X	X	X		X						X	345737
695B1A	10/8/03 1130	5		X	S	F	/	5	X	X	X			X		X							345738
695B1B	10/8/03 1145	5		X	S	F	/	5	X	X	X			X		X							345739
695B1C	10/8/03 1200	5		X	S	F	/	5	X	X	X			X		X							345740
695B3A	10/8/03 1415	5		X	S	F	/	5	X	X	X			X		X							345741
5BD7	10/8/03 —	5		X	S	F	/	5	X	X	X			X		X							345742
695B3B	10/8/03 1430	5		X	S	F	/	5	X	X	X			X		X							345743
695B3C	10/8/03 1445	5		X	S	F	/	5	X	X	X			X		X							345744

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
[signature]	10/8/03 1800				
Relinquished by:	Date/time	Received by: (for lab) [signature]	Date/Time 10/9/03 8:40	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

36440-4

19-3

DATA VALIDATION REPORT - Level III Review

SDG No.: 36440-5 **Fraction:** VOCs, SVOCs, PAHs, Explosives, Pesticides, PCBs, Herbicides, Metals, & Cyanide

Lab: TriMatrix **Project Name:** Radford_SSP

Reviewer: AS **Date:** February_13,_2004

This report presents the findings of a review of the referenced data. The report consists of this summary, copies of data reports with data qualifying flags applied (as required), the completed data validation checklist, supporting documentation, and an explanation of the data qualifying flags employed. The review performed is based on the USEPA Region III Modifications to the National Functional Guidelines for Organic and Inorganic Data Review as pertains to the specifics of the analytical methods employed and provisions of the approved project-specific Quality Assurance Project Plan (QAPP).

Major Anomalies: None.

Minor Anomalies: For the VOC analyses, the method blank for batch 90061-120 contained acetone at 23 ug/Kg and methylene chloride at 4.0 ug/Kg. The method blank for batch 90061-121 contained acetone at 10 ug/Kg. The method blank for batch 90257-121 contained acetone at 10 ug/Kg. The method blank for batch 90037-122 contained methylene chloride at 27 ug/Kg. Positive results less than ten times the blank concentration were flagged "B,z" in the associated samples.

The associated equipment blank EQB5 submitted with sample delivery group 36440-6 displayed positive detections for acetone at 1.6 ug/L and methylene chloride at 0.60 ug/L. The field blank detection for methylene chloride was previously qualified due to a method blank detection. Positive associated soil boring sample results for acetone less than ten times the field blank concentration were previously flagged for method blank detections. No further data qualifying action was taken.

The continuing calibration analyzed on 10/20/03 at 1115 displayed a percent difference greater than the control limit (i.e., 20%) with a negative bias for methyl acetate at 23.6%. The associated field sample results were non-detect and were flagged "UJ,c". This continuing calibration also displayed percent differences greater than the control limit with a positive bias for methyl-tert-butyl ether at 22.0%, bromochloromethane at 24.0%, trans-1,3-dichloropropene at 23.3%, dibromochloromethane at 34.3%, bromoform at 33.1%, and 1,2-dibromo-3-chloropropane at 29.0%. The associated field sample results were non-detect, thus, no data qualifying action was required.

The continuing calibration analyzed on 10/21/03 at 0901 displayed a percent difference greater than the control limit with a negative bias for chloroethane at 24.1%. The associated field sample results were non-detect and were flagged "UJ,c". This continuing calibration also displayed percent differences greater than the control limit with a positive bias for trans-1,3-dichloropropene at 23.1%, dibromochloromethane at 24.8%, bromoform at 20.7%, and 1,2-dibromo-3-chloropropane at 31.6%. The associated field sample results were non-detect, thus, no data qualifying action was required.

The continuing calibration analyzed on 10/22/03 at 1151 displayed percent differences greater than the control limit with a negative bias for acetone at 28.4%, 4-methyl-2-pentanone at 26.8%, and 2-hexanone at 27.7%. The associated field sample results were non-detect and were flagged "UJ,c". This continuing calibration also displayed percent differences greater than the control limit with a positive bias for dichlorodifluoromethane at 20.3% and carbon disulfide at 22.5%. The associated field sample results were non-detect, thus, no data qualifying action was required.

The laboratory control spike for batch 90061-120 displayed recoveries greater than the laboratory generated upper control limits for bromoform at 133% and chlorodibromomethane at 135%. The laboratory control spike for batch 90061-121 displayed recoveries greater than the laboratory generated upper control limits for 1,2-dibromo-3-chloropropane at 132% and methyl acetate at 131%. The laboratory control spike for batch 90257-121 displayed recoveries greater than the laboratory generated upper control limits for 1,2-dibromo-3-chloropropane at 132% and methyl acetate at 131%. The laboratory control spike for batch 90037-122 displayed recoveries greater than the laboratory generated upper control limit (i.e., 139%) for carbon disulfide at 142%. The associated field sample results were non-detect while the laboratory control spike displayed a positive bias. No data qualifying action was required.

The matrix spike pair for sample 13SB7C displayed several percent recoveries less than the laboratory generated lower control limits. The matrix spike pair was reanalyzed and both of the matrix spikes displayed low recoveries again. The parent sample results for acetone and methylene chloride were previously flagged for method blank detections and no further data qualifying action was taken. All other parent sample results were non-detect and were flagged "UJ,m" for all recoveries that indicated a negative bias. This matrix spike pair also displayed relative percent differences greater than the laboratory generated control limits. The parent sample was positive for methyl ethyl ketone and this result was flagged "J,d". The matrix spike displayed a recovery greater than the upper control limit (i.e., 130%) for 1,2-dibromo-3-chloropropane. The laboratory control spike for this batch displayed a similar recovery and the associated parent sample result was non-detect. No data qualifying action was taken based on the matrix spike anomaly for 1,2-dibromo-3-chloropropane.

Sample 13SB12C displayed an internal standard area count less than the lower control limit (i.e., 50%) for 1,4-dichlorobenzene-d_4 at 42%. This sample was reanalyzed with similar results. Only the initial analysis was reported and should be used for data interpretation. All associated field sample results were non-detect and were flagged "UJ,i".

For the SVOC analyses, the method blank for extraction batch 90482-114 displayed positive detections for bis(2-ethylhexyl)phthalate at 26 ug/Kg and di-n-butylphthalate at 11 ug/Kg. Positive associated field sample results less than ten times the blank concentrations were flagged "B,z".

The equipment blank EQB5 contained bis(2-ethylhexyl)phthalate at 0.35 ug/L, butyl benzyl phthalate at 0.060 ug/L, and several tentatively identified compounds (TICs). The equipment blank detections for these phthalates were previously flagged due to method blank detections and no further data qualifying action was taken. Positive results less than five times the blank concentration of the TICs were flagged "B,x" in the associated soil boring field samples.

The continuing calibration analyzed on 11/01/03 at 0653 displayed a percent difference greater than the control limit (i.e., 20%) with a negative bias for 4-chloroaniline at 21.7%. The

continuing calibration analyzed on 11/01/03 at 2117 displayed a percent difference greater than the control limit with a negative bias for 2,4-dinitrophenol at 39.2%. The continuing calibration analyzed on 11/02/03 at 1249 displayed percent differences greater than the control limit with a negative bias for hexachlorocyclopentadiene at 28.0% and 2,4-dinitrophenol at 22.4%. The associated field sample results were non-detect and were flagged "UJ,c".

The laboratory control spike for batch 90482-114 displayed recoveries greater than the laboratory generated upper control limits for 2,4,5-trichlorophenol at 128%, 2,6-dinitrotoluene at 123%, 2-nitroaniline at 127%, 3,3'-dichlorobenzidine at 117%, acenaphthylene at 118%, benzo(b)fluoranthene at 125%, benzo(g,h,i)perylene at 130%, carbazole at 127%, dibenzo(a,h) anthracene at 126%, diethylphthalate at 119%, dimethylphthalate at 118%, fluorene at 121%, hexachlorocyclopentadiene at 115%, and indeno(1,2,3-cd)pyrene at 125%. The laboratory control spike for batch 90572-114 displayed a recovery greater than the laboratory generated upper control limit (i.e., 113%) for 3,3'-dichlorobenzidine at 120%. Positive associated field sample results were flagged "J,l".

The matrix spike pair for sample 13SB7C displayed percent recoveries less than the laboratory generated lower control limits for 2,4-dinitrophenol (15%/23%), 4-chloroaniline (26%), and hexachlorocyclopentadiene (12%/12%). The parent sample result for 2,4-dinitrophenol was previously flagged for a negative bias anomaly in the continuing calibration. Since the matrix spike recoveries were greater than the project QAPP lower limit (i.e., 10%), no data qualifying action was taken based on these anomalies. This matrix spike pair displayed percent recoveries greater than the laboratory generated upper control limits for 4-bromophenyl phenyl ether (114%), atrazine (124%/128%), benzo(k)fluoranthene (127%/134%), bis(2-ethylhexyl) phthalate (125%), butyl benzyl phthalate (121%), and fluorene (131%/127%). This matrix spike pair also displayed a relative percent difference greater than the laboratory generated control limit (i.e., 32%) for 2,4-dinitrophenol at 39%. All associated parent sample results were non-detect or previously flagged due to a method blank detection for bis(2-ethylhexyl) phthalate while the matrix spike recoveries exhibited a positive bias or imprecision. Since the matrix spike recoveries were less than the project QAPP upper limit (i.e., 150%), no data qualifying action was taken based on these anomalies.

The field duplicate pair (13SB12B and SBD8) displayed a relative percent difference greater than the control limit (i.e., 35%) for di-n-butylphthalate at 37.5%. These two results were flagged positive and were flagged "J,f".

Samples 13SB12B and SBD8 displayed concentrations that exceed the linear range of the analytical instrument initial calibration. These results were flagged "J,g". The samples were re-analyzed at a dilution factor of two and display acceptable results for these compounds that should be used for data interpretation.

For the PAH analyses, the 2-fluorobiphenyl surrogate percent recoveries were less than the laboratory generated lower control limit (i.e., 49%) for 69SB2B at 47%, 69SB2C at 46%, and 13SB11B at 45%. Positive associated field sample results were flagged "L,s" while non-detects were flagged "UL,s".

The field duplicate pair (13SB9A and SBD9) displayed relative percent differences greater than the control limit (i.e., 35%) for benzo(g,h,i)perylene at 77%, fluoranthene at 83%, and pyrene at 74%. The field duplicate pair results were positive for these compounds and were flagged "J,f".

For the explosive analyses, the continuing calibration analyzed on 10/23/03 at 0859 displayed a percent difference greater than the control limit (i.e., 15%) with a negative bias for 3-nitrotoluene at 16.5%. The continuing calibration analyzed on 10/23/03 at 1358 displayed a percent difference greater than the control limit with a negative bias for RDX at 23.0%. The continuing calibration analyzed on 10/23/03 at 1426 displayed a percent difference greater than the control limit with a negative bias for 3-nitrotoluene at 15.1%. The continuing calibration analyzed on 10/23/03 at 1952 displayed a percent difference greater than the control limit with a negative bias for RDX at 21.0%. The continuing calibration analyzed on 10/23/03 at 2019 displayed a percent difference greater than the control limit with a negative bias for 3-nitrotoluene at 18.3%. The positive associated field sample result was flagged "J,c" while non-detects were flagged "UJ,c". The continuing calibrations analyzed on 10/24/03 at 0119 and 0646 displayed percent differences greater than the control limit with a positive bias for 2,6-dinitrotoluene at 16.0% and 15.2%, respectively. The associated field sample results were non-detect for 2,6-dinitrotoluene while the continuing calibration displayed a positive bias. No data qualifying action was required.

The confirmation opening continuing calibration analyzed on 11/11/03 at 0817 displayed a percent difference greater than the control limit with a negative bias for RDX at 20.8%. The confirmation closing continuing calibration analyzed on 11/11/03 at 1317 displayed percent differences greater than the control limit with a negative bias for 2,4-dinitrotoluene at 15.1% and RDX at 35.8%. The laboratory reported the higher of the two concentrations for the positive 2,4-dinitrotoluene results from the primary column. The associated field sample results for RDX were previously flagged for a negative bias for the primary column continuing calibration. No further data qualifying action was taken based on these confirmation continuing calibration anomalies.

For the pesticide analyses, the continuing calibration analyzed on 10/31/03 at 0413 displayed percent differences greater than the control limit (i.e., 15%) with a positive bias for endrin at 21.6% and 4,4'-DDD at 19.9% on the front column. The associated field sample results were non-detect for endrin and 4,4'-DDD while the continuing calibration displayed a positive bias. No data qualifying action was required.

For the PCB analyses, the continuing calibration analyzed on 10/17/03 at 2007 displayed percent differences greater than the control limit (i.e., 15%) with a positive bias for aroclor 1016 at 17.7% and aroclor 1260 at 25.0% on the front column. The associated field sample results were non-detect while the continuing calibration displayed a positive bias. No data qualifying action was required.

For the herbicide analyses, the laboratory control spike for batch 90218-110 displayed a recovery less than the laboratory generated lower control limit (i.e., 50%) for dinoseb at 0% and a recovery greater than the laboratory generated upper control limit (i.e., 91%) for MCPP at 117%. The associated field sample results were non-detect for MCPP while the laboratory control spike displayed a positive bias, therefore, no data qualifying action was required. All dinoseb results from the original extraction were rejected and manually removed from the result forms by the reviewer. Only dinoseb results from the re-extraction should be used for data interpretation.

The surrogate recoveries were greater than the upper laboratory generated control limit (i.e., 114%) for both the original and re-extraction of sample 69SB2A. Since the associated field sample results were non-detect, no data qualifying action was required.

The closing continuing calibration displayed a percent difference greater than the control limit (i.e., 15%) with a positive bias for dicamba at 29.6% on column one and silvex at 17.0% on column two. The associated field sample results were non-detect. No data qualifying action was required.

For the metal analyses by 6020, the method blank for batch 90043-117 contained antimony at 0.082 mg/Kg and silver at 0.0060 mg/Kg. The method blank for batch 90112-120 contained lead at 0.098 mg/Kg. The associated positive field sample results less than five times the method blank concentrations were flagged "B,p". The equipment blank EQB5 contained chromium at 4.5 ug/L and thallium at 0.5 ug/L. The associated positive field sample results less than five times the equipment blank concentrations were flagged "B,x".

Samples 13SB11B and 13SB8A contained concentration of lead that interfered with the internal standard response for bismuth. The bismuth internal standard is used to quantitate thallium detections. TriMatrix used an alternate internal standard, holmium, and performed a seven replicate method detection limit (MDL) study for thallium using this alternate internal standard. The MDL for thallium using the holmium internal standard (0.0358 mg/Kg) could not be incorporated into the electronic data deliverable (EDD). The concentration of the thallium MDL for these two samples was manually corrected by URS within the EDD.

For the metal analyses by 6010B, the method blank for batch 90177-120 contained cobalt at 0.374 mg/Kg and sodium at 8.95 mg/Kg. The method blank for batch 90187-117 contained cobalt at 0.43 mg/Kg and iron at 14.9 mg/Kg. The associated positive field sample results were greater than five times the blank concentrations. No data qualifying action was required. The equipment blank EQB5 contained beryllium at 0.3 ug/L, iron at 7.6 ug/L, and sodium at 280 ug/L. The equipment blank results for beryllium, iron, and sodium were previously qualified due to method blank detections. No further data qualifying action was required.

The matrix spike pair performed on sample 13SB7C displayed percent recoveries greater than the laboratory generated upper control limits for calcium (133/129%), chromium (119/114%), and magnesium (127/142%). The associated field sample results were positive and were flagged "J,m", unless previously flagged for due to an equipment blank detection. The serial dilution performed on sample 13SB7C displayed percent differences greater than the control limit (i.e., 10%) for cobalt at 53.8% and copper at 21.1%. All associated field sample results were positive and were flagged "J,s".

The internal standard recovery was greater than the laboratory upper control limit (i.e., 120%) for yttrium during the neat analyses of samples 13SB7A at 135%, 13SB7B at 138%, 13SB7C at 149%, 13SB11A at 146%, 13SB11C at 152%, 13SB10A at 134%, 13SB10B at 137%, 13SB9A at 151%, and SBD9 at 151%. The samples were reanalyzed at a dilution factor of five and display acceptable internal standard recoveries. The associated field sample results for beryllium were reported from the dilution and display elevated method detection limits. Since the reporting limits were greater than three times the elevated method detection limits, the reporting limits were not elevated based on the dilution factor.

Correctable Anomalies: None.

Comments: Field coolers were received at the laboratory with internal temperatures less than the lower control limit (i.e., 2°C) at 0.9, 0.8, and 0.4 °C. Since the sample aliquots were not frozen and the containers were intact, no data qualifying action was taken.

Sample 69SB2C was analyzed at a medium level for VOC due to severe loss of internal standards for a neat original and a neat re-analysis. The sample reporting limits are appropriately elevated.

It should be noted that TIC results were flagged "NJ,t" in the associated samples. TIC results that were identified as unknown were manually lined out by the reviewer. The GIS-Key format is limited to 12 characters for a TIC CAS number. One SVOC TIC detection exceeded this limitation for samples 13SB10A and SBD9. The laboratory reported the CAS number without the dashes. The reviewer manually entered the dashes for evaluation purposes on the hardcopy result forms included in this report.

The concentrations reported for lead by SW6020 for samples 13SB11B at 26500 mg/Kg, 13SB8A at 8620 mg/Kg, 13SB12C at 1140 mg/Kg, and 13SB9A at 434 mg/Kg were greater than the concentrations not reported for lead from the SW6010B analyses for the same samples at 277 mg/Kg, 101 mg/Kg, 956 mg/Kg, and 378 mg/Kg, respectively. The two analyses have separate digestates. There was no evidence of laboratory contamination present in the method blanks. Due to the small initial volumes used for digestion, there may be fragments of lead that create heterogeneity.

No anomalies were encountered if a given fraction was not mentioned. All data are usable, as qualified, for their intended purpose based on the data reviewed.

Signed: Andrea Sansom

Andrea Sansom

Radford SSP
Duplicate Statistics

13SB9A and SBD9

	Units	RL	5xRL	Sample Conc		Duplicate Conc		%RPD	Delta	4xRL	Pass/Fail
Volatiles											
methyl ethyl ketone	ug/Kg	26	130	41		33		22%	8.0	104	Pass
acetone	ug/Kg	26	130	140		130		7.4%	10	104	Pass
methylene chloride	ug/Kg	26	130	5.7	J	5.7	J	0.0%	0.0	104	N/A
toluene	ug/Kg	6.4	32	2.7	J	0.69	J	119%	**2.0**	26	N/A
Semi-Volatiles											
2,4-dinitrotoluene	ug/Kg	220	1100	220		23	J	162%	197	880	N/A
4-chloro-3-methylphenol	ug/Kg	220	1100	25	J	8	J	103%	17	880	N/A
acenaphthene	ug/Kg	220	1100	10	J	7	J	35%	3.0	880	N/A
acephthylene	ug/Kg	220	1100	7.0	J	3	J	80%	4.0	880	N/A
anthracene	ug/Kg	220	1100	25	J	18	J	33%	7.0	880	N/A
benzo(a)anthracene	ug/Kg	220	1100	200	J	140	J	35%	60	880	N/A
benxo(a)pyrene	ug/Kg	220	1100	140	J	120	J	15%	20	880	N/A
benzo(b)fluoranthene	ug/Kg	220	1100	240		170	J	34%	70	880	N/A
benzo(g,h,i)perylene	ug/Kg	220	1100	46	J	58	J	23%	12	880	N/A
benzo(k)fluoranthene	ug/Kg	220	1100	93	J	85	J	9.0%	8.0	880	N/A
bis(2-ethylhexyl)phthalate	ug/Kg	220	1100	43	J	33	J	26%	10	880	N/A
carbazole	ug/Kg	220	1100	220	U	37	J	142%	183	880	N/A
chrysene	ug/Kg	220	1100	220		160	J	32%	60	880	N/A
dibenzo(a,h)anthracene	ug/Kg	220	1100	13	J	18	J	32%	5.0	880	N/A
diethylphthalate	ug/Kg	220	1100	230		44	J	136%	186	880	N/A
dimethylphthalate	ug/Kg	220	1100	18	J	210	U	168%	192	880	N/A
di-n-butylphthalate	ug/Kg	220	1100	580		430		30%	**150**	880	Pass
fluoranthene	ug/Kg	220	1100	260		190	J	31%	70	880	N/A
fluorene	ug/Kg	220	1100	6.0	J	4.0	J	40%	2.0	880	N/A
indeno(1,2,3-cd)pyrene	ug/Kg	220	1100	43	J	52	J	19%	9.0	880	N/A
n-nitroso-di-phenylamine	ug/Kg	220	1100	25	J	46	J	59%	21	880	N/A
phenanthene	ug/Kg	220	1100	79	J	60	J	27%	19.0	880	N/A
pyrene	ug/Kg	220	1100	230		170	J	30%	60.0	880	N/A
Polyaromatic Hydrocarbons											
acenaphthene	ug/Kg	130	650	17	J	130	U	154%	113	520	N/A
anthracene	ug/Kg	26	130	38		15		87%	**23**	104	N/A
benzo(a)anthracene	ug/Kg	26	130	130		61		72%	**69**	104	N/A
benxo(a)pyrene	ug/Kg	26	130	170		73		80%	**97**	104	N/A
benzo(b)fluoranthene	ug/Kg	26	130	120		56		73%	**64**	104	N/A
benzo(g,h,i)perylene	ug/Kg	26	130	540		240		**77%**	300	104	**Fail**
benzo(k)fluoranthene	ug/Kg	26	130	77		36		73%	**41**	104	N/A
chrysene	ug/Kg	26	130	150		74		68%	**76**	104	N/A
fluoranthene	ug/Kg	26	130	290		120		**83%**	170	104	**Fail**
fluorene	ug/Kg	26	130	11	J	26	U	81%	15	104	N/A
indeno(1,2,3-cd)pyrene	ug/Kg	26	130	100		46		74%	**54**	104	N/A
phenanthene	ug/Kg	26	130	130		50		89%	**80**	104	N/A
pyrene	ug/Kg	26	130	240		110		**74%**	130	104	**Fail**
Explosives											
BDL											
Pesticides											
BDL											
Polychlorinated Biphenyls											
BDL											
Herbicides											
BDL											
Metals											
aluminum	mg/Kg	50	250	20400		18600		9.2%	1800	200	Pass
antimony	mg/Kg	0.50	2.5	0.095	J	0.10	J	5.1%	0.005	2	N/A
arsenic	mg/Kg	0.40	2.0	2.7		2.4		12%	0.3	1.6	Pass
barium	mg/Kg	5.0	25	175		178		2%	3	20	Pass
beryllium	mg/Kg	1.0	5.0	1.2		1.1		9%	0.1	4	Pass
cadmium	mg/Kg	1.0	5.0	2.2		2.4		9%	0.2	4	Pass
calcium	mg/Kg	250	1250	1890		2070		9%	180	1000	Pass
chromium	mg/Kg	5.0	25	36		34		6%	2	20	Pass
cobalt	mg/Kg	1.0	5.0	13		13		0.0%	0	4	Pass
copper	mg/Kg	2.0	10.0	25		26		3.9%	1	8	Pass
iron	mg/Kg	200	1000	36500		35900		1.7%	600	800	Pass
lead	mg/Kg	50.0	250.0	434		396		9%	38	200	Pass
magnesium	mg/Kg	250	1250	3690		3690		0.0%	0	1000	Pass
manganese	mg/Kg	25.0	125	1240		1390		11%	150	100	Pass
mercury	mg/Kg	0.10	0.50	0.043	J	0.043	J	0%	0	0.4	N/A
nickel	mg/Kg	0.50	2.5	19		17		11%	2	2	Pass
potassium	mg/Kg	100	500	1980		1910		3.6%	70	400	Pass
selenium	mg/Kg	1.0	5.0	0.93	J	0.84	J	10%	0.09	4	N/A
silver	mg/Kg	3.0	15	0.12	J	0.12	J	0.0%	0	12	N/A
sodium	mg/Kg	100	500	44	J	45	J	2.2%	1	400	N/A
thallium	mg/Kg	0.50	2.5	0.78		0.95		20%	0.17	2	Pass
vanadium	mg/Kg	1.0	5.0	37		35		6%	2	4	Pass
zinc	mg/Kg	100	500	1010		969		4%	41	400	Pass
Cyanide											
Total Cyanide	mg/Kg	0.50	2.5	0.35	J	0.26	J	30%	0.09	2	N/A

Soil Control Limits

[sample] > 5 x RL, use 35%
[sample] < 5 x RL, use 4 x RL

URS
Measurement Systems DV Service

Radford SSP
Duplicate Statistics

13SB12B and SBD8

	Units	RL	5xRL	Sample Conc	Duplicate Conc	%RPD	Delta	4xRL	Pass/ Fail
Volatiles									
methyl ethyl ketone	ug/Kg	28	140	25 J	27 J	7.7%	2	112	N/A
acetone	ug/Kg	28	140	55 B	62 B	12%	7	112	N/A
methylene chloride	ug/Kg	28	140	6.9 B	6.1 B	12%	0.8	112	N/A
benzene	ug/Kg	7.0	35	7.0 U	1.0 J	150%	**6**	28	N/A
Semi-Volatiles									
2,4-dinitrotoluene	ug/Kg	240	1200	700	1500	73%	**800**	960	Pass
2,6-dinitrotoluene	ug/Kg	240	1200	61 J	56 J	8.5%	5	960	N/A
4-chloro-3-methylphenol	ug/Kg	240	1200	18 J	23 J	24%	5	960	N/A
bis(2-ethylhexyl)phthalate	ug/Kg	240	1200	360	300	18%	60	960	Pass
diethylphthalate	ug/Kg	240	1200	2200	2400	8.7%	200	960	Pass
dimethylphthalate	ug/Kg	240	1200	32 J	250 U	155%	218	960	N/A
di-n-butylphthalate	ug/Kg	240	1200	1300	1900	**37.5%**	600	960	**Fail**
fluoranthene	ug/Kg	240	1200	240 U	21 J	168%	219	960	N/A
n-nitroso-di-phenylamine	ug/Kg	240	1200	900	700	25%	200	960	Pass
phenanthrene	ug/Kg	240	1200	240 U	9.0 J	186%	231	960	N/A
pyrene	ug/Kg	240	1200	240 U	16 J	175%	224	960	N/A
Polyaromatic Hydrocarbons									
benzo(a)anthracene	ug/Kg	30	150	1.7 J	6 J	116%	4.7	120	N/A
benzo(a)pyrene	ug/Kg	30	150	30 U	8 J	116%	22	120	N/A
benzo(b)fluoranthene	ug/Kg	30	150	30 U	7 J	127%	23.3	120	N/A
benzo(g,h,i)perylene	ug/Kg	30	150	30 U	21 J	35%	9	120	N/A
chrysene	ug/Kg	30	150	30 U	7 J	127%	23.3	120	N/A
fluoranthene	ug/Kg	30	150	7.4 J	16 J	74%	8.6	120	N/A
indeon(1,2,3-cd)pyrene	ug/Kg	30	150	30 U	7 J	126%	23.2	120	N/A
phenanthrene	ug/Kg	30	150	2.2 J	3 J	20%	0.5	120	N/A
pyrene	ug/Kg	30	150	3.9 J	10 J	88%	6.1	120	N/A
Explosives									
fluoranthene	mg/Kg	0.50	2.5	0.50 U	0.32 J	44%	0.18	2	N/A
indeon(1,2,3-cd)pyrene	mg/Kg	0.50	2.5	0.55	0.56	2%	0.01	2	Pass
phenanthrene	mg/Kg	0.50	2.5	0.19 J	0.50 U	90%	0.31	2	N/A
pyrene	mg/Kg	0.50	2.5	0.29 J	0.50 U	53%	0.21	2	N/A
Metals									
aluminum	mg/Kg	50	250	9910	8930	10%	980	200	Pass
antimony	mg/Kg	0.50	2.5	1.1	1.30	17%	0.2	2	Pass
arsenic	mg/Kg	0.40	2.0	1.2	1.2	0.0%	0	1.6	Pass
barium	mg/Kg	5.0	25	106	102	3.8%	4	20	Pass
cadmium	mg/Kg	1.0	5.0	1.4	1.6	13%	0.2	4	Pass
calcium	mg/Kg	250	1250	4820	4640	3.8%	180	1000	Pass
chromium	mg/Kg	5.0	25	27	26	3.8%	1	20	Pass
cobalt	mg/Kg	1.0	5.0	6.4	6	1.6%	0.1	4	Pass
copper	mg/Kg	2.0	10.0	37	36	2.7%	1	8	Pass
iron	mg/Kg	100	500	15000	14700	2.0%	300	400	Pass
lead	mg/Kg	50.0	250.0	325	318	2.2%	7	200	Pass
magnesium	mg/Kg	250	1250	3270	3050	7.0%	220	1000	Pass
manganese	mg/Kg	5.0	25	280	291	3.9%	11	20	Pass
mercury	mg/Kg	0.10	0.50	0.041 J	0.035 J	16%	0.006	0.4	N/A
nickel	mg/Kg	0.50	2.5	11	10	14%	1.4	2	Pass
potassium	mg/Kg	100	500	1420	1290	9.6%	130	400	Pass
selenium	mg/Kg	1.0	5.0	0.39 J	0.41 J	5%	0.02	4	N/A
silver	mg/Kg	3.0	15	0.027 J	0.030 J	11%	0.003	12	N/A
sodium	mg/Kg	100	500	252	88 J	96%	**164**	400	N/A
thallium	mg/Kg	0.50	2.5	0.23 J	0.15 J	42%	0.08	2	N/A
vanadium	mg/Kg	1.0	5.0	17	17	0.0%	0	4	Pass
zinc	mg/Kg	4.0	20	377	426	12%	49	16	Pass
Cyanide									
Total Cyanide	mg/Kg	0.50	2.5	0.39 J	0.23 J	52%	0.16	2	N/A

Soil Control Limits

[sample] > 5 x RL, use 35%
[sample] < 5 x RL, use 4 x RL

URS
Measurement Systems DV Service

Radford SSP

Submittal No.	Lab Sample ID	Field Sample ID	Matrix (Code)	Sample Date
36440-5	345745	69SB2A	SO	10/08/03
36440-5	345746	69SB2B	SO	10/08/03
36440-5	345747	69SB2C	SO	10/08/03
36440-5	345748	57SB4B	SO	10/08/03
36440-5	345883	13SB7A	SO	10/09/03
36440-5	345884	13SB7B	SO	10/09/03
36440-5	345885	13SB7C	SO	10/09/03
36440-5	345886	13SB12A	SO	10/09/03
36440-5	345887	13SB12B	SO	10/09/03
36440-5	345888	SBD8	SO	10/09/03
36440-5	345889	13SB12C	SO	10/09/03
36440-5	345890	13SB11A	SO	10/09/03
36440-5	345891	13SB11B	SO	10/09/03
36440-5	345892	13SB11C	SO	10/09/03
36440-5	345893	13SB10A	SO	10/09/03
36440-5	345894	13SB10B	SO	10/09/03
36440-5	345895	13SB10C	SO	10/09/03
36440-5	345896	13SB9A	SO	10/09/03
36440-5	345897	SBD9	SO	10/09/03
36440-5	345898	13SB9B	SO	10/09/03
36440-5	345899	13SB9C	SO	10/09/03
36440-5	345900	13SB8A	SO	10/09/03
36440-5	345901	13SB8B	SO	10/09/03

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**69SB2A**	QC Batch:	90061 -120
Sample #:	**345745**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	83
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.0 U		6.0	0.511
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.0 U		6.0	0.911
79-34-5	1,1,2,2-Tetrachloroethane	6.0 U		6.0	0.784
79-00-5	1,1,2-Trichloroethane	6.0 U		6.0	0.712
75-34-3	1,1-Dichloroethane	6.0 U		6.0	0.869
75-35-4	1,1-Dichloroethylene	6.0 U		6.0	0.880
106-93-4	1,2-Dibromoethane	6.0 U		6.0	0.822
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.50
95-50-1	1,2-Dichlorobenzene	6.0 U		6.0	0.581
107-06-2	1,2-Dichloroethane	6.0 U		6.0	0.517
156-59-2	cis-1,2-Dichloroethene	6.0 U		6.0	0.852
156-60-5	trans-1,2-Dichloroethene	6.0 U		6.0	0.844
78-87-5	1,2-Dichloropropane	6.0 U		6.0	0.703
87-61-6	1,2,3-Trichlorobenzene	6.0 U		6.0	0.653
120-82-1	1,2,4-Trichlorobenzene	6.0 U		6.0	0.492
541-73-1	1,3-Dichlorobenzene	6.0 U		6.0	0.322
106-46-7	1,4-Dichlorobenzene	6.0 U		6.0	0.852
78-93-3	**Methyl Ethyl Ketone**	**30**		24	6.00
591-78-6	2-Hexanone	12 U		12	2.71
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.75
67-64-1	***Acetone**	**110 B**	B,Z	24	6.00
71-43-2	Benzene	6.0 U		6.0	0.632
74-97-5	Bromochloromethane	6.0 U		6.0	0.913
75-27-4	Dichlorobromomethane	6.0 U		6.0	0.601
75-25-2	Bromoform	6.0 U		6.0	0.694
74-83-9	Bromomethane	6.0 U		6.0	1.80
75-15-0	Carbon Disulfide	6.0 U		6.0	1.74
56-23-5	Carbon Tetrachloride	6.0 U		6.0	0.559
108-90-7	Chlorobenzene	6.0 U		6.0	0.793
75-00-3	Chloroethane	6.0 U		6.0	1.62
67-66-3	Chloroform	6.0 U		6.0	0.535

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**69SB2A**	QC Batch:	90061 -120
Sample #:	**345745**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	83
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	6.0 U	6.0	1.00
110-82-7	Cyclohexane	12 U	12	0.379
10061-01-5	cis-1,3-Dichloropropene	6.0 U	6.0	0.589
10061-02-6	trans-1,3-Dichloropropene	6.0 U	6.0	0.625
75-71-8	Dichlorodifluoromethane	6.0 U	6.0	0.802
124-48-1	Chlorodibromomethane	6.0 U	6.0	0.620
100-41-4	Ethylbenzene	6.0 U	6.0	0.508
98-82-8	Isopropylbenzene	6.0 U	6.0	0.655
79-20-9	Methyl Acetate	24 U	UJ,c 24	4.16
108-87-2	Methylcyclohexane	12 U	12	1.01
1634-04-4	Methyl(tert)butyl Ether	6.0 U	6.0	0.769
75-09-2	Methylene Chloride	24 U	24	3.37
100-42-5	Styrene	6.0 U	6.0	0.530
127-18-4	Tetrachloroethene	6.0 U	6.0	0.736
108-88-3	Toluene	6.0 U	6.0	0.557
79-01-6	Trichloroethene	6.0 U	6.0	0.812
75-69-4	Trichlorofluoromethane	6.0 U	6.0	0.892
75-01-4	Vinyl Chloride	6.0 U	6.0	0.444
1330-20-7	Xylene (Total)	6.0 U	6.0	0.505

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**69SB2A**	QC Batch:	90061 -120
Sample #:	**345745**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	83
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
Hexanal	66-25-1	17	E	NJ, +

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/20/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**69SB2B**	QC Batch:	90061 -120
Sample #:	**345746**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	79
Unit:	ug/kg dry	Dilution Factor:	1.26

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.3 U		6.3	0.537
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.3 U		6.3	0.956
79-34-5	1,1,2,2-Tetrachloroethane	6.3 U		6.3	0.823
79-00-5	1,1,2-Trichloroethane	6.3 U		6.3	0.747
75-34-3	1,1-Dichloroethane	6.3 U		6.3	0.912
75-35-4	1,1-Dichloroethylene	6.3 U		6.3	0.924
106-93-4	1,2-Dibromoethane	6.3 U		6.3	0.863
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	2.62
95-50-1	1,2-Dichlorobenzene	6.3 U		6.3	0.610
107-06-2	1,2-Dichloroethane	6.3 U		6.3	0.543
156-59-2	cis-1,2-Dichloroethene	6.3 U		6.3	0.895
156-60-5	trans-1,2-Dichloroethene	6.3 U		6.3	0.886
78-87-5	1,2-Dichloropropane	6.3 U		6.3	0.738
87-61-6	1,2,3-Trichlorobenzene	6.3 U		6.3	0.685
120-82-1	1,2,4-Trichlorobenzene	6.3 U		6.3	0.517
541-73-1	1,3-Dichlorobenzene	6.3 U		6.3	0.338
106-46-7	1,4-Dichlorobenzene	6.3 U		6.3	0.895
78-93-3	**Methyl Ethyl Ketone**	**23 J**		26	6.30
591-78-6	2-Hexanone	13 U		13	2.85
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.84
67-64-1	***Acetone**	**65 B**	B,Z	26	6.30
71-43-2	Benzene	6.3 U		6.3	0.664
74-97-5	Bromochloromethane	6.3 U		6.3	0.959
75-27-4	Dichlorobromomethane	6.3 U		6.3	0.631
75-25-2	Bromoform	6.3 U		6.3	0.728
74-83-9	Bromomethane	6.3 U		6.3	1.89
75-15-0	Carbon Disulfide	6.3 U		6.3	1.83
56-23-5	Carbon Tetrachloride	6.3 U		6.3	0.587
108-90-7	Chlorobenzene	6.3 U		6.3	0.833
75-00-3	Chloroethane	6.3 U		6.3	1.70
67-66-3	Chloroform	6.3 U		6.3	0.562

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**69SB2B**	QC Batch:	90061 -120
Sample #:	**345746**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	79
Unit:	ug/kg dry	Dilution Factor:	1.26

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	6.3 U	6.3	1.05
110-82-7	Cyclohexane	13 U	13	0.398
10061-01-5	cis-1,3-Dichloropropene	6.3 U	6.3	0.619
10061-02-6	trans-1,3-Dichloropropene	6.3 U	6.3	0.656
75-71-8	Dichlorodifluoromethane	6.3 U	6.3	0.842
124-48-1	Chlorodibromomethane	6.3 U	6.3	0.651
100-41-4	Ethylbenzene	6.3 U	6.3	0.533
98-82-8	Isopropylbenzene	6.3 U	6.3	0.688
79-20-9	Methyl Acetate	26 U	UJ,C 26	4.37
108-87-2	Methylcyclohexane	13 U	13	1.06
1634-04-4	Methyl(tert)butyl Ether	6.3 U	6.3	0.808
75-09-2	Methylene Chloride	26 U	26	3.54
100-42-5	Styrene	6.3 U	6.3	0.557
127-18-4	Tetrachloroethene	6.3 U	6.3	0.772
108-88-3	Toluene	6.3 U	6.3	0.585
79-01-6	Trichloroethene	6.3 U	6.3	0.853
75-69-4	Trichlorofluoromethane	6.3 U	6.3	0.936
75-01-4	Vinyl Chloride	6.3 U	6.3	0.466
1330-20-7	Xylene (Total)	6.3 U	6.3	0.530

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**69SB2B**	QC Batch:	90061 -120
Sample #:	**345746**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	79
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	CAS Number	Result (ug/kg dr	Qualifier
No compound was detected.			

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/22/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**69SB2C**	QC Batch:	90037 -122
Sample #:	**345747**	Anal. Batch:	208078
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	67 U		67	9.23
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	67 U		67	11.6
79-34-5	1,1,2,2-Tetrachloroethane	67 U		67	9.62
79-00-5	1,1,2-Trichloroethane	67 U		67	9.23
75-34-3	1,1-Dichloroethane	67 U		67	3.71
75-35-4	1,1-Dichloroethylene	67 U		67	8.65
106-93-4	1,2-Dibromoethane	67 U		67	11.1
96-12-8	1,2-Dibromo-3-chloropropane	130 U		130	17.6
95-50-1	1,2-Dichlorobenzene	67 U		67	10.7
107-06-2	1,2-Dichloroethane	67 U		67	7.22
156-59-2	cis-1,2-Dichloroethene	67 U		67	9.04
156-60-5	trans-1,2-Dichloroethene	67 U		67	9.30
78-87-5	1,2-Dichloropropane	67 U		67	16.6
87-61-6	1,2,3-Trichlorobenzene	67 U		67	14.8
120-82-1	1,2,4-Trichlorobenzene	67 U		67	12.3
541-73-1	1,3-Dichlorobenzene	67 U		67	10.4
106-46-7	1,4-Dichlorobenzene	67 U		67	8.06
78-93-3	**Methyl Ethyl Ketone**	**260 J**		670	27.0
591-78-6	2-Hexanone	670 U	UJ,c	670	29.6
108-10-1	4-Methyl-2-Pentanone	670 U	UJ,c	670	23.7
67-64-1	Acetone	670 U	UJ,c	670	69.6
71-43-2	Benzene	67 U		67	1.40
74-97-5	Bromochloromethane	67 U		67	4.93
75-27-4	Dichlorobromomethane	130 U		130	28.1
75-25-2	Bromoform	67 U		67	7.15
74-83-9	Bromomethane	67 U		67	17.4
75-15-0	Carbon Disulfide	67 U		67	3.86
56-23-5	Carbon Tetrachloride	67 U		67	7.48
108-90-7	Chlorobenzene	67 U		67	10.2
75-00-3	Chloroethane	67 U		67	11.7
67-66-3	Chloroform	67 U		67	6.57

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**69SB2C**	QC Batch:	90037 -122
Sample #:	**345747**	Anal. Batch:	208078
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	67 U	67	6.70
110-82-7	Cyclohexane	670 U	670	14.0
10061-01-5	cis-1,3-Dichloropropene	67 U	67	12.3
10061-02-6	trans-1,3-Dichloropropene	67 U	67	7.61
75-71-8	Dichlorodifluoromethane	67 U	67	7.80
124-48-1	Chlorodibromomethane	67 U	67	7.02
100-41-4	Ethylbenzene	67 U	67	12.7
98-82-8	Isopropylbenzene	67 U	67	5.86
79-20-9	Methyl Acetate	670 U	670	15.1
108-87-2	Methylcyclohexane	670 U	670	10.9
1634-04-4	Methyl(tert)butyl Ether	67 U	67	5.01
75-09-2	**Methylene Chloride**	**42 J** B,2	67	7.61
100-42-5	Styrene	67 U	67	8.91
127-18-4	Tetrachloroethene	67 U	67	12.5
108-88-3	Toluene	67 U	67	13.9
79-01-6	Trichloroethene	67 U	67	13.8
75-69-4	Trichlorofluoromethane	67 U	67	3.30
75-01-4	Vinyl Chloride	67 U	67	7.74
1330-20-7	Xylene (Total)	200 U	200	34.5

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**69SB2C**	QC Batch:	90037 -122
Sample #:	**345747**	Anal. Batch:	208078
Matrix:	Soil	Percent Solids:	75
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB4B**	QC Batch:	90061 -120
Sample #:	**345748**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.35

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.8 U		6.8	0.575
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.8 U		6.8	1.02
79-34-5	1,1,2,2-Tetrachloroethane	6.8 U		6.8	0.882
79-00-5	1,1,2-Trichloroethane	6.8 U		6.8	0.801
75-34-3	1,1-Dichloroethane	6.8 U		6.8	0.977
75-35-4	1,1-Dichloroethylene	6.8 U		6.8	0.990
106-93-4	1,2-Dibromoethane	6.8 U		6.8	0.925
96-12-8	1,2-Dibromo-3-chloropropane	14 U		14	2.81
95-50-1	1,2-Dichlorobenzene	6.8 U		6.8	0.653
107-06-2	1,2-Dichloroethane	6.8 U		6.8	0.582
156-59-2	cis-1,2-Dichloroethene	6.8 U		6.8	0.959
156-60-5	trans-1,2-Dichloroethene	6.8 U		6.8	0.949
78-87-5	1,2-Dichloropropane	6.8 U		6.8	0.791
87-61-6	1,2,3-Trichlorobenzene	6.8 U		6.8	0.734
120-82-1	1,2,4-Trichlorobenzene	6.8 U		6.8	0.554
541-73-1	1,3-Dichlorobenzene	6.8 U		6.8	0.362
106-46-7	1,4-Dichlorobenzene	6.8 U		6.8	0.959
78-93-3	**Methyl Ethyl Ketone**	**27 J**		28	6.75
591-78-6	2-Hexanone	14 U		14	3.05
108-10-1	4-Methyl-2-Pentanone	14 U		14	1.97
67-64-1	***Acetone**	**66 B**	B, Z	28	6.75
71-43-2	Benzene	6.8 U		6.8	0.711
74-97-5	Bromochloromethane	6.8 U		6.8	1.03
75-27-4	Dichlorobromomethane	6.8 U		6.8	0.676
75-25-2	Bromoform	6.8 U		6.8	0.780
74-83-9	Bromomethane	6.8 U		6.8	2.03
75-15-0	Carbon Disulfide	6.8 U		6.8	1.96
56-23-5	Carbon Tetrachloride	6.8 U		6.8	0.629
108-90-7	Chlorobenzene	6.8 U		6.8	0.892
75-00-3	Chloroethane	6.8 U		6.8	1.82
67-66-3	Chloroform	6.8 U		6.8	0.602

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB4B**	QC Batch:	90061 -120
Sample #:	**345748**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.35

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.8 U		6.8	1.13
110-82-7	Cyclohexane	14 U		14	0.427
10061-01-5	cis-1,3-Dichloropropene	6.8 U		6.8	0.663
10061-02-6	trans-1,3-Dichloropropene	6.8 U		6.8	0.703
75-71-8	Dichlorodifluoromethane	6.8 U		6.8	0.902
124-48-1	Chlorodibromomethane	6.8 U		6.8	0.698
100-41-4	Ethylbenzene	6.8 U		6.8	0.571
98-82-8	Isopropylbenzene	6.8 U		6.8	0.737
79-20-9	Methyl Acetate	28 U	UJ, C	28	4.68
108-87-2	Methylcyclohexane	14 U		14	1.14
1634-04-4	Methyl(tert)butyl Ether	6.8 U		6.8	0.865
75-09-2	Methylene Chloride	28 U		28	3.79
100-42-5	Styrene	6.8 U		6.8	0.597
127-18-4	Tetrachloroethene	6.8 U		6.8	0.828
108-88-3	Toluene	6.8 U		6.8	0.626
79-01-6	Trichloroethene	6.8 U		6.8	0.914
75-69-4	Trichlorofluoromethane	6.8 U		6.8	1.00
75-01-4	Vinyl Chloride	6.8 U		6.8	0.500
1330-20-7	Xylene (Total)	6.8 U		6.8	0.568

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB4B**	QC Batch:	90061 -120
Sample #:	**345748**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	74
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB7A**	QC Batch:	90061 -120
Sample #:	**345883**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.1 U		6.1	0.511
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.1 U		6.1	0.911
79-34-5	1,1,2,2-Tetrachloroethane	6.1 U		6.1	0.784
79-00-5	1,1,2-Trichloroethane	6.1 U		6.1	0.712
75-34-3	1,1-Dichloroethane	6.1 U		6.1	0.869
75-35-4	1,1-Dichloroethylene	6.1 U		6.1	0.880
106-93-4	1,2-Dibromoethane	6.1 U		6.1	0.822
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.50
95-50-1	1,2-Dichlorobenzene	6.1 U		6.1	0.581
107-06-2	1,2-Dichloroethane	6.1 U		6.1	0.517
156-59-2	cis-1,2-Dichloroethene	6.1 U		6.1	0.852
156-60-5	trans-1,2-Dichloroethene	6.1 U		6.1	0.844
78-87-5	1,2-Dichloropropane	6.1 U		6.1	0.703
87-61-6	1,2,3-Trichlorobenzene	6.1 U		6.1	0.653
120-82-1	1,2,4-Trichlorobenzene	6.1 U		6.1	0.492
541-73-1	1,3-Dichlorobenzene	6.1 U		6.1	0.322
106-46-7	1,4-Dichlorobenzene	6.1 U		6.1	0.852
78-93-3	**Methyl Ethyl Ketone**	**38**		24	6.00
591-78-6	2-Hexanone	12 U		12	2.71
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.75
67-64-1	**Acetone**	**140**	B,Z	24	6.00
71-43-2	Benzene	6.1 U		6.1	0.632
74-97-5	Bromochloromethane	6.1 U		6.1	0.913
75-27-4	Dichlorobromomethane	6.1 U		6.1	0.601
75-25-2	Bromoform	6.1 U		6.1	0.694
74-83-9	Bromomethane	6.1 U		6.1	1.80
75-15-0	Carbon Disulfide	6.1 U		6.1	1.74
56-23-5	Carbon Tetrachloride	6.1 U		6.1	0.559
108-90-7	Chlorobenzene	6.1 U		6.1	0.793
75-00-3	Chloroethane	6.1 U		6.1	1.62
67-66-3	Chloroform	6.1 U		6.1	0.535

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Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB7A**	QC Batch:	90061 -120
Sample #:	**345883**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.1 U		6.1	1.00
110-82-7	Cyclohexane	12 U		12	0.379
10061-01-5	cis-1,3-Dichloropropene	6.1 U		6.1	0.589
10061-02-6	trans-1,3-Dichloropropene	6.1 U		6.1	0.625
75-71-8	Dichlorodifluoromethane	6.1 U		6.1	0.802
124-48-1	Chlorodibromomethane	6.1 U		6.1	0.620
100-41-4	Ethylbenzene	6.1 U		6.1	0.508
98-82-8	Isopropylbenzene	6.1 U		6.1	0.655
79-20-9	Methyl Acetate	24 U	UJ,C	24	4.16
108-87-2	Methylcyclohexane	12 U		12	1.01
1634-04-4	Methyl(tert)butyl Ether	6.1 U		6.1	0.769
75-09-2	**Methylene Chloride**	**6.4 J**	B,Z	24	3.37
100-42-5	Styrene	6.1 U		6.1	0.530
127-18-4	Tetrachloroethene	6.1 U		6.1	0.736
108-88-3	Toluene	6.1 U		6.1	0.557
79-01-6	Trichloroethene	6.1 U		6.1	0.812
75-69-4	Trichlorofluoromethane	6.1 U		6.1	0.892
75-01-4	Vinyl Chloride	6.1 U		6.1	0.444
1330-20-7	Xylene (Total)	6.1 U		6.1	0.505

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB7A**	QC Batch:	90061 -120
Sample #:	**345883**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	82
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
Hexanal	66-25-1	13	E NJ, +

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB7B**	QC Batch:	90061 -120
Sample #:	**345884**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.2 U		6.2	0.511
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.2 U		6.2	0.911
79-34-5	1,1,2,2-Tetrachloroethane	6.2 U		6.2	0.784
79-00-5	1,1,2-Trichloroethane	6.2 U		6.2	0.712
75-34-3	1,1-Dichloroethane	6.2 U		6.2	0.869
75-35-4	1,1-Dichloroethylene	6.2 U		6.2	0.880
106-93-4	1,2-Dibromoethane	6.2 U		6.2	0.822
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.50
95-50-1	1,2-Dichlorobenzene	6.2 U		6.2	0.581
107-06-2	1,2-Dichloroethane	6.2 U		6.2	0.517
156-59-2	cis-1,2-Dichloroethene	6.2 U		6.2	0.852
156-60-5	trans-1,2-Dichloroethene	6.2 U		6.2	0.844
78-87-5	1,2-Dichloropropane	6.2 U		6.2	0.703
87-61-6	1,2,3-Trichlorobenzene	6.2 U		6.2	0.653
120-82-1	1,2,4-Trichlorobenzene	6.2 U		6.2	0.492
541-73-1	1,3-Dichlorobenzene	6.2 U		6.2	0.322
106-46-7	1,4-Dichlorobenzene	6.2 U		6.2	0.852
78-93-3	**Methyl Ethyl Ketone**	**37**		25	6.00
591-78-6	2-Hexanone	12 U		12	2.71
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.75
67-64-1	**Acetone**	**130**	B,Z	25	6.00
71-43-2	Benzene	6.2 U		6.2	0.632
74-97-5	Bromochloromethane	6.2 U		6.2	0.913
75-27-4	Dichlorobromomethane	6.2 U		6.2	0.601
75-25-2	Bromoform	6.2 U		6.2	0.694
74-83-9	Bromomethane	6.2 U		6.2	1.80
75-15-0	Carbon Disulfide	6.2 U		6.2	1.74
56-23-5	Carbon Tetrachloride	6.2 U		6.2	0.559
108-90-7	Chlorobenzene	6.2 U		6.2	0.793
75-00-3	Chloroethane	6.2 U		6.2	1.62
67-66-3	Chloroform	6.2 U		6.2	0.535

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB7B**	QC Batch:	90061 -120
Sample #:	**345884**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.2 U		6.2	1.00
110-82-7	Cyclohexane	12 U		12	0.379
10061-01-5	cis-1,3-Dichloropropene	6.2 U		6.2	0.589
10061-02-6	trans-1,3-Dichloropropene	6.2 U		6.2	0.625
75-71-8	Dichlorodifluoromethane	6.2 U		6.2	0.802
124-48-1	Chlorodibromomethane	6.2 U		6.2	0.620
100-41-4	Ethylbenzene	6.2 U		6.2	0.508
98-82-8	Isopropylbenzene	6.2 U		6.2	0.655
79-20-9	Methyl Acetate	25 U	UJ,C	25	4.16
108-87-2	Methylcyclohexane	12 U		12	1.01
1634-04-4	Methyl(tert)butyl Ether	6.2 U		6.2	0.769
75-09-2	**Methylene Chloride**	**6.8 J**	B,Z	25	3.37
100-42-5	Styrene	6.2 U		6.2	0.530
127-18-4	Tetrachloroethene	6.2 U		6.2	0.736
108-88-3	Toluene	6.2 U		6.2	0.557
79-01-6	Trichloroethene	6.2 U		6.2	0.812
75-69-4	Trichlorofluoromethane	6.2 U		6.2	0.892
75-01-4	Vinyl Chloride	6.2 U		6.2	0.444
1330-20-7	Xylene (Total)	6.2 U		6.2	0.505

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB7B**	QC Batch:	90061 -120
Sample #:	**345884**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	80
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB7C**	QC Batch:	90061 -120
Sample #:	**345885**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	79
Unit:	ug/kg dry	Dilution Factor:	1.26

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	*1,1,1-Trichloroethane	6.3 U	UJ,M	6.3	0.537
76-13-1	*1,1,2-Trichloro-1,2,2-trifluoroethane	6.3 U	UJ,M	6.3	0.956
79-34-5	*1,1,2,2-Tetrachloroethane	6.3 U		6.3	0.823
79-00-5	1,1,2-Trichloroethane	6.3 U		6.3	0.747
75-34-3	1,1-Dichloroethane	6.3 U		6.3	0.912
75-35-4	*1,1-Dichloroethylene	6.3 U	UJ,M	6.3	0.924
106-93-4	*1,2-Dibromoethane	6.3 U	UJ,M	6.3	0.863
96-12-8	*1,2-Dibromo-3-chloropropane	13 U		13	2.62
95-50-1	*1,2-Dichlorobenzene	6.3 U	UJ,M	6.3	0.610
107-06-2	1,2-Dichloroethane	6.3 U		6.3	0.543
156-59-2	cis-1,2-Dichloroethene	6.3 U		6.3	0.895
156-60-5	*trans-1,2-Dichloroethene	6.3 U	UJ,M	6.3	0.886
78-87-5	1,2-Dichloropropane	6.3 U		6.3	0.738
87-61-6	*1,2,3-Trichlorobenzene	6.3 U	UJ,M	6.3	0.685
120-82-1	*1,2,4-Trichlorobenzene	6.3 U	UJ,M	6.3	0.517
541-73-1	*1,3-Dichlorobenzene	6.3 U	UJ,M	6.3	0.338
106-46-7	*1,4-Dichlorobenzene	6.3 U	UJ,M	6.3	0.895
78-93-3	***Methyl Ethyl Ketone**	**29**	J,d	25	6.30
591-78-6	*2-Hexanone	13 U		13	2.85
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.84
67-64-1	***Acetone**	**110 B**	B,Z	25	6.30
71-43-2	*Benzene	6.3 U	UJ,M	6.3	0.664
74-97-5	Bromochloromethane	6.3 U		6.3	0.959
75-27-4	*Dichlorobromomethane	6.3 U		6.3	0.631
75-25-2	*Bromoform	6.3 U		6.3	0.728
74-83-9	Bromomethane	6.3 U		6.3	1.89
75-15-0	*Carbon Disulfide	6.3 U	UJ,M	6.3	1.83
56-23-5	*Carbon Tetrachloride	6.3 U	UJ,M	6.3	0.587
108-90-7	*Chlorobenzene	6.3 U	UJ,M	6.3	0.833
75-00-3	*Chloroethane	6.3 U	UJ,M	6.3	1.70
67-66-3	Chloroform	6.3 U		6.3	0.562

* See attached Statement of Data Qualifications.

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB7C**	QC Batch:	90061 -120
Sample #:	**345885**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	79
Unit:	ug/kg dry	Dilution Factor:	1.26

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.3 U		6.3	1.05
110-82-7	*Cyclohexane	13 U	UJ,M	13	0.398
10061-01-5	*cis-1,3-Dichloropropene	6.3 U		6.3	0.619
10061-02-6	*trans-1,3-Dichloropropene	6.3 U		6.3	0.656
75-71-8	*Dichlorodifluoromethane	6.3 U	UJ,M	6.3	0.842
124-48-1	*Chlorodibromomethane	6.3 U		6.3	0.651
100-41-4	*Ethylbenzene	6.3 U	UJ,M	6.3	0.533
98-82-8	*Isopropylbenzene	6.3 U	UJ,M	6.3	0.688
79-20-9	*Methyl Acetate	25 U	UJ,C	25	4.37
108-87-2	*Methylcyclohexane	13 U		13	1.06
1634-04-4	Methyl(tert)butyl Ether	6.3 U		6.3	0.808
75-09-2	***Methylene Chloride**	**7.2 J**	B,Z	25	3.54
100-42-5	*Styrene	6.3 U	UJ,M	6.3	0.557
127-18-4	*Tetrachloroethene	6.3 U	UJ,M	6.3	0.772
108-88-3	*Toluene	6.3 U	UJ,M	6.3	0.585
79-01-6	*Trichloroethene	6.3 U		6.3	0.853
75-69-4	*Trichlorofluoromethane	6.3 U	UJ,M	6.3	0.936
75-01-4	Vinyl Chloride	6.3 U		6.3	0.466
1330-20-7	*Xylene (Total)	6.3 U	UJ,M	6.3	0.530

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB7C**	QC Batch:	90061 -120
Sample #:	**345885**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	79
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB12A**	QC Batch:	90061 -120
Sample #:	**345886**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.4 U		6.4	0.554
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.4 U		6.4	0.987
79-34-5	1,1,2,2-Tetrachloroethane	6.4 U		6.4	0.849
79-00-5	1,1,2-Trichloroethane	6.4 U		6.4	0.771
75-34-3	1,1-Dichloroethane	6.4 U		6.4	0.941
75-35-4	1,1-Dichloroethylene	6.4 U		6.4	0.953
106-93-4	1,2-Dibromoethane	6.4 U		6.4	0.891
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	2.70
95-50-1	1,2-Dichlorobenzene	6.4 U		6.4	0.629
107-06-2	1,2-Dichloroethane	6.4 U		6.4	0.560
156-59-2	cis-1,2-Dichloroethene	6.4 U		6.4	0.923
156-60-5	trans-1,2-Dichloroethene	6.4 U		6.4	0.914
78-87-5	1,2-Dichloropropane	6.4 U		6.4	0.762
87-61-6	1,2,3-Trichlorobenzene	6.4 U		6.4	0.707
120-82-1	1,2,4-Trichlorobenzene	6.4 U		6.4	0.533
541-73-1	1,3-Dichlorobenzene	6.4 U		6.4	0.348
106-46-7	1,4-Dichlorobenzene	6.4 U		6.4	0.923
78-93-3	**Methyl Ethyl Ketone**	**26**		26	6.50
591-78-6	2-Hexanone	13 U		13	2.94
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.90
67-64-1	***Acetone**	**49 B**	B, Z	26	6.50
71-43-2	Benzene	6.4 U		6.4	0.685
74-97-5	Bromochloromethane	6.4 U		6.4	0.989
75-27-4	Dichlorobromomethane	6.4 U		6.4	0.651
75-25-2	Bromoform	6.4 U		6.4	0.751
74-83-9	Bromomethane	6.4 U		6.4	1.95
75-15-0	Carbon Disulfide	6.4 U		6.4	1.89
56-23-5	Carbon Tetrachloride	6.4 U		6.4	0.606
108-90-7	Chlorobenzene	6.4 U		6.4	0.859
75-00-3	Chloroethane	6.4 U		6.4	1.76
67-66-3	Chloroform	6.4 U		6.4	0.580

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB12A**	QC Batch:	90061 -120
Sample #:	**345886**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.4 U		6.4	1.08
110-82-7	Cyclohexane	13 U		13	0.411
10061-01-5	cis-1,3-Dichloropropene	6.4 U		6.4	0.638
10061-02-6	trans-1,3-Dichloropropene	6.4 U		6.4	0.677
75-71-8	Dichlorodifluoromethane	6.4 U		6.4	0.868
124-48-1	Chlorodibromomethane	6.4 U		6.4	0.672
100-41-4	Ethylbenzene	6.4 U		6.4	0.550
98-82-8	Isopropylbenzene	6.4 U		6.4	0.710
79-20-9	Methyl Acetate	26 U	UJ, c	26	4.51
108-87-2	Methylcyclohexane	13 U		13	1.10
1634-04-4	Methyl(tert)butyl Ether	6.4 U		6.4	0.833
75-09-2	**Methylene Chloride**	**4.7 J**	B, Z	26	3.65
100-42-5	Styrene	6.4 U		6.4	0.575
127-18-4	Tetrachloroethene	6.4 U		6.4	0.797
108-88-3	**Toluene**	**1.2 J**		6.4	0.603
79-01-6	Trichloroethene	6.4 U		6.4	0.880
75-69-4	Trichlorofluoromethane	6.4 U		6.4	0.966
75-01-4	Vinyl Chloride	6.4 U		6.4	0.481
1330-20-7	Xylene (Total)	6.4 U		6.4	0.547

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
Submittal #:	**36440-5**	Prepared:	n/a
Submittal:	Delivery Order 0046 RAAP	Prep. Method:	n/a
		Analyzed:	10/20/03 JDM
Sample ID:	**13SB12A**	Anal. Method:	USEPA-8260B
Sample #:	**345886**	QC Batch:	90061 -120
Matrix:	Soil	Anal. Batch:	208021
		Percent Solids:	78
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	CAS Number	Result (ug/kg dr	Qualifier
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB12B**	QC Batch:	90061 -120
Sample #:	**345887**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	7.0 U	7.0	0.596
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	7.0 U	7.0	1.06
79-34-5	1,1,2,2-Tetrachloroethane	7.0 U	7.0	0.914
79-00-5	1,1,2-Trichloroethane	7.0 U	7.0	0.830
75-34-3	1,1-Dichloroethane	7.0 U	7.0	1.01
75-35-4	1,1-Dichloroethylene	7.0 U	7.0	1.03
106-93-4	1,2-Dibromoethane	7.0 U	7.0	0.959
96-12-8	1,2-Dibromo-3-chloropropane	14 U	14	2.91
95-50-1	1,2-Dichlorobenzene	7.0 U	7.0	0.678
107-06-2	1,2-Dichloroethane	7.0 U	7.0	0.603
156-59-2	cis-1,2-Dichloroethene	7.0 U	7.0	0.994
156-60-5	trans-1,2-Dichloroethene	7.0 U	7.0	0.984
78-87-5	1,2-Dichloropropane	7.0 U	7.0	0.820
87-61-6	1,2,3-Trichlorobenzene	7.0 U	7.0	0.762
120-82-1	1,2,4-Trichlorobenzene	7.0 U	7.0	0.574
541-73-1	1,3-Dichlorobenzene	7.0 U	7.0	0.375
106-46-7	1,4-Dichlorobenzene	7.0 U	7.0	0.994
78-93-3	**Methyl Ethyl Ketone**	**25 J**	28	7.00
591-78-6	2-Hexanone	14 U	14	3.16
108-10-1	4-Methyl-2-Pentanone	14 U	14	2.04
67-64-1	***Acetone**	**55 B** B,Z	28	7.00
71-43-2	Benzene	7.0 U	7.0	0.738
74-97-5	Bromochloromethane	7.0 U	7.0	1.07
75-27-4	Dichlorobromomethane	7.0 U	7.0	0.701
75-25-2	Bromoform	7.0 U	7.0	0.809
74-83-9	Bromomethane	7.0 U	7.0	2.10
75-15-0	Carbon Disulfide	7.0 U	7.0	2.03
56-23-5	Carbon Tetrachloride	7.0 U	7.0	0.652
108-90-7	Chlorobenzene	7.0 U	7.0	0.925
75-00-3	Chloroethane	7.0 U	7.0	1.89
67-66-3	Chloroform	7.0 U	7.0	0.624

* See attached Statement of Data Qualifications.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB12B**	QC Batch:	90061 -120
Sample #:	**345887**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	7.0 U		7.0	1.17
110-82-7	Cyclohexane	14 U		14	0.442
10061-01-5	cis-1,3-Dichloropropene	7.0 U		7.0	0.687
10061-02-6	trans-1,3-Dichloropropene	7.0 U		7.0	0.729
75-71-8	Dichlorodifluoromethane	7.0 U		7.0	0.935
124-48-1	Chlorodibromomethane	7.0 U		7.0	0.724
100-41-4	Ethylbenzene	7.0 U		7.0	0.592
98-82-8	Isopropylbenzene	7.0 U		7.0	0.764
79-20-9	Methyl Acetate	28 U	VJ/c	28	4.86
108-87-2	Methylcyclohexane	14 U		14	1.18
1634-04-4	Methyl(tert)butyl Ether	7.0 U		7.0	0.897
75-09-2	**Methylene Chloride**	**6.9 J**	B,Z	28	3.93
100-42-5	Styrene	7.0 U		7.0	0.619
127-18-4	Tetrachloroethene	7.0 U		7.0	0.858
108-88-3	Toluene	7.0 U		7.0	0.650
79-01-6	Trichloroethene	7.0 U		7.0	0.948
75-69-4	Trichlorofluoromethane	7.0 U		7.0	1.04
75-01-4	Vinyl Chloride	7.0 U		7.0	0.518
1330-20-7	Xylene (Total)	7.0 U		7.0	0.589

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB12B**	QC Batch:	90061 -120
Sample #:	**345887**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	71
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD8**	QC Batch:	90061 -120
Sample #:	**345888**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	7.5 U	7.5	0.639
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	7.5 U	7.5	1.14
79-34-5	1,1,2,2-Tetrachloroethane	7.5 U	7.5	0.980
79-00-5	1,1,2-Trichloroethane	7.5 U	7.5	0.890
75-34-3	1,1-Dichloroethane	7.5 U	7.5	1.09
75-35-4	1,1-Dichloroethylene	7.5 U	7.5	1.10
106-93-4	1,2-Dibromoethane	7.5 U	7.5	1.03
96-12-8	1,2-Dibromo-3-chloropropane	15 U	15	3.12
95-50-1	1,2-Dichlorobenzene	7.5 U	7.5	0.726
107-06-2	1,2-Dichloroethane	7.5 U	7.5	0.647
156-59-2	cis-1,2-Dichloroethene	7.5 U	7.5	1.07
156-60-5	trans-1,2-Dichloroethene	7.5 U	7.5	1.05
78-87-5	1,2-Dichloropropane	7.5 U	7.5	0.879
87-61-6	1,2,3-Trichlorobenzene	7.5 U	7.5	0.816
120-82-1	1,2,4-Trichlorobenzene	7.5 U	7.5	0.615
541-73-1	1,3-Dichlorobenzene	7.5 U	7.5	0.402
106-46-7	1,4-Dichlorobenzene	7.5 U	7.5	1.07
78-93-3	**Methyl Ethyl Ketone**	**27 J**	30	7.50
591-78-6	2-Hexanone	15 U	15	3.39
108-10-1	4-Methyl-2-Pentanone	15 U	15	2.19
67-64-1	***Acetone**	**62 B** B,Z	30	7.50
71-43-2	**Benzene**	**1.0 J**	7.5	0.791
74-97-5	Bromochloromethane	7.5 U	7.5	1.14
75-27-4	Dichlorobromomethane	7.5 U	7.5	0.752
75-25-2	Bromoform	7.5 U	7.5	0.867
74-83-9	Bromomethane	7.5 U	7.5	2.25
75-15-0	Carbon Disulfide	7.5 U	7.5	2.18
56-23-5	Carbon Tetrachloride	7.5 U	7.5	0.699
108-90-7	Chlorobenzene	7.5 U	7.5	0.992
75-00-3	Chloroethane	7.5 U	7.5	2.03
67-66-3	Chloroform	7.5 U	7.5	0.669

* See attached Statement of Data Qualifications.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD8**	QC Batch:	90061 -120
Sample #:	**345888**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	7.5 U		7.5	1.25
110-82-7	Cyclohexane	15 U		15	0.474
10061-01-5	cis-1,3-Dichloropropene	7.5 U		7.5	0.737
10061-02-6	trans-1,3-Dichloropropene	7.5 U		7.5	0.782
75-71-8	Dichlorodifluoromethane	7.5 U		7.5	1.00
124-48-1	Chlorodibromomethane	7.5 U		7.5	0.776
100-41-4	Ethylbenzene	7.5 U		7.5	0.635
98-82-8	Isopropylbenzene	7.5 U		7.5	0.819
79-20-9	Methyl Acetate	30 U	VJ,C	30	5.21
108-87-2	Methylcyclohexane	15 U		15	1.27
1634-04-4	Methyl(tert)butyl Ether	7.5 U		7.5	0.962
75-09-2	**Methylene Chloride**	**6.1 J**	B,Z	30	4.22
100-42-5	Styrene	7.5 U		7.5	0.663
127-18-4	Tetrachloroethene	7.5 U		7.5	0.920
108-88-3	Toluene	7.5 U		7.5	0.696
79-01-6	Trichloroethene	7.5 U		7.5	1.02
75-69-4	Trichlorofluoromethane	7.5 U		7.5	1.11
75-01-4	Vinyl Chloride	7.5 U		7.5	0.555
1330-20-7	Xylene (Total)	7.5 U		7.5	0.632

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD8**	QC Batch:	90061 -120
Sample #:	**345888**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	67
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/20/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**13SB12C**	QC Batch:	90061 -120
Sample #:	**345889**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	62
Unit:	ug/kg dry	Dilution Factor:	1.6

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	8.1 U		8.1	0.682
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	8.1 U		8.1	1.21
79-34-5	*1,1,2,2-Tetrachloroethane	8.1 UJ	UJ,i	8.1	1.04
79-00-5	1,1,2-Trichloroethane	8.1 U		8.1	0.949
75-34-3	1,1-Dichloroethane	8.1 U		8.1	1.16
75-35-4	1,1-Dichloroethylene	8.1 U		8.1	1.17
106-93-4	1,2-Dibromoethane	8.1 U		8.1	1.10
96-12-8	*1,2-Dibromo-3-chloropropane	16 UJ	UJ,i	16	3.33
95-50-1	*1,2-Dichlorobenzene	8.1 UJ	UJ,i	8.1	0.774
107-06-2	1,2-Dichloroethane	8.1 U		8.1	0.690
156-59-2	cis-1,2-Dichloroethene	8.1 U		8.1	1.14
156-60-5	trans-1,2-Dichloroethene	8.1 U		8.1	1.12
78-87-5	1,2-Dichloropropane	8.1 U		8.1	0.938
87-61-6	*1,2,3-Trichlorobenzene	8.1 UJ	UJ,i	8.1	0.870
120-82-1	*1,2,4-Trichlorobenzene	8.1 UJ	UJ,i	8.1	0.656
541-73-1	*1,3-Dichlorobenzene	8.1 UJ	UJ,i	8.1	0.429
106-46-7	*1,4-Dichlorobenzene	8.1 UJ	UJ,i	8.1	1.14
78-93-3	Methyl Ethyl Ketone	32 U		32	8.00
591-78-6	2-Hexanone	16 U		16	3.62
108-10-1	4-Methyl-2-Pentanone	16 U		16	2.34
67-64-1	***Acetone**	**63 B**	B,z	32	8.00
71-43-2	Benzene	8.1 U		8.1	0.843
74-97-5	Bromochloromethane	8.1 U		8.1	1.22
75-27-4	Dichlorobromomethane	8.1 U		8.1	0.802
75-25-2	Bromoform	8.1 U		8.1	0.925
74-83-9	Bromomethane	8.1 U		8.1	2.40
75-15-0	Carbon Disulfide	8.1 U		8.1	2.32
56-23-5	Carbon Tetrachloride	8.1 U		8.1	0.746
108-90-7	Chlorobenzene	8.1 U		8.1	1.06
75-00-3	Chloroethane	8.1 U		8.1	2.16
67-66-3	Chloroform	8.1 U		8.1	0.714

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB12C**	QC Batch:	90061 -120
Sample #:	**345889**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	62
Unit:	ug/kg dry	Dilution Factor:	1.6

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	8.1 U		8.1	1.33
110-82-7	Cyclohexane	16 U		16	0.506
10061-01-5	cis-1,3-Dichloropropene	8.1 U		8.1	0.786
10061-02-6	trans-1,3-Dichloropropene	8.1 U		8.1	0.834
75-71-8	Dichlorodifluoromethane	8.1 U		8.1	1.07
124-48-1	Chlorodibromomethane	8.1 U		8.1	0.827
100-41-4	Ethylbenzene	8.1 U		8.1	0.677
98-82-8	*Isopropylbenzene	8.1 UJ	UJ;	8.1	0.874
79-20-9	Methyl Acetate	32 U	UJ,C	32	5.55
108-87-2	Methylcyclohexane	16 U		16	1.35
1634-04-4	Methyl(tert)butyl Ether	8.1 U		8.1	1.03
75-09-2	Methylene Chloride	32 U		32	4.50
100-42-5	Styrene	8.1 U		8.1	0.707
127-18-4	Tetrachloroethene	8.1 U		8.1	0.981
108-88-3	Toluene	8.1 U		8.1	0.742
79-01-6	Trichloroethene	8.1 U		8.1	1.08
75-69-4	Trichlorofluoromethane	8.1 U		8.1	1.19
75-01-4	Vinyl Chloride	8.1 U		8.1	0.592
1330-20-7	Xylene (Total)	8.1 U		8.1	0.674

* See attached Statement of Data Qualifications.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB12C**	QC Batch:	90061 -120
Sample #:	**345889**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	62
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
Ethyl Ether	60-29-7	28	Q	NJ, +

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB11A**	QC Batch:	90061 -120
Sample #:	**345890**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.5 U	6.5	0.554
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.5 U	6.5	0.987
79-34-5	1,1,2,2-Tetrachloroethane	6.5 U	6.5	0.849
79-00-5	1,1,2-Trichloroethane	6.5 U	6.5	0.771
75-34-3	1,1-Dichloroethane	6.5 U	6.5	0.941
75-35-4	1,1-Dichloroethylene	6.5 U	6.5	0.953
106-93-4	1,2-Dibromoethane	6.5 U	6.5	0.891
96-12-8	1,2-Dibromo-3-chloropropane	13 U	13	2.70
95-50-1	1,2-Dichlorobenzene	6.5 U	6.5	0.629
107-06-2	1,2-Dichloroethane	6.5 U	6.5	0.560
156-59-2	cis-1,2-Dichloroethene	6.5 U	6.5	0.923
156-60-5	trans-1,2-Dichloroethene	6.5 U	6.5	0.914
78-87-5	1,2-Dichloropropane	6.5 U	6.5	0.762
87-61-6	1,2,3-Trichlorobenzene	6.5 U	6.5	0.707
120-82-1	1,2,4-Trichlorobenzene	6.5 U	6.5	0.533
541-73-1	1,3-Dichlorobenzene	6.5 U	6.5	0.348
106-46-7	1,4-Dichlorobenzene	6.5 U	6.5	0.923
78-93-3	**Methyl Ethyl Ketone**	**45**	26	6.50
591-78-6	2-Hexanone	13 U	13	2.94
108-10-1	4-Methyl-2-Pentanone	13 U	13	1.90
67-64-1	**Acetone**	**240**	26	6.50
71-43-2	**Benzene**	**0.91 J**	6.5	0.685
74-97-5	Bromochloromethane	6.5 U	6.5	0.989
75-27-4	Dichlorobromomethane	6.5 U	6.5	0.651
75-25-2	Bromoform	6.5 U	6.5	0.751
74-83-9	Bromomethane	6.5 U	6.5	1.95
75-15-0	Carbon Disulfide	6.5 U	6.5	1.89
56-23-5	Carbon Tetrachloride	6.5 U	6.5	0.606
108-90-7	Chlorobenzene	6.5 U	6.5	0.859
75-00-3	Chloroethane	6.5 U	6.5	1.76
67-66-3	Chloroform	6.5 U	6.5	0.580

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB11A**	QC Batch:	90061 -120
Sample #:	**345890**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.5 U		6.5	1.08
110-82-7	Cyclohexane	13 U		13	0.411
10061-01-5	cis-1,3-Dichloropropene	6.5 U		6.5	0.638
10061-02-6	trans-1,3-Dichloropropene	6.5 U		6.5	0.677
75-71-8	Dichlorodifluoromethane	6.5 U		6.5	0.868
124-48-1	Chlorodibromomethane	6.5 U		6.5	0.672
100-41-4	Ethylbenzene	6.5 U		6.5	0.550
98-82-8	Isopropylbenzene	6.5 U		6.5	0.710
79-20-9	Methyl Acetate	26 U	VJ,C	26	4.51
108-87-2	Methylcyclohexane	13 U		13	1.10
1634-04-4	Methyl(tert)butyl Ether	6.5 U		6.5	0.833
75-09-2	**Methylene Chloride**	**7.3 J**	B,Z	26	3.65
100-42-5	Styrene	6.5 U		6.5	0.575
127-18-4	Tetrachloroethene	6.5 U		6.5	0.797
108-88-3	**Toluene**	**1.9 J**		6.5	0.603
79-01-6	**Trichloroethene**	**9.6**		6.5	0.880
75-69-4	Trichlorofluoromethane	6.5 U		6.5	0.966
75-01-4	Vinyl Chloride	6.5 U		6.5	0.481
1330-20-7	Xylene (Total)	6.5 U		6.5	0.547

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB11A**	QC Batch:	90061 -120
Sample #:	**345890**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	77
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB11B**	QC Batch:	90061 -120
Sample #:	**345891**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	88
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	5.7 U		5.7	0.469
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.7 U		5.7	0.835
79-34-5	1,1,2,2-Tetrachloroethane	5.7 U		5.7	0.718
79-00-5	1,1,2-Trichloroethane	5.7 U		5.7	0.652
75-34-3	1,1-Dichloroethane	5.7 U		5.7	0.796
75-35-4	1,1-Dichloroethylene	5.7 U		5.7	0.806
106-93-4	1,2-Dibromoethane	5.7 U		5.7	0.754
96-12-8	1,2-Dibromo-3-chloropropane	11 U		11	2.29
95-50-1	1,2-Dichlorobenzene	5.7 U		5.7	0.532
107-06-2	1,2-Dichloroethane	5.7 U		5.7	0.474
156-59-2	**cis-1,2-Dichloroethene**	**1.9 J**		5.7	0.781
156-60-5	trans-1,2-Dichloroethene	5.7 U		5.7	0.773
78-87-5	1,2-Dichloropropane	5.7 U		5.7	0.645
87-61-6	1,2,3-Trichlorobenzene	5.7 U		5.7	0.598
120-82-1	1,2,4-Trichlorobenzene	5.7 U		5.7	0.451
541-73-1	1,3-Dichlorobenzene	5.7 U		5.7	0.295
106-46-7	1,4-Dichlorobenzene	5.7 U		5.7	0.781
78-93-3	**Methyl Ethyl Ketone**	**32**		23	5.50
591-78-6	2-Hexanone	11 U		11	2.49
108-10-1	4-Methyl-2-Pentanone	11 U		11	1.61
67-64-1	**Acetone**	**150**	B,Z	23	5.50
71-43-2	**Benzene**	**1.5 J**		5.7	0.580
74-97-5	Bromochloromethane	5.7 U		5.7	0.837
75-27-4	Dichlorobromomethane	5.7 U		5.7	0.551
75-25-2	Bromoform	5.7 U		5.7	0.636
74-83-9	Bromomethane	5.7 U		5.7	1.65
75-15-0	Carbon Disulfide	5.7 U		5.7	1.60
56-23-5	Carbon Tetrachloride	5.7 U		5.7	0.513
108-90-7	Chlorobenzene	5.7 U		5.7	0.727
75-00-3	Chloroethane	5.7 U		5.7	1.49
67-66-3	Chloroform	5.7 U		5.7	0.491

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB11B**	QC Batch:	90061 -120
Sample #:	**345891**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	88
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	5.7 U		5.7	0.917
110-82-7	Cyclohexane	11 U		11	0.348
10061-01-5	cis-1,3-Dichloropropene	5.7 U		5.7	0.540
10061-02-6	trans-1,3-Dichloropropene	5.7 U		5.7	0.573
75-71-8	Dichlorodifluoromethane	5.7 U		5.7	0.735
124-48-1	Chlorodibromomethane	5.7 U		5.7	0.569
100-41-4	Ethylbenzene	5.7 U		5.7	0.465
98-82-8	Isopropylbenzene	5.7 U		5.7	0.601
79-20-9	Methyl Acetate	23 U	UJ,C	23	3.82
108-87-2	Methylcyclohexane	11 U		11	0.930
1634-04-4	Methyl(tert)butyl Ether	5.7 U		5.7	0.705
75-09-2	**Methylene Chloride**	**6.1 J**	B,Z	23	3.09
100-42-5	Styrene	5.7 U		5.7	0.486
127-18-4	Tetrachloroethene	5.7 U		5.7	0.674
108-88-3	**Toluene**	**1.4 J**		5.7	0.510
79-01-6	**Trichloroethene**	**31**		5.7	0.745
75-69-4	Trichlorofluoromethane	5.7 U		5.7	0.817
75-01-4	Vinyl Chloride	5.7 U		5.7	0.407
1330-20-7	Xylene (Total)	5.7 U		5.7	0.463

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Individual sample results relate only to the sample tested.
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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB11B**	QC Batch:	90061 -120
Sample #:	**345891**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	88
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
Hexanal	66-25-1	8.9	E

NJ+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/20/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**13SB11C**	QC Batch:	90061 -120
Sample #:	**345892**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.5 U	6.5	0.554
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.5 U	6.5	0.987
79-34-5	1,1,2,2-Tetrachloroethane	6.5 U	6.5	0.849
79-00-5	1,1,2-Trichloroethane	6.5 U	6.5	0.771
75-34-3	1,1-Dichloroethane	6.5 U	6.5	0.941
75-35-4	1,1-Dichloroethylene	6.5 U	6.5	0.953
106-93-4	1,2-Dibromoethane	6.5 U	6.5	0.891
96-12-8	1,2-Dibromo-3-chloropropane	13 U	13	2.70
95-50-1	1,2-Dichlorobenzene	6.5 U	6.5	0.629
107-06-2	1,2-Dichloroethane	6.5 U	6.5	0.560
156-59-2	**cis-1,2-Dichloroethene**	**4.2 J**	6.5	0.923
156-60-5	trans-1,2-Dichloroethene	6.5 U	6.5	0.914
78-87-5	1,2-Dichloropropane	6.5 U	6.5	0.762
87-61-6	1,2,3-Trichlorobenzene	6.5 U	6.5	0.707
120-82-1	1,2,4-Trichlorobenzene	6.5 U	6.5	0.533
541-73-1	1,3-Dichlorobenzene	6.5 U	6.5	0.348
106-46-7	1,4-Dichlorobenzene	6.5 U	6.5	0.923
78-93-3	**Methyl Ethyl Ketone**	**40**	26	6.50
591-78-6	2-Hexanone	13 U	13	2.94
108-10-1	4-Methyl-2-Pentanone	13 U	13	1.90
67-64-1	**Acetone**	**200** B,Z	26	6.50
71-43-2	**Benzene**	**1.5 J**	6.5	0.685
74-97-5	Bromochloromethane	6.5 U	6.5	0.989
75-27-4	Dichlorobromomethane	6.5 U	6.5	0.651
75-25-2	Bromoform	6.5 U	6.5	0.751
74-83-9	Bromomethane	6.5 U	6.5	1.95
75-15-0	Carbon Disulfide	6.5 U	6.5	1.89
56-23-5	Carbon Tetrachloride	6.5 U	6.5	0.606
108-90-7	Chlorobenzene	6.5 U	6.5	0.859
75-00-3	Chloroethane	6.5 U	6.5	1.76
67-66-3	Chloroform	6.5 U	6.5	0.580

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB11C**	QC Batch:	90061 -120
Sample #:	**345892**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.5 U		6.5	1.08
110-82-7	Cyclohexane	13 U		13	0.411
10061-01-5	cis-1,3-Dichloropropene	6.5 U		6.5	0.638
10061-02-6	trans-1,3-Dichloropropene	6.5 U		6.5	0.677
75-71-8	Dichlorodifluoromethane	6.5 U		6.5	0.868
124-48-1	Chlorodibromomethane	6.5 U		6.5	0.672
100-41-4	Ethylbenzene	6.5 U		6.5	0.550
98-82-8	Isopropylbenzene	6.5 U		6.5	0.710
79-20-9	Methyl Acetate	26 U	UJ/C	26	4.51
108-87-2	Methylcyclohexane	13 U		13	1.10
1634-04-4	Methyl(tert)butyl Ether	6.5 U		6.5	0.833
75-09-2	**Methylene Chloride**	**5.8 J**	B/Z	26	3.65
100-42-5	Styrene	6.5 U		6.5	0.575
127-18-4	Tetrachloroethene	6.5 U		6.5	0.797
108-88-3	**Toluene**	**1.1 J**		6.5	0.603
79-01-6	**Trichloroethene**	**57**		6.5	0.880
75-69-4	Trichlorofluoromethane	6.5 U		6.5	0.966
75-01-4	Vinyl Chloride	6.5 U		6.5	0.481
1330-20-7	Xylene (Total)	6.5 U		6.5	0.547

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB11C**	QC Batch:	90061 -120
Sample #:	**345892**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	77
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
Hexanal	66-25-1	4.7	E

NJA

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB10A**	QC Batch:	90061 -120
Sample #:	**345893**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	7.0 U	7.0	0.596
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	7.0 U	7.0	1.06
79-34-5	1,1,2,2-Tetrachloroethane	7.0 U	7.0	0.914
79-00-5	1,1,2-Trichloroethane	7.0 U	7.0	0.830
75-34-3	1,1-Dichloroethane	7.0 U	7.0	1.01
75-35-4	1,1-Dichloroethylene	7.0 U	7.0	1.03
106-93-4	1,2-Dibromoethane	7.0 U	7.0	0.959
96-12-8	1,2-Dibromo-3-chloropropane	14 U	14	2.91
95-50-1	1,2-Dichlorobenzene	7.0 U	7.0	0.678
107-06-2	1,2-Dichloroethane	7.0 U	7.0	0.603
156-59-2	cis-1,2-Dichloroethene	7.0 U	7.0	0.994
156-60-5	trans-1,2-Dichloroethene	7.0 U	7.0	0.984
78-87-5	1,2-Dichloropropane	7.0 U	7.0	0.820
87-61-6	1,2,3-Trichlorobenzene	7.0 U	7.0	0.762
120-82-1	**1,2,4-Trichlorobenzene**	**0.96 J**	7.0	0.574
541-73-1	1,3-Dichlorobenzene	7.0 U	7.0	0.375
106-46-7	1,4-Dichlorobenzene	7.0 U	7.0	0.994
78-93-3	**Methyl Ethyl Ketone**	**39**	28	7.00
591-78-6	2-Hexanone	14 U	14	3.16
108-10-1	4-Methyl-2-Pentanone	14 U	14	2.04
67-64-1	**Acetone**	**320**	28	7.00
71-43-2	Benzene	7.0 U	7.0	0.738
74-97-5	Bromochloromethane	7.0 U	7.0	1.07
75-27-4	Dichlorobromomethane	7.0 U	7.0	0.701
75-25-2	Bromoform	7.0 U	7.0	0.809
74-83-9	Bromomethane	7.0 U	7.0	2.10
75-15-0	Carbon Disulfide	7.0 U	7.0	2.03
56-23-5	Carbon Tetrachloride	7.0 U	7.0	0.652
108-90-7	Chlorobenzene	7.0 U	7.0	0.925
75-00-3	Chloroethane	7.0 U	7.0	1.89
67-66-3	Chloroform	7.0 U	7.0	0.624

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB10A**	QC Batch:	90061 -120
Sample #:	**345893**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	7.0 U		7.0	1.17
110-82-7	Cyclohexane	14 U		14	0.442
10061-01-5	cis-1,3-Dichloropropene	7.0 U		7.0	0.687
10061-02-6	trans-1,3-Dichloropropene	7.0 U		7.0	0.729
75-71-8	Dichlorodifluoromethane	7.0 U		7.0	0.935
124-48-1	Chlorodibromomethane	7.0 U		7.0	0.724
100-41-4	Ethylbenzene	7.0 U		7.0	0.592
98-82-8	Isopropylbenzene	7.0 U		7.0	0.764
79-20-9	Methyl Acetate	28 U	UJ,C	28	4.86
108-87-2	Methylcyclohexane	14 U		14	1.18
1634-04-4	Methyl(tert)butyl Ether	7.0 U		7.0	0.897
75-09-2	**Methylene Chloride**	**11 J**	B,Z	28	3.93
100-42-5	Styrene	7.0 U		7.0	0.619
127-18-4	Tetrachloroethene	7.0 U		7.0	0.858
108-88-3	**Toluene**	**3.5 J**		7.0	0.650
79-01-6	Trichloroethene	7.0 U		7.0	0.948
75-69-4	Trichlorofluoromethane	7.0 U		7.0	1.04
75-01-4	Vinyl Chloride	7.0 U		7.0	0.518
1330-20-7	Xylene (Total)	7.0 U		7.0	0.589

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB10A**	QC Batch:	90061 -120
Sample #:	**345893**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	71
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
Hexanal	66-25-1	350	E

NJ/+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/20/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**13SB10B**	QC Batch:	90061 -120
Sample #:	**345894**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.5 U		6.5	0.554
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.5 U		6.5	0.987
79-34-5	1,1,2,2-Tetrachloroethane	6.5 U		6.5	0.849
79-00-5	1,1,2-Trichloroethane	6.5 U		6.5	0.771
75-34-3	1,1-Dichloroethane	6.5 U		6.5	0.941
75-35-4	1,1-Dichloroethylene	6.5 U		6.5	0.953
106-93-4	1,2-Dibromoethane	6.5 U		6.5	0.891
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	2.70
95-50-1	1,2-Dichlorobenzene	6.5 U		6.5	0.629
107-06-2	1,2-Dichloroethane	6.5 U		6.5	0.560
156-59-2	cis-1,2-Dichloroethene	6.5 U		6.5	0.923
156-60-5	trans-1,2-Dichloroethene	6.5 U		6.5	0.914
78-87-5	1,2-Dichloropropane	6.5 U		6.5	0.762
87-61-6	1,2,3-Trichlorobenzene	6.5 U		6.5	0.707
120-82-1	1,2,4-Trichlorobenzene	6.5 U		6.5	0.533
541-73-1	1,3-Dichlorobenzene	6.5 U		6.5	0.348
106-46-7	1,4-Dichlorobenzene	6.5 U		6.5	0.923
78-93-3	**Methyl Ethyl Ketone**	**39**		26	6.50
591-78-6	2-Hexanone	13 U		13	2.94
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.90
67-64-1	**Acetone**	**180**	B,Z	26	6.50
71-43-2	Benzene	6.5 U		6.5	0.685
74-97-5	Bromochloromethane	6.5 U		6.5	0.989
75-27-4	Dichlorobromomethane	6.5 U		6.5	0.651
75-25-2	Bromoform	6.5 U		6.5	0.751
74-83-9	Bromomethane	6.5 U		6.5	1.95
75-15-0	Carbon Disulfide	6.5 U		6.5	1.89
56-23-5	Carbon Tetrachloride	6.5 U		6.5	0.606
108-90-7	Chlorobenzene	6.5 U		6.5	0.859
75-00-3	Chloroethane	6.5 U		6.5	1.76
67-66-3	Chloroform	6.5 U		6.5	0.580

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/20/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**13SB10B**	QC Batch:	90061 -120
Sample #:	**345894**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.5 U		6.5	1.08
110-82-7	Cyclohexane	13 U		13	0.411
10061-01-5	cis-1,3-Dichloropropene	6.5 U		6.5	0.638
10061-02-6	trans-1,3-Dichloropropene	6.5 U		6.5	0.677
75-71-8	Dichlorodifluoromethane	6.5 U		6.5	0.868
124-48-1	Chlorodibromomethane	6.5 U		6.5	0.672
100-41-4	Ethylbenzene	6.5 U		6.5	0.550
98-82-8	Isopropylbenzene	6.5 U		6.5	0.710
79-20-9	Methyl Acetate	26 U	VJC	26	4.51
108-87-2	Methylcyclohexane	13 U		13	1.10
1634-04-4	Methyl(tert)butyl Ether	6.5 U		6.5	0.833
75-09-2	**Methylene Chloride**	**6.6 J**	B/Z	26	3.65
100-42-5	Styrene	6.5 U		6.5	0.575
127-18-4	Tetrachloroethene	6.5 U		6.5	0.797
108-88-3	**Toluene**	**1.0 J**		6.5	0.603
79-01-6	Trichloroethene	6.5 U		6.5	0.880
75-69-4	Trichlorofluoromethane	6.5 U		6.5	0.966
75-01-4	Vinyl Chloride	6.5 U		6.5	0.481
1330-20-7	Xylene (Total)	6.5 U		6.5	0.547

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB10B**	QC Batch:	90061 -120
Sample #:	**345894**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	77
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
Hexanal	66-25-1	9.0	E

NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/20/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**13SB10C**	QC Batch:	90061 -120
Sample #:	**345895**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.8 U		6.8	0.596
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.8 U		6.8	1.06
79-34-5	1,1,2,2-Tetrachloroethane	6.8 U		6.8	0.914
79-00-5	1,1,2-Trichloroethane	6.8 U		6.8	0.830
75-34-3	1,1-Dichloroethane	6.8 U		6.8	1.01
75-35-4	1,1-Dichloroethylene	6.8 U		6.8	1.03
106-93-4	1,2-Dibromoethane	6.8 U		6.8	0.959
96-12-8	1,2-Dibromo-3-chloropropane	14 U		14	2.91
95-50-1	1,2-Dichlorobenzene	6.8 U		6.8	0.678
107-06-2	1,2-Dichloroethane	6.8 U		6.8	0.603
156-59-2	cis-1,2-Dichloroethene	6.8 U		6.8	0.994
156-60-5	trans-1,2-Dichloroethene	6.8 U		6.8	0.984
78-87-5	1,2-Dichloropropane	6.8 U		6.8	0.820
87-61-6	1,2,3-Trichlorobenzene	6.8 U		6.8	0.762
120-82-1	1,2,4-Trichlorobenzene	6.8 U		6.8	0.574
541-73-1	1,3-Dichlorobenzene	6.8 U		6.8	0.375
106-46-7	1,4-Dichlorobenzene	6.8 U		6.8	0.994
78-93-3	**Methyl Ethyl Ketone**	**36**		27	7.00
591-78-6	2-Hexanone	14 U		14	3.16
108-10-1	4-Methyl-2-Pentanone	14 U		14	2.04
67-64-1	**Acetone**	**160**	B,Z	27	7.00
71-43-2	Benzene	6.8 U		6.8	0.738
74-97-5	Bromochloromethane	6.8 U		6.8	1.07
75-27-4	Dichlorobromomethane	6.8 U		6.8	0.701
75-25-2	Bromoform	6.8 U		6.8	0.809
74-83-9	Bromomethane	6.8 U		6.8	2.10
75-15-0	Carbon Disulfide	6.8 U		6.8	2.03
56-23-5	Carbon Tetrachloride	6.8 U		6.8	0.652
108-90-7	Chlorobenzene	6.8 U		6.8	0.925
75-00-3	Chloroethane	6.8 U		6.8	1.89
67-66-3	Chloroform	6.8 U		6.8	0.624

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB10C**	QC Batch:	90061 -120
Sample #:	**345895**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.8 U		6.8	1.17
110-82-7	Cyclohexane	14 U		14	0.442
10061-01-5	cis-1,3-Dichloropropene	6.8 U		6.8	0.687
10061-02-6	trans-1,3-Dichloropropene	6.8 U		6.8	0.729
75-71-8	Dichlorodifluoromethane	6.8 U		6.8	0.935
124-48-1	Chlorodibromomethane	6.8 U		6.8	0.724
100-41-4	Ethylbenzene	6.8 U		6.8	0.592
98-82-8	Isopropylbenzene	6.8 U		6.8	0.764
79-20-9	Methyl Acetate	27 U		27	4.86
108-87-2	Methylcyclohexane	14 U		14	1.18
1634-04-4	Methyl(tert)butyl Ether	6.8 U		6.8	0.897
75-09-2	**Methylene Chloride**	**7.4 J**	B,Z	27	3.93
100-42-5	Styrene	6.8 U		6.8	0.619
127-18-4	Tetrachloroethene	6.8 U		6.8	0.858
108-88-3	Toluene	6.8 U		6.8	0.650
79-01-6	Trichloroethene	6.8 U		6.8	0.948
75-69-4	Trichlorofluoromethane	6.8 U		6.8	1.04
75-01-4	Vinyl Chloride	6.8 U		6.8	0.518
1330-20-7	Xylene (Total)	6.8 U		6.8	0.589

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB10C**	QC Batch:	90061 -120
Sample #:	**345895**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	73
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB9A**	QC Batch:	90061 -121
Sample #:	**345896**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.4 U		6.4	0.554
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.4 U		6.4	0.987
79-34-5	1,1,2,2-Tetrachloroethane	6.4 U		6.4	0.849
79-00-5	1,1,2-Trichloroethane	6.4 U		6.4	0.771
75-34-3	1,1-Dichloroethane	6.4 U		6.4	0.941
75-35-4	1,1-Dichloroethylene	6.4 U		6.4	0.953
106-93-4	1,2-Dibromoethane	6.4 U		6.4	0.891
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	2.70
95-50-1	1,2-Dichlorobenzene	6.4 U		6.4	0.629
107-06-2	1,2-Dichloroethane	6.4 U		6.4	0.560
156-59-2	cis-1,2-Dichloroethene	6.4 U		6.4	0.923
156-60-5	trans-1,2-Dichloroethene	6.4 U		6.4	0.914
78-87-5	1,2-Dichloropropane	6.4 U		6.4	0.762
87-61-6	1,2,3-Trichlorobenzene	6.4 U		6.4	0.707
120-82-1	1,2,4-Trichlorobenzene	6.4 U		6.4	0.533
541-73-1	1,3-Dichlorobenzene	6.4 U		6.4	0.348
106-46-7	1,4-Dichlorobenzene	6.4 U		6.4	0.923
78-93-3	**Methyl Ethyl Ketone**	**41**		26	6.50
591-78-6	2-Hexanone	13 U		13	2.94
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.90
67-64-1	**Acetone**	**140**		26	6.50
71-43-2	Benzene	6.4 U		6.4	0.685
74-97-5	Bromochloromethane	6.4 U		6.4	0.989
75-27-4	Dichlorobromomethane	6.4 U		6.4	0.651
75-25-2	Bromoform	6.4 U		6.4	0.751
74-83-9	Bromomethane	6.4 U		6.4	1.95
75-15-0	Carbon Disulfide	6.4 U		6.4	1.89
56-23-5	Carbon Tetrachloride	6.4 U		6.4	0.606
108-90-7	Chlorobenzene	6.4 U		6.4	0.859
75-00-3	Chloroethane	6.4 U	VJ,c	6.4	1.76
67-66-3	Chloroform	6.4 U		6.4	0.580

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB9A**	QC Batch:	90061 -121
Sample #:	**345896**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	6.4 U	6.4	1.08
110-82-7	Cyclohexane	13 U	13	0.411
10061-01-5	cis-1,3-Dichloropropene	6.4 U	6.4	0.638
10061-02-6	trans-1,3-Dichloropropene	6.4 U	6.4	0.677
75-71-8	Dichlorodifluoromethane	6.4 U	6.4	0.868
124-48-1	Chlorodibromomethane	6.4 U	6.4	0.672
100-41-4	Ethylbenzene	6.4 U	6.4	0.550
98-82-8	Isopropylbenzene	6.4 U	6.4	0.710
79-20-9	Methyl Acetate	26 U	26	4.51
108-87-2	Methylcyclohexane	13 U	13	1.10
1634-04-4	Methyl(tert)butyl Ether	6.4 U	6.4	0.833
75-09-2	**Methylene Chloride**	**5.7 J**	26	3.65
100-42-5	Styrene	6.4 U	6.4	0.575
127-18-4	Tetrachloroethene	6.4 U	6.4	0.797
108-88-3	**Toluene**	**2.7 J**	6.4	0.603
79-01-6	Trichloroethene	6.4 U	6.4	0.880
75-69-4	Trichlorofluoromethane	6.4 U	6.4	0.966
75-01-4	Vinyl Chloride	6.4 U	6.4	0.481
1330-20-7	Xylene (Total)	6.4 U	6.4	0.547

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB9A**	QC Batch:	90061 -121
Sample #:	**345896**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	78
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD9**	QC Batch:	90061 -121
Sample #:	**345897**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.2 U		6.2	0.511
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.2 U		6.2	0.911
79-34-5	1,1,2,2-Tetrachloroethane	6.2 U		6.2	0.784
79-00-5	1,1,2-Trichloroethane	6.2 U		6.2	0.712
75-34-3	1,1-Dichloroethane	6.2 U		6.2	0.869
75-35-4	1,1-Dichloroethylene	6.2 U		6.2	0.880
106-93-4	1,2-Dibromoethane	6.2 U		6.2	0.822
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.50
95-50-1	1,2-Dichlorobenzene	6.2 U		6.2	0.581
107-06-2	1,2-Dichloroethane	6.2 U		6.2	0.517
156-59-2	cis-1,2-Dichloroethene	6.2 U		6.2	0.852
156-60-5	trans-1,2-Dichloroethene	6.2 U		6.2	0.844
78-87-5	1,2-Dichloropropane	6.2 U		6.2	0.703
87-61-6	1,2,3-Trichlorobenzene	6.2 U		6.2	0.653
120-82-1	1,2,4-Trichlorobenzene	6.2 U		6.2	0.492
541-73-1	1,3-Dichlorobenzene	6.2 U		6.2	0.322
106-46-7	1,4-Dichlorobenzene	6.2 U		6.2	0.852
78-93-3	**Methyl Ethyl Ketone**	**33**		25	6.00
591-78-6	2-Hexanone	12 U		12	2.71
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.75
67-64-1	**Acetone**	**130**		25	6.00
71-43-2	Benzene	6.2 U		6.2	0.632
74-97-5	Bromochloromethane	6.2 U		6.2	0.913
75-27-4	Dichlorobromomethane	6.2 U		6.2	0.601
75-25-2	Bromoform	6.2 U		6.2	0.694
74-83-9	Bromomethane	6.2 U		6.2	1.80
75-15-0	Carbon Disulfide	6.2 U		6.2	1.74
56-23-5	Carbon Tetrachloride	6.2 U		6.2	0.559
108-90-7	Chlorobenzene	6.2 U		6.2	0.793
75-00-3	Chloroethane	6.2 U	UJc	6.2	1.62
67-66-3	Chloroform	6.2 U		6.2	0.535

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD9**	QC Batch:	90061 -121
Sample #:	**345897**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	6.2 U	6.2	1.00
110-82-7	Cyclohexane	12 U	12	0.379
10061-01-5	cis-1,3-Dichloropropene	6.2 U	6.2	0.589
10061-02-6	trans-1,3-Dichloropropene	6.2 U	6.2	0.625
75-71-8	Dichlorodifluoromethane	6.2 U	6.2	0.802
124-48-1	Chlorodibromomethane	6.2 U	6.2	0.620
100-41-4	Ethylbenzene	6.2 U	6.2	0.508
98-82-8	Isopropylbenzene	6.2 U	6.2	0.655
79-20-9	Methyl Acetate	25 U	25	4.16
108-87-2	Methylcyclohexane	12 U	12	1.01
1634-04-4	Methyl(tert)butyl Ether	6.2 U	6.2	0.769
75-09-2	**Methylene Chloride**	**5.7 J**	25	3.37
100-42-5	Styrene	6.2 U	6.2	0.530
127-18-4	Tetrachloroethene	6.2 U	6.2	0.736
108-88-3	**Toluene**	**0.69 J**	6.2	0.557
79-01-6	Trichloroethene	6.2 U	6.2	0.812
75-69-4	Trichlorofluoromethane	6.2 U	6.2	0.892
75-01-4	Vinyl Chloride	6.2 U	6.2	0.444
1330-20-7	Xylene (Total)	6.2 U	6.2	0.505

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD9**	QC Batch:	90061 -121
Sample #:	**345897**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	80
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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Individual sample results relate only to the sample tested.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB9B**	QC Batch:	90061 -121
Sample #:	**345898**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.8 U		6.8	0.596
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.8 U		6.8	1.06
79-34-5	1,1,2,2-Tetrachloroethane	6.8 U		6.8	0.914
79-00-5	1,1,2-Trichloroethane	6.8 U		6.8	0.830
75-34-3	1,1-Dichloroethane	6.8 U		6.8	1.01
75-35-4	1,1-Dichloroethylene	6.8 U		6.8	1.03
106-93-4	1,2-Dibromoethane	6.8 U		6.8	0.959
96-12-8	1,2-Dibromo-3-chloropropane	14 U		14	2.91
95-50-1	1,2-Dichlorobenzene	6.8 U		6.8	0.678
107-06-2	1,2-Dichloroethane	6.8 U		6.8	0.603
156-59-2	cis-1,2-Dichloroethene	6.8 U		6.8	0.994
156-60-5	trans-1,2-Dichloroethene	6.8 U		6.8	0.984
78-87-5	1,2-Dichloropropane	6.8 U		6.8	0.820
87-61-6	1,2,3-Trichlorobenzene	6.8 U		6.8	0.762
120-82-1	1,2,4-Trichlorobenzene	6.8 U		6.8	0.574
541-73-1	1,3-Dichlorobenzene	6.8 U		6.8	0.375
106-46-7	1,4-Dichlorobenzene	6.8 U		6.8	0.994
78-93-3	**Methyl Ethyl Ketone**	**400**		27	7.00
591-78-6	2-Hexanone	14 U		14	3.16
108-10-1	4-Methyl-2-Pentanone	14 U		14	2.04
67-64-1	**Acetone**	**140**		27	7.00
71-43-2	Benzene	6.8 U		6.8	0.738
74-97-5	Bromochloromethane	6.8 U		6.8	1.07
75-27-4	Dichlorobromomethane	6.8 U		6.8	0.701
75-25-2	Bromoform	6.8 U		6.8	0.809
74-83-9	Bromomethane	6.8 U		6.8	2.10
75-15-0	Carbon Disulfide	6.8 U		6.8	2.03
56-23-5	Carbon Tetrachloride	6.8 U		6.8	0.652
108-90-7	Chlorobenzene	6.8 U		6.8	0.925
75-00-3	Chloroethane	6.8 U	VJ,C	6.8	1.89
67-66-3	Chloroform	6.8 U		6.8	0.624

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB9B**	QC Batch:	90061 -121
Sample #:	**345898**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	6.8 U	6.8	1.17
110-82-7	Cyclohexane	14 U	14	0.442
10061-01-5	cis-1,3-Dichloropropene	6.8 U	6.8	0.687
10061-02-6	trans-1,3-Dichloropropene	6.8 U	6.8	0.729
75-71-8	Dichlorodifluoromethane	6.8 U	6.8	0.935
124-48-1	Chlorodibromomethane	6.8 U	6.8	0.724
100-41-4	Ethylbenzene	6.8 U	6.8	0.592
98-82-8	Isopropylbenzene	6.8 U	6.8	0.764
79-20-9	Methyl Acetate	27 U	27	4.86
108-87-2	Methylcyclohexane	14 U	14	1.18
1634-04-4	Methyl(tert)butyl Ether	6.8 U	6.8	0.897
75-09-2	**Methylene Chloride**	**5.5 J**	27	3.93
100-42-5	Styrene	6.8 U	6.8	0.619
127-18-4	Tetrachloroethene	6.8 U	6.8	0.858
108-88-3	Toluene	6.8 U	6.8	0.650
79-01-6	Trichloroethene	6.8 U	6.8	0.948
75-69-4	Trichlorofluoromethane	6.8 U	6.8	1.04
75-01-4	Vinyl Chloride	6.8 U	6.8	0.518
1330-20-7	Xylene (Total)	6.8 U	6.8	0.589

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB9B**	QC Batch:	90061 -121
Sample #:	**345898**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	73
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
Hexanal	66-25-1	8.6	E NJ+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB9C**	QC Batch:	90257 -121
Sample #:	**345899**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.4 U		6.4	0.554
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.4 U		6.4	0.987
79-34-5	1,1,2,2-Tetrachloroethane	6.4 U		6.4	0.849
79-00-5	1,1,2-Trichloroethane	6.4 U		6.4	0.771
75-34-3	1,1-Dichloroethane	6.4 U		6.4	0.941
75-35-4	1,1-Dichloroethylene	6.4 U		6.4	0.953
106-93-4	1,2-Dibromoethane	6.4 U		6.4	0.891
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	2.70
95-50-1	1,2-Dichlorobenzene	6.4 U		6.4	0.629
107-06-2	1,2-Dichloroethane	6.4 U		6.4	0.560
156-59-2	cis-1,2-Dichloroethene	6.4 U		6.4	0.923
156-60-5	trans-1,2-Dichloroethene	6.4 U		6.4	0.914
78-87-5	1,2-Dichloropropane	6.4 U		6.4	0.762
87-61-6	1,2,3-Trichlorobenzene	6.4 U		6.4	0.707
120-82-1	1,2,4-Trichlorobenzene	6.4 U		6.4	0.533
541-73-1	1,3-Dichlorobenzene	6.4 U		6.4	0.348
106-46-7	1,4-Dichlorobenzene	6.4 U		6.4	0.923
78-93-3	**Methyl Ethyl Ketone**	**24 J**		26	6.50
591-78-6	2-Hexanone	13 U		13	2.94
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.90
67-64-1	**Acetone**	**31**	B,Z	26	6.50
71-43-2	Benzene	6.4 U		6.4	0.685
74-97-5	Bromochloromethane	6.4 U		6.4	0.989
75-27-4	Dichlorobromomethane	6.4 U		6.4	0.651
75-25-2	Bromoform	6.4 U		6.4	0.751
74-83-9	Bromomethane	6.4 U		6.4	1.95
75-15-0	Carbon Disulfide	6.4 U		6.4	1.89
56-23-5	Carbon Tetrachloride	6.4 U		6.4	0.606
108-90-7	Chlorobenzene	6.4 U		6.4	0.859
75-00-3	Chloroethane	6.4 U	VJ,C	6.4	1.76
67-66-3	Chloroform	6.4 U		6.4	0.580

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB9C**	QC Batch:	90257 -121
Sample #:	**345899**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	6.4 U	6.4	1.08
110-82-7	Cyclohexane	13 U	13	0.411
10061-01-5	cis-1,3-Dichloropropene	6.4 U	6.4	0.638
10061-02-6	trans-1,3-Dichloropropene	6.4 U	6.4	0.677
75-71-8	Dichlorodifluoromethane	6.4 U	6.4	0.868
124-48-1	Chlorodibromomethane	6.4 U	6.4	0.672
100-41-4	Ethylbenzene	6.4 U	6.4	0.550
98-82-8	Isopropylbenzene	6.4 U	6.4	0.710
79-20-9	Methyl Acetate	26 U	26	4.51
108-87-2	Methylcyclohexane	13 U	13	1.10
1634-04-4	Methyl(tert)butyl Ether	6.4 U	6.4	0.833
75-09-2	**Methylene Chloride**	**5.0 J**	26	3.65
100-42-5	Styrene	6.4 U	6.4	0.575
127-18-4	Tetrachloroethene	6.4 U	6.4	0.797
108-88-3	Toluene	6.4 U	6.4	0.603
79-01-6	Trichloroethene	6.4 U	6.4	0.880
75-69-4	Trichlorofluoromethane	6.4 U	6.4	0.966
75-01-4	Vinyl Chloride	6.4 U	6.4	0.481
1330-20-7	Xylene (Total)	6.4 U	6.4	0.547

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB9C**	QC Batch:	90257 -121
Sample #:	**345899**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	78
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	CAS Number	Result (ug/kg dr	Qualifier
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB8A**	QC Batch:	90257 -121
Sample #:	**345900**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.5 U		6.5	0.554
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.5 U		6.5	0.987
79-34-5	1,1,2,2-Tetrachloroethane	6.5 U		6.5	0.849
79-00-5	1,1,2-Trichloroethane	6.5 U		6.5	0.771
75-34-3	1,1-Dichloroethane	6.5 U		6.5	0.941
75-35-4	1,1-Dichloroethylene	6.5 U		6.5	0.953
106-93-4	1,2-Dibromoethane	6.5 U		6.5	0.891
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	2.70
95-50-1	1,2-Dichlorobenzene	6.5 U		6.5	0.629
107-06-2	1,2-Dichloroethane	6.5 U		6.5	0.560
156-59-2	cis-1,2-Dichloroethene	6.5 U		6.5	0.923
156-60-5	trans-1,2-Dichloroethene	6.5 U		6.5	0.914
78-87-5	1,2-Dichloropropane	6.5 U		6.5	0.762
87-61-6	1,2,3-Trichlorobenzene	6.5 U		6.5	0.707
120-82-1	1,2,4-Trichlorobenzene	6.5 U		6.5	0.533
541-73-1	1,3-Dichlorobenzene	6.5 U		6.5	0.348
106-46-7	1,4-Dichlorobenzene	6.5 U		6.5	0.923
78-93-3	**Methyl Ethyl Ketone**	**30**		26	6.50
591-78-6	2-Hexanone	13 U		13	2.94
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.90
67-64-1	**Acetone**	**120**		26	6.50
71-43-2	Benzene	6.5 U		6.5	0.685
74-97-5	Bromochloromethane	6.5 U		6.5	0.989
75-27-4	Dichlorobromomethane	6.5 U		6.5	0.651
75-25-2	Bromoform	6.5 U		6.5	0.751
74-83-9	Bromomethane	6.5 U		6.5	1.95
75-15-0	Carbon Disulfide	6.5 U		6.5	1.89
56-23-5	Carbon Tetrachloride	6.5 U		6.5	0.606
108-90-7	Chlorobenzene	6.5 U		6.5	0.859
75-00-3	Chloroethane	6.5 U	VJc	6.5	1.76
67-66-3	Chloroform	6.5 U		6.5	0.580

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 15:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/21/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**13SB8A**	QC Batch:	90257 -121
Sample #:	**345900**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	6.5 U	6.5	1.08
110-82-7	Cyclohexane	13 U	13	0.411
10061-01-5	cis-1,3-Dichloropropene	6.5 U	6.5	0.638
10061-02-6	trans-1,3-Dichloropropene	6.5 U	6.5	0.677
75-71-8	Dichlorodifluoromethane	6.5 U	6.5	0.868
124-48-1	Chlorodibromomethane	6.5 U	6.5	0.672
100-41-4	Ethylbenzene	6.5 U	6.5	0.550
98-82-8	Isopropylbenzene	6.5 U	6.5	0.710
79-20-9	Methyl Acetate	26 U	26	4.51
108-87-2	Methylcyclohexane	13 U	13	1.10
1634-04-4	Methyl(tert)butyl Ether	6.5 U	6.5	0.833
75-09-2	**Methylene Chloride**	**4.1 J**	26	3.65
100-42-5	Styrene	6.5 U	6.5	0.575
127-18-4	Tetrachloroethene	6.5 U	6.5	0.797
108-88-3	**Toluene**	**0.66 J**	6.5	0.603
79-01-6	Trichloroethene	6.5 U	6.5	0.880
75-69-4	Trichlorofluoromethane	6.5 U	6.5	0.966
75-01-4	Vinyl Chloride	6.5 U	6.5	0.481
1330-20-7	Xylene (Total)	6.5 U	6.5	0.547

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 15:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/21/03 JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**13SB8A**	QC Batch:	90257 -121
Sample #:	**345900**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	77
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	CAS Number	Result (ug/kg dr	Qualifier
No compound was detected.			

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APPENDIX K.1
(Continued)

SSP SAMPLING EVENT – DECEMBER 2003
DATA VALIDATION REPORTS
AND LABORATORY ANALYTICAL DATA (FORM I)

TriMatrix Laboratories, Inc.
(Continued)

VOCs, SVOCs, PAHs, Explosives, Pesticides,
PCBs, Herbicides, Metals, and Cyanide

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 15:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/21/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**13SB8B**	QC Batch:	90257 -121
Sample #:	**345901**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.5 U		6.5	0.554
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.5 U		6.5	0.987
79-34-5	1,1,2,2-Tetrachloroethane	6.5 U		6.5	0.849
79-00-5	1,1,2-Trichloroethane	6.5 U		6.5	0.771
75-34-3	1,1-Dichloroethane	6.5 U		6.5	0.941
75-35-4	1,1-Dichloroethylene	6.5 U		6.5	0.953
106-93-4	1,2-Dibromoethane	6.5 U		6.5	0.891
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	2.70
95-50-1	1,2-Dichlorobenzene	6.5 U		6.5	0.629
107-06-2	1,2-Dichloroethane	6.5 U		6.5	0.560
156-59-2	cis-1,2-Dichloroethene	6.5 U		6.5	0.923
156-60-5	trans-1,2-Dichloroethene	6.5 U		6.5	0.914
78-87-5	1,2-Dichloropropane	6.5 U		6.5	0.762
87-61-6	1,2,3-Trichlorobenzene	6.5 U		6.5	0.707
120-82-1	1,2,4-Trichlorobenzene	6.5 U		6.5	0.533
541-73-1	1,3-Dichlorobenzene	6.5 U		6.5	0.348
106-46-7	1,4-Dichlorobenzene	6.5 U		6.5	0.923
78-93-3	**Methyl Ethyl Ketone**	**25 J**		26	6.50
591-78-6	2-Hexanone	13 U		13	2.94
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.90
67-64-1	**Acetone**	**77**	B,Z	26	6.50
71-43-2	Benzene	6.5 U		6.5	0.685
74-97-5	Bromochloromethane	6.5 U		6.5	0.989
75-27-4	Dichlorobromomethane	6.5 U		6.5	0.651
75-25-2	Bromoform	6.5 U		6.5	0.751
74-83-9	Bromomethane	6.5 U		6.5	1.95
75-15-0	Carbon Disulfide	6.5 U		6.5	1.89
56-23-5	Carbon Tetrachloride	6.5 U		6.5	0.606
108-90-7	Chlorobenzene	6.5 U		6.5	0.859
75-00-3	Chloroethane	6.5 U	UJ,C	6.5	1.76
67-66-3	Chloroform	6.5 U		6.5	0.580

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 15:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/21/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**13SB8B**	QC Batch:	90257 -121
Sample #:	**345901**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	6.5 U	6.5	1.08
110-82-7	Cyclohexane	13 U	13	0.411
10061-01-5	cis-1,3-Dichloropropene	6.5 U	6.5	0.638
10061-02-6	trans-1,3-Dichloropropene	6.5 U	6.5	0.677
75-71-8	Dichlorodifluoromethane	6.5 U	6.5	0.868
124-48-1	Chlorodibromomethane	6.5 U	6.5	0.672
100-41-4	Ethylbenzene	6.5 U	6.5	0.550
98-82-8	Isopropylbenzene	6.5 U	6.5	0.710
79-20-9	Methyl Acetate	26 U	26	4.51
108-87-2	Methylcyclohexane	13 U	13	1.10
1634-04-4	Methyl(tert)butyl Ether	6.5 U	6.5	0.833
75-09-2	**Methylene Chloride**	**5.6 J**	26	3.65
100-42-5	Styrene	6.5 U	6.5	0.575
127-18-4	Tetrachloroethene	6.5 U	6.5	0.797
108-88-3	Toluene	6.5 U	6.5	0.603
79-01-6	Trichloroethene	6.5 U	6.5	0.880
75-69-4	Trichlorofluoromethane	6.5 U	6.5	0.966
75-01-4	Vinyl Chloride	6.5 U	6.5	0.481
1330-20-7	Xylene (Total)	6.5 U	6.5	0.547

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 15:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/21/03 JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**13SB8B**	QC Batch:	90257 -121
Sample #:	**345901**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	78
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**69SB2A**	QC Batch:	90482 -114
Sample #:	**345745**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	83
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	200 U	200	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	200 U	200	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	200 U	200	1.58
95-95-4	2,4,5-Trichlorophenol	200 U	200	4.01
88-06-2	2,4,6-Trichlorophenol	200 U	200	3.14
120-83-2	2,4-Dichlorophenol	200 U	200	4.22
105-67-9	2,4-Dimethylphenol	200 U	200	9.53
51-28-5	2,4-Dinitrophenol	400 U	400	3.84
121-14-2	2,4-Dinitrotoluene	200 U	200	3.78
606-20-2	2,6-Dinitrotoluene	200 U	200	33.2
91-58-7	2-Chloronaphthalene	200 U	200	2.76
95-57-8	2-Chlorophenol	200 U	200	2.41
91-57-6	2-Methylnaphthalene	200 U	200	3.29
95-48-7	2-Methylphenol	200 U	200	5.81
88-74-4	2-Nitroaniline	200 U	200	5.52
88-75-5	2-Nitrophenol	200 U	200	2.04
91-94-1	3,3'-Dichlorobenzidine	200 U	200	66.5
99-09-2	3-Nitroaniline	200 U	200	22.0
534-52-1	4,6-Dinitro-2-Methylphenol	200 U	200	5.41
101-55-3	4-Bromophenyl Phenylether	200 U	200	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**12 J**	200	6.25
106-47-8	4-Chloroaniline	200 U	200	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	200 U	200	3.92
106-44-5	4-Methylphenol	200 U	200	7.64
100-01-6	4-Nitroaniline	200 U	200	8.70
100-02-7	4-Nitrophenol	400 U	400	3.40
83-32-9	Acenaphthene	200 U	200	2.06
208-96-8	Acenaphthylene	200 U	200	1.80
98-86-2	Acetophenone	200 U	200	2.28

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**69SB2A**	QC Batch:	90482 -114
Sample #:	**345745**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	83
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	200 U		200	5.54
1912-24-9	Atrazine	200 U		200	8.26
100-52-7	Benzaldehyde	200 U		200	4.86
56-55-3	Benzo (a) Anthracene	200 U		200	16.0
50-32-8	Benzo (a) Pyrene	200 U		200	6.85
205-99-2	Benzo (b) Fluoranthene	200 U		200	11.7
191-24-2	Benzo (g,h,i,) Perylene	200 U		200	10.5
207-08-9	Benzo (k) Fluoranthene	200 U		200	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	200 U		200	3.77
111-44-4	Bis (2-Chloroethyl) Ether	200 U		200	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**22 J**	B,Z	200	2.48
85-68-7	Butyl Benzyl Phthalate	200 U		200	5.38
105-60-2	Caprolactam	400 U		400	7.66
86-74-8	Carbazole	200 U		200	7.32
218-01-9	Chrysene	200 U		200	12.2
53-70-3	Dibenzo (a,h) Anthracene	200 U		200	7.08
132-64-9	Dibenzofuran	200 U		200	3.79
84-66-2	**Diethylphthalate**	**6.0 J**	J,I	200	2.28
131-11-3	Dimethylphthalate	200 U		200	3.97
84-74-2	**Di-n-Butylphthalate**	**53 J**	B,Z	200	4.58
117-84-0	Di-n-Octylphthalate	200 U		200	3.72
206-44-0	**Fluoranthene**	**8.0 J**		200	2.82
86-73-7	Fluorene	200 U		200	2.02
118-74-1	Hexachlorobenzene	200 U		200	3.01
87-68-3	Hexachlorobutadiene	200 U		200	4.64
77-47-4	Hexachlorocyclopentadiene	200 U		200	2.38
67-72-1	Hexachloroethane	200 U		200	2.80
193-39-5	Indeno (1,2,3-cd) Pyrene	200 U		200	4.70
78-59-1	Isophorone	200 U		200	2.08
91-20-3	Naphthalene	200 U		200	3.30
98-95-3	Nitrobenzene	200 U		200	3.84

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**69SB2A**	QC Batch:	90482 -114
Sample #:	**345745**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	83
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	200 U	200	3.95
86-30-6	N-Nitroso-di-Phenylamine	200 U	200	5.70
87-86-5	Pentachlorophenol	400 U	400	5.27
85-01-8	**Phenanthrene**	**5.0 J**	200	2.76
108-95-2	Phenol	200 U	200	4.75
129-00-0	**Pyrene**	**9.0 J**	200	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**69SB2A**	QC Batch:	90482 -114
Sample #:	**345745**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	83
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	190	E	NJ,+
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	38	E	B,X
D-Friedoolean-14-ene, 3-methoxy-, (3.beta.)-	14021-23-9	210	E	NJ,+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~600~~	~~E~~	~~AS~~ 2/18/03

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**69SB2B**	QC Batch:	90482 -114
Sample #:	**345746**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	79
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U		220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U		220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U		220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U		220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U		220	3.41
120-83-2	2,4-Dichlorophenol	220 U		220	4.58
105-67-9	2,4-Dimethylphenol	220 U		220	10.3
51-28-5	2,4-Dinitrophenol	420 U		420	4.16
121-14-2	2,4-Dinitrotoluene	220 U		220	4.10
606-20-2	2,6-Dinitrotoluene	220 U		220	36.0
91-58-7	2-Chloronaphthalene	220 U		220	2.99
95-57-8	2-Chlorophenol	220 U		220	2.61
91-57-6	2-Methylnaphthalene	220 U		220	3.56
95-48-7	2-Methylphenol	220 U		220	6.29
88-74-4	2-Nitroaniline	220 U		220	5.98
88-75-5	2-Nitrophenol	220 U		220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U		220	72.0
99-09-2	3-Nitroaniline	220 U		220	23.8
534-52-1	4,6-Dinitro-2-Methylphenol	220 U		220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U		220	4.39
59-50-7	**4-Chloro-3-Methylphenol**	**12 J**		220	6.77
106-47-8	4-Chloroaniline	220 U	VJ,c	220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U		220	4.25
106-44-5	4-Methylphenol	220 U		220	8.28
100-01-6	4-Nitroaniline	220 U		220	9.43
100-02-7	4-Nitrophenol	420 U		420	3.68
83-32-9	Acenaphthene	220 U		220	2.24
208-96-8	Acenaphthylene	220 U		220	1.95
98-86-2	Acetophenone	220 U		220	2.47

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**69SB2B**	QC Batch:	90482 -114
Sample #:	**345746**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	79
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	220 U		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U		220	5.27
56-55-3	Benzo (a) Anthracene	220 U		220	17.3
50-32-8	Benzo (a) Pyrene	220 U		220	7.42
205-99-2	Benzo (b) Fluoranthene	220 U		220	12.7
191-24-2	Benzo (g,h,i,) Perylene	220 U		220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**15 J**	B,Z	220	2.69
85-68-7	Butyl Benzyl Phthalate	220 U		220	5.82
105-60-2	Caprolactam	420 U		420	8.29
86-74-8	Carbazole	220 U		220	7.93
218-01-9	Chrysene	220 U		220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U		220	7.67
132-64-9	Dibenzofuran	220 U		220	4.11
84-66-2	**Diethylphthalate**	**4.0 J**	J,1	220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**50 J**	B,Z	220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	Fluoranthene	220 U		220	3.06
86-73-7	Fluorene	220 U		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U		220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	Indeno (1,2,3-cd) Pyrene	220 U		220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	Naphthalene	220 U		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**69SB2B**	QC Batch:	90482 -114
Sample #:	**345746**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	79
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	N-Nitroso-di-Phenylamine	220 U	220	6.18
87-86-5	Pentachlorophenol	420 U	420	5.71
85-01-8	Phenanthrene	220 U	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	Pyrene	220 U	220	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**69SB2B**	QC Batch:	90482 -114
Sample #:	**345746**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	79
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	57	E	NJ,+
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	34	E	NJ,+
Erucylamide	112-84-5	190	E	B,X
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~270~~	~~E~~	

AS 2/18/04

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**69SB2C**	QC Batch:	90482 -114
Sample #:	**345747**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	230 U		230	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	230 U		230	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	230 U		230	1.72
95-95-4	2,4,5-Trichlorophenol	230 U		230	4.34
88-06-2	2,4,6-Trichlorophenol	230 U		230	3.41
120-83-2	2,4-Dichlorophenol	230 U		230	4.58
105-67-9	2,4-Dimethylphenol	230 U		230	10.3
51-28-5	2,4-Dinitrophenol	440 U		440	4.16
121-14-2	2,4-Dinitrotoluene	230 U		230	4.10
606-20-2	2,6-Dinitrotoluene	230 U		230	36.0
91-58-7	2-Chloronaphthalene	230 U		230	2.99
95-57-8	2-Chlorophenol	230 U		230	2.61
91-57-6	2-Methylnaphthalene	230 U		230	3.56
95-48-7	2-Methylphenol	230 U		230	6.29
88-74-4	2-Nitroaniline	230 U		230	5.98
88-75-5	2-Nitrophenol	230 U		230	2.21
91-94-1	3,3'-Dichlorobenzidine	230 U		230	72.0
99-09-2	3-Nitroaniline	230 U		230	23.8
534-52-1	4,6-Dinitro-2-Methylphenol	230 U		230	5.86
101-55-3	4-Bromophenyl Phenylether	230 U		230	4.39
59-50-7	**4-Chloro-3-Methylphenol**	**16 J**		230	6.77
106-47-8	4-Chloroaniline	230 U	UJ,C	230	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	230 U		230	4.25
106-44-5	4-Methylphenol	230 U		230	8.28
100-01-6	4-Nitroaniline	230 U		230	9.43
100-02-7	4-Nitrophenol	440 U		440	3.68
83-32-9	Acenaphthene	230 U		230	2.24
208-96-8	Acenaphthylene	230 U		230	1.95
98-86-2	Acetophenone	230 U		230	2.47

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**69SB2C**	QC Batch:	90482 -114
Sample #:	**345747**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	230 U		230	6.01
1912-24-9	Atrazine	230 U		230	8.94
100-52-7	Benzaldehyde	230 U		230	5.27
56-55-3	Benzo (a) Anthracene	230 U		230	17.3
50-32-8	Benzo (a) Pyrene	230 U		230	7.42
205-99-2	Benzo (b) Fluoranthene	230 U		230	12.7
191-24-2	Benzo (g,h,i,) Perylene	230 U		230	11.3
207-08-9	Benzo (k) Fluoranthene	230 U		230	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	230 U		230	4.08
111-44-4	Bis (2-Chloroethyl) Ether	230 U		230	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**16 J**	B,Z	230	2.69
85-68-7	Butyl Benzyl Phthalate	230 U		230	5.82
105-60-2	Caprolactam	440 U		440	8.29
86-74-8	Carbazole	230 U		230	7.93
218-01-9	Chrysene	230 U		230	13.3
53-70-3	Dibenzo (a,h) Anthracene	230 U		230	7.67
132-64-9	Dibenzofuran	230 U		230	4.11
84-66-2	**Diethylphthalate**	**5.0 J**	J,I	230	2.47
131-11-3	Dimethylphthalate	230 U		230	4.30
84-74-2	**Di-n-Butylphthalate**	**70 J**	B,Z	230	4.97
117-84-0	Di-n-Octylphthalate	230 U		230	4.03
206-44-0	Fluoranthene	230 U		230	3.06
86-73-7	Fluorene	230 U		230	2.18
118-74-1	Hexachlorobenzene	230 U		230	3.26
87-68-3	Hexachlorobutadiene	230 U		230	5.03
77-47-4	Hexachlorocyclopentadiene	230 U		230	2.57
67-72-1	Hexachloroethane	230 U		230	3.03
193-39-5	Indeno (1,2,3-cd) Pyrene	230 U		230	5.10
78-59-1	Isophorone	230 U		230	2.25
91-20-3	Naphthalene	230 U		230	3.58
98-95-3	Nitrobenzene	230 U		230	4.16

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**69SB2C**	QC Batch:	90482 -114
Sample #:	**345747**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	230 U	230	4.28
86-30-6	N-Nitroso-di-Phenylamine	230 U	230	6.18
87-86-5	Pentachlorophenol	440 U	440	5.71
85-01-8	Phenanthrene	230 U	230	2.99
108-95-2	Phenol	230 U	230	5.15
129-00-0	Pyrene	230 U	230	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**69SB2C**	QC Batch:	90482 -114
Sample #:	**345747**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	75
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	76	E	NJ,+
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	63	E	NJ,+
Erucylamide	112-84-5	380	E	B X
Ethanol, 2-(hexadecyloxy)-	2136-71-2	42	E	NJ,+
Squalene	7683-64-9	46	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 16:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**57SB4B**	QC Batch:	90482 -114
Sample #:	**345748**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	230 U		230	3.44
95-94-3	1,2,4,5-Tetrachloro-benzene	230 U		230	40.2
108-60-1	Bis (2-Chloroisopropyl)-Ether	230 U		230	1.85
95-95-4	2,4,5-Trichlorophenol	230 U		230	4.68
88-06-2	2,4,6-Trichlorophenol	230 U		230	3.67
120-83-2	2,4-Dichlorophenol	230 U		230	4.93
105-67-9	2,4-Dimethylphenol	230 U		230	11.1
51-28-5	2,4-Dinitrophenol	440 U		440	4.48
121-14-2	2,4-Dinitrotoluene	230 U		230	4.41
606-20-2	2,6-Dinitrotoluene	230 U		230	38.8
91-58-7	2-Chloronaphthalene	230 U		230	3.22
95-57-8	2-Chlorophenol	230 U		230	2.81
91-57-6	2-Methylnaphthalene	230 U		230	3.84
95-48-7	2-Methylphenol	230 U		230	6.78
88-74-4	2-Nitroaniline	230 U		230	6.44
88-75-5	2-Nitrophenol	230 U		230	2.38
91-94-1	3,3'-Dichlorobenzidine	230 U		230	77.6
99-09-2	3-Nitroaniline	230 U		230	25.6
534-52-1	4,6-Dinitro-2-Methylphenol	230 U		230	6.31
101-55-3	4-Bromophenyl Phenylether	230 U		230	4.73
59-50-7	**4-Chloro-3-Methylphenol**	**18 J**		230	7.29
106-47-8	4-Chloroaniline	230 U	UJ,C	230	1.76
7005-72-3	4-Chlorophenylphenyl-Ether	230 U		230	4.58
106-44-5	4-Methylphenol	230 U		230	8.92
100-01-6	4-Nitroaniline	230 U		230	10.2
100-02-7	4-Nitrophenol	440 U		440	3.96
83-32-9	Acenaphthene	230 U		230	2.41
208-96-8	Acenaphthylene	230 U		230	2.10
98-86-2	Acetophenone	230 U		230	2.66

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB4B**	QC Batch:	90482 -114
Sample #:	**345748**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	230 U		230	6.47
1912-24-9	Atrazine	230 U		230	9.63
100-52-7	Benzaldehyde	230 U		230	5.67
56-55-3	Benzo (a) Anthracene	230 U		230	18.6
50-32-8	Benzo (a) Pyrene	230 U		230	7.99
205-99-2	Benzo (b) Fluoranthene	230 U		230	13.7
191-24-2	Benzo (g,h,i,) Perylene	230 U		230	12.2
207-08-9	Benzo (k) Fluoranthene	230 U		230	18.8
111-91-1	Bis (2-Chloroethoxy)-Methane	230 U		230	4.40
111-44-4	Bis (2-Chloroethyl) Ether	230 U		230	2.42
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**24 J**	B,2	230	2.90
85-68-7	Butyl Benzyl Phthalate	230 U		230	6.27
105-60-2	Caprolactam	440 U		440	8.93
86-74-8	Carbazole	230 U		230	8.54
218-01-9	Chrysene	230 U		230	14.3
53-70-3	Dibenzo (a,h) Anthracene	230 U		230	8.26
132-64-9	Dibenzofuran	230 U		230	4.42
84-66-2	**Diethylphthalate**	**6.0 J**	J,1	230	2.66
131-11-3	Dimethylphthalate	230 U		230	4.63
84-74-2	**Di-n-Butylphthalate**	**76 J**	B,2	230	5.35
117-84-0	Di-n-Octylphthalate	230 U		230	4.34
206-44-0	Fluoranthene	230 U		230	3.29
86-73-7	Fluorene	230 U		230	2.35
118-74-1	Hexachlorobenzene	230 U		230	3.51
87-68-3	Hexachlorobutadiene	230 U		230	5.42
77-47-4	Hexachlorocyclopentadiene	230 U		230	2.77
67-72-1	Hexachloroethane	230 U		230	3.27
193-39-5	Indeno (1,2,3-cd) Pyrene	230 U		230	5.49
78-59-1	Isophorone	230 U		230	2.42
91-20-3	Naphthalene	230 U		230	3.85
98-95-3	Nitrobenzene	230 U		230	4.48

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB4B**	QC Batch:	90482 -114
Sample #:	**345748**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	230 U	230	4.61
86-30-6	N-Nitroso-di-Phenylamine	230 U	230	6.65
87-86-5	Pentachlorophenol	440 U	440	6.15
85-01-8	Phenanthrene	230 U	230	3.22
108-95-2	Phenol	230 U	230	5.54
129-00-0	Pyrene	230 U	230	2.07

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB4B**	QC Batch:	90482 -114
Sample #:	**345748**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	74
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, butyl 2-methylpropyl ester	17851-53-5	160	E	NJ,+
1-Hexadecanol	36653-82-4	48	E	NJ,+
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	58	E	NJ,+
4-(1,1,3,3-Tetramethyl Butyl)-Phenol	140-66-9	29	E	NJ,+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~150~~	~~E~~	2/18/04
Phenol, 4-(1,1-dimethylpropyl)-	80-46-6	720	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB7A**	QC Batch:	90482 -114
Sample #:	**345883**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	210 U		210	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	210 U		210	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	210 U		210	1.58
95-95-4	2,4,5-Trichlorophenol	210 U		210	4.01
88-06-2	2,4,6-Trichlorophenol	210 U		210	3.14
120-83-2	2,4-Dichlorophenol	210 U		210	4.22
105-67-9	2,4-Dimethylphenol	210 U		210	9.53
51-28-5	2,4-Dinitrophenol	400 U	UJ,c	400	3.84
121-14-2	2,4-Dinitrotoluene	210 U		210	3.78
606-20-2	2,6-Dinitrotoluene	210 U		210	33.2
91-58-7	2-Chloronaphthalene	210 U		210	2.76
95-57-8	2-Chlorophenol	210 U		210	2.41
91-57-6	2-Methylnaphthalene	210 U		210	3.29
95-48-7	2-Methylphenol	210 U		210	5.81
88-74-4	2-Nitroaniline	210 U		210	5.52
88-75-5	2-Nitrophenol	210 U		210	2.04
91-94-1	3,3'-Dichlorobenzidine	210 U		210	66.5
99-09-2	3-Nitroaniline	210 U		210	22.0
534-52-1	4,6-Dinitro-2-Methylphenol	210 U		210	5.41
101-55-3	4-Bromophenyl Phenylether	210 U		210	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**19 J**		210	6.25
106-47-8	4-Chloroaniline	210 U		210	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	210 U		210	3.92
106-44-5	4-Methylphenol	210 U		210	7.64
100-01-6	4-Nitroaniline	210 U		210	8.70
100-02-7	4-Nitrophenol	400 U		400	3.40
83-32-9	Acenaphthene	210 U		210	2.06
208-96-8	Acenaphthylene	210 U		210	1.80
98-86-2	Acetophenone	210 U		210	2.28

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB7A**	QC Batch:	90482 -114
Sample #:	**345883**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	210 U		210	5.54
1912-24-9	Atrazine	210 U		210	8.26
100-52-7	Benzaldehyde	210 U		210	4.86
56-55-3	Benzo (a) Anthracene	210 U		210	16.0
50-32-8	**Benzo (a) Pyrene**	**18 J**		210	6.85
205-99-2	**Benzo (b) Fluoranthene**	**25 J**	J,1	210	11.7
191-24-2	**Benzo (g,h,i,) Perylene**	**11 J**	J,1	210	10.5
207-08-9	Benzo (k) Fluoranthene	210 U		210	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	210 U		210	3.77
111-44-4	Bis (2-Chloroethyl) Ether	210 U		210	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**19 J**	B,2	210	2.48
85-68-7	**Butyl Benzyl Phthalate**	**6.0 J**		210	5.38
105-60-2	Caprolactam	400 U		400	7.66
86-74-8	Carbazole	210 U		210	7.32
218-01-9	**Chrysene**	**24 J**		210	12.2
53-70-3	Dibenzo (a,h) Anthracene	210 U		210	7.08
132-64-9	Dibenzofuran	210 U		210	3.79
84-66-2	**Diethylphthalate**	**9.0 J**	J,1	210	2.28
131-11-3	Dimethylphthalate	210 U		210	3.97
84-74-2	**Di-n-Butylphthalate**	**70 J**	B,2	210	4.58
117-84-0	Di-n-Octylphthalate	210 U		210	3.72
206-44-0	**Fluoranthene**	**9.0 J**		210	2.82
86-73-7	Fluorene	210 U		210	2.02
118-74-1	Hexachlorobenzene	210 U		210	3.01
87-68-3	Hexachlorobutadiene	210 U		210	4.64
77-47-4	Hexachlorocyclopentadiene	210 U		210	2.38
67-72-1	Hexachloroethane	210 U		210	2.80
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**10 J**	J,1	210	4.70
78-59-1	Isophorone	210 U		210	2.08
91-20-3	Naphthalene	210 U		210	3.30
98-95-3	Nitrobenzene	210 U		210	3.84

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB7A**	QC Batch:	90482 -114
Sample #:	**345883**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	210 U	210	3.95
86-30-6	N-Nitroso-di-Phenylamine	210 U	210	5.70
87-86-5	Pentachlorophenol	400 U	400	5.27
85-01-8	**Phenanthrene**	**4.0 J**	210	2.76
108-95-2	Phenol	210 U	210	4.75
129-00-0	**Pyrene**	**6.0 J**	210	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB7A**	QC Batch:	90482 -114
Sample #:	**345883**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	82
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, butyl 2-methylpropyl ester	17851-53-5	69	E	NJ,+
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	50	E	B,X
Erucylamide	112-84-5	300	E	B,X
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~170~~	~~E~~	AS 2/18/04

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB7B**	QC Batch:	90482 -114
Sample #:	**345884**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	210 U		210	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	210 U		210	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	210 U		210	1.58
95-95-4	2,4,5-Trichlorophenol	210 U		210	4.01
88-06-2	2,4,6-Trichlorophenol	210 U		210	3.14
120-83-2	2,4-Dichlorophenol	210 U		210	4.22
105-67-9	2,4-Dimethylphenol	210 U		210	9.53
51-28-5	2,4-Dinitrophenol	410 U	VJC	410	3.84
121-14-2	2,4-Dinitrotoluene	210 U		210	3.78
606-20-2	2,6-Dinitrotoluene	210 U		210	33.2
91-58-7	2-Chloronaphthalene	210 U		210	2.76
95-57-8	2-Chlorophenol	210 U		210	2.41
91-57-6	2-Methylnaphthalene	210 U		210	3.29
95-48-7	2-Methylphenol	210 U		210	5.81
88-74-4	2-Nitroaniline	210 U		210	5.52
88-75-5	2-Nitrophenol	210 U		210	2.04
91-94-1	3,3'-Dichlorobenzidine	210 U		210	66.5
99-09-2	3-Nitroaniline	210 U		210	22.0
534-52-1	4,6-Dinitro-2-Methylphenol	210 U		210	5.41
101-55-3	4-Bromophenyl Phenylether	210 U		210	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**16 J**		210	6.25
106-47-8	4-Chloroaniline	210 U		210	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	210 U		210	3.92
106-44-5	4-Methylphenol	210 U		210	7.64
100-01-6	4-Nitroaniline	210 U		210	8.70
100-02-7	4-Nitrophenol	410 U		410	3.40
83-32-9	Acenaphthene	210 U		210	2.06
208-96-8	Acenaphthylene	210 U		210	1.80
98-86-2	Acetophenone	210 U		210	2.28

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB7B**	QC Batch:	90482 -114
Sample #:	**345884**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	210 U		210	5.54
1912-24-9	Atrazine	210 U		210	8.26
100-52-7	Benzaldehyde	210 U		210	4.86
56-55-3	Benzo (a) Anthracene	210 U		210	16.0
50-32-8	**Benzo (a) Pyrene**	**11 J**		210	6.85
205-99-2	**Benzo (b) Fluoranthene**	**17 J**	J,1	210	11.7
191-24-2	Benzo (g,h,i,) Perylene	210 U		210	10.5
207-08-9	Benzo (k) Fluoranthene	210 U		210	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	210 U		210	3.77
111-44-4	Bis (2-Chloroethyl) Ether	210 U		210	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**18 J**	B,2	210	2.48
85-68-7	Butyl Benzyl Phthalate	210 U		210	5.38
105-60-2	Caprolactam	410 U		410	7.66
86-74-8	Carbazole	210 U		210	7.32
218-01-9	**Chrysene**	**16 J**		210	12.2
53-70-3	Dibenzo (a,h) Anthracene	210 U		210	7.08
132-64-9	Dibenzofuran	210 U		210	3.79
84-66-2	**Diethylphthalate**	**8.0 J**	J,1	210	2.28
131-11-3	Dimethylphthalate	210 U		210	3.97
84-74-2	**Di-n-Butylphthalate**	**85 J**	B,2	210	4.58
117-84-0	Di-n-Octylphthalate	210 U		210	3.72
206-44-0	Fluoranthene	210 U		210	2.82
86-73-7	Fluorene	210 U		210	2.02
118-74-1	Hexachlorobenzene	210 U		210	3.01
87-68-3	Hexachlorobutadiene	210 U		210	4.64
77-47-4	Hexachlorocyclopentadiene	210 U		210	2.38
67-72-1	Hexachloroethane	210 U		210	2.80
193-39-5	Indeno (1,2,3-cd) Pyrene	210 U		210	4.70
78-59-1	Isophorone	210 U		210	2.08
91-20-3	Naphthalene	210 U		210	3.30
98-95-3	Nitrobenzene	210 U		210	3.84

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB7B**	QC Batch:	90482 -114
Sample #:	**345884**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	210 U	210	3.95
86-30-6	N-Nitroso-di-Phenylamine	210 U	210	5.70
87-86-5	Pentachlorophenol	410 U	410	5.27
85-01-8	Phenanthrene	210 U	210	2.76
108-95-2	Phenol	210 U	210	4.75
129-00-0	Pyrene	210 U	210	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB7B**	QC Batch:	90482 -114
Sample #:	**345884**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	80
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	140	E	NJ,+
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	42	E	B,X
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~330~~	~~E~~	AB 2/18/04

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB7C**	QC Batch:	90482 -114
Sample #:	**345885**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	79
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U		220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U		220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U		220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U		220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U		220	3.41
120-83-2	2,4-Dichlorophenol	220 U		220	4.58
105-67-9	2,4-Dimethylphenol	220 U		220	10.3
51-28-5	2,4-Dinitrophenol	420 U	UJ,C	420	4.16
121-14-2	2,4-Dinitrotoluene	220 U		220	4.10
606-20-2	2,6-Dinitrotoluene	220 U		220	36.0
91-58-7	2-Chloronaphthalene	220 U		220	2.99
95-57-8	2-Chlorophenol	220 U		220	2.61
91-57-6	2-Methylnaphthalene	220 U		220	3.56
95-48-7	2-Methylphenol	220 U		220	6.29
88-74-4	2-Nitroaniline	220 U		220	5.98
88-75-5	2-Nitrophenol	220 U		220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U		220	72.0
99-09-2	3-Nitroaniline	220 U		220	23.8
534-52-1	4,6-Dinitro-2-Methylphenol	220 U		220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U		220	4.39
59-50-7	**4-Chloro-3-Methylphenol**	**8.0 J**		220	6.77
106-47-8	4-Chloroaniline	220 U		220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U		220	4.25
106-44-5	4-Methylphenol	220 U		220	8.28
100-01-6	4-Nitroaniline	220 U		220	9.43
100-02-7	4-Nitrophenol	420 U		420	3.68
83-32-9	Acenaphthene	220 U		220	2.24
208-96-8	Acenaphthylene	220 U		220	1.95
98-86-2	Acetophenone	220 U		220	2.47

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB7C**	QC Batch:	90482 -114
Sample #:	**345885**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	79
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	220 U		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U		220	5.27
56-55-3	Benzo (a) Anthracene	220 U		220	17.3
50-32-8	Benzo (a) Pyrene	220 U		220	7.42
205-99-2	Benzo (b) Fluoranthene	220 U		220	12.7
191-24-2	Benzo (g,h,i,) Perylene	220 U		220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**17 J**	B,Z	220	2.69
85-68-7	Butyl Benzyl Phthalate	220 U		220	5.82
105-60-2	Caprolactam	420 U		420	8.29
86-74-8	Carbazole	220 U		220	7.93
218-01-9	Chrysene	220 U		220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U		220	7.67
132-64-9	Dibenzofuran	220 U		220	4.11
84-66-2	**Diethylphthalate**	**6.0 J**	J,I	220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**120 J**	B,Z	220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	Fluoranthene	220 U		220	3.06
86-73-7	Fluorene	220 U		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U		220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	Indeno (1,2,3-cd) Pyrene	220 U		220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	Naphthalene	220 U		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB7C**	QC Batch:	90482 -114
Sample #:	**345885**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	79
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	N-Nitroso-di-Phenylamine	220 U	220	6.18
87-86-5	Pentachlorophenol	420 U	420	5.71
85-01-8	Phenanthrene	220 U	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	Pyrene	220 U	220	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB7C**	QC Batch:	90482 -114
Sample #:	**345885**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	79
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	200	E	NJ+
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	36	E	B,X
Erucylamide	112-84-5	120	E	B,X
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~500~~	~~E~~	~~B,X~~ ts 2/18/04

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB12A**	QC Batch:	90572 -114
Sample #:	**345886**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U	220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U	220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U	220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U	220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U	220	3.41
120-83-2	2,4-Dichlorophenol	220 U	220	4.58
105-67-9	2,4-Dimethylphenol	220 U	220	10.3
51-28-5	2,4-Dinitrophenol	420 U VJ,C	420	4.16
121-14-2	**2,4-Dinitrotoluene**	**710**	220	4.10
606-20-2	**2,6-Dinitrotoluene**	**210 J**	220	36.0
91-58-7	2-Chloronaphthalene	220 U	220	2.99
95-57-8	2-Chlorophenol	220 U	220	2.61
91-57-6	2-Methylnaphthalene	220 U	220	3.56
95-48-7	2-Methylphenol	220 U	220	6.29
88-74-4	2-Nitroaniline	220 U	220	5.98
88-75-5	2-Nitrophenol	220 U	220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U	220	72.0
99-09-2	3-Nitroaniline	220 U	220	23.8
534-52-1	4,6-Dinitro-2-Methylphenol	220 U	220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U	220	4.39
59-50-7	**4-Chloro-3-Methylphenol**	**19 J**	220	6.77
106-47-8	4-Chloroaniline	220 U	220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U	220	4.25
106-44-5	4-Methylphenol	220 U	220	8.28
100-01-6	4-Nitroaniline	220 U	220	9.43
100-02-7	4-Nitrophenol	420 U	420	3.68
83-32-9	Acenaphthene	220 U	220	2.24
208-96-8	Acenaphthylene	220 U	220	1.95
98-86-2	Acetophenone	220 U	220	2.47

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB12A**	QC Batch:	90572 -114
Sample #:	**345886**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
120-12-7	Anthracene	220 U	220	6.01
1912-24-9	Atrazine	220 U	220	8.94
100-52-7	Benzaldehyde	220 U	220	5.27
56-55-3	Benzo (a) Anthracene	220 U	220	17.3
50-32-8	Benzo (a) Pyrene	220 U	220	7.42
205-99-2	**Benzo (b) Fluoranthene**	**13 J**	220	12.7
191-24-2	Benzo (g,h,i,) Perylene	220 U	220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U	220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U	220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U	220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**71 J**	220	2.69
85-68-7	Butyl Benzyl Phthalate	220 U	220	5.82
105-60-2	Caprolactam	420 U	420	8.29
86-74-8	Carbazole	220 U	220	7.93
218-01-9	Chrysene	220 U	220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U	220	7.67
132-64-9	Dibenzofuran	220 U	220	4.11
84-66-2	**Diethylphthalate**	**950**	220	2.47
131-11-3	Dimethylphthalate	220 U	220	4.30
84-74-2	**Di-n-Butylphthalate**	**680**	220	4.97
117-84-0	Di-n-Octylphthalate	220 U	220	4.03
206-44-0	**Fluoranthene**	**25 J**	220	3.06
86-73-7	Fluorene	220 U	220	2.18
118-74-1	Hexachlorobenzene	220 U	220	3.26
87-68-3	Hexachlorobutadiene	220 U	220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U	220	2.57
67-72-1	Hexachloroethane	220 U	220	3.03
193-39-5	Indeno (1,2,3-cd) Pyrene	220 U	220	5.10
78-59-1	Isophorone	220 U	220	2.25
91-20-3	Naphthalene	220 U	220	3.58
98-95-3	Nitrobenzene	220 U	220	4.16

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB12A**	QC Batch:	90572 -114
Sample #:	**345886**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	**N-Nitroso-di-Phenylamine**	**630**	220	6.18
87-86-5	Pentachlorophenol	420 U	420	5.71
85-01-8	**Phenanthrene**	**15 J**	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	**Pyrene**	**21 J**	220	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB12A**	QC Batch:	90572 -114
Sample #:	**345886**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	78
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	120	E	NJ,t
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	290	E	NJ,t
Benzene, 2-methyl-1,3,5-trinitro-	118-96-7	350	E	NJ,t
Benzeneamine, 2-nitro-N-phenyl-	119-75-5	280	E	NJ,t
Erucylamide	112-84-5	330	E	B,x
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~670~~	~~E~~	~~*~~ 2/18/04
Triacetin	102-76-1	140	E	NJ,t
Urea, N,N'-dimethyl-N,N'-diphenyl-	611-92-7	910	E	NJ,t

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB12B**	QC Batch:	90572 -114
Sample #:	**345887**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	240 U		240	3.44
95-94-3	1,2,4,5-Tetrachloro-benzene	240 U		240	40.2
108-60-1	Bis (2-Chloroisopropyl)-Ether	240 U		240	1.85
95-95-4	2,4,5-Trichlorophenol	240 U		240	4.68
88-06-2	2,4,6-Trichlorophenol	240 U		240	3.67
120-83-2	2,4-Dichlorophenol	240 U		240	4.93
105-67-9	2,4-Dimethylphenol	240 U		240	11.1
51-28-5	2,4-Dinitrophenol	460 U	UJ,C	460	4.48
121-14-2	**2,4-Dinitrotoluene**	**700**		240	4.41
606-20-2	**2,6-Dinitrotoluene**	**61 J**		240	38.8
91-58-7	2-Chloronaphthalene	240 U		240	3.22
95-57-8	2-Chlorophenol	240 U		240	2.81
91-57-6	2-Methylnaphthalene	240 U		240	3.84
95-48-7	2-Methylphenol	240 U		240	6.78
88-74-4	2-Nitroaniline	240 U		240	6.44
88-75-5	2-Nitrophenol	240 U		240	2.38
91-94-1	3,3'-Dichlorobenzidine	240 U		240	77.6
99-09-2	3-Nitroaniline	240 U		240	25.6
534-52-1	4,6-Dinitro-2-Methylphenol	240 U		240	6.31
101-55-3	4-Bromophenyl Phenylether	240 U		240	4.73
59-50-7	**4-Chloro-3-Methylphenol**	**18 J**		240	7.29
106-47-8	4-Chloroaniline	240 U		240	1.76
7005-72-3	4-Chlorophenylphenyl-Ether	240 U		240	4.58
106-44-5	4-Methylphenol	240 U		240	8.92
100-01-6	4-Nitroaniline	240 U		240	10.2
100-02-7	4-Nitrophenol	460 U		460	3.96
83-32-9	Acenaphthene	240 U		240	2.41
208-96-8	Acenaphthylene	240 U		240	2.10
98-86-2	Acetophenone	240 U		240	2.66

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB12B**	QC Batch:	90572 -114
Sample #:	**345887**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
120-12-7	Anthracene	240 U	240	6.47
1912-24-9	Atrazine	240 U	240	9.63
100-52-7	Benzaldehyde	240 U	240	5.67
56-55-3	Benzo (a) Anthracene	240 U	240	18.6
50-32-8	Benzo (a) Pyrene	240 U	240	7.99
205-99-2	Benzo (b) Fluoranthene	240 U	240	13.7
191-24-2	Benzo (g,h,i,) Perylene	240 U	240	12.2
207-08-9	Benzo (k) Fluoranthene	240 U	240	18.8
111-91-1	Bis (2-Chloroethoxy)-Methane	240 U	240	4.40
111-44-4	Bis (2-Chloroethyl) Ether	240 U	240	2.42
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**360**	240	2.90
85-68-7	Butyl Benzyl Phthalate	240 U	240	6.27
105-60-2	Caprolactam	460 U	460	8.93
86-74-8	Carbazole	240 U	240	8.54
218-01-9	Chrysene	240 U	240	14.3
53-70-3	Dibenzo (a,h) Anthracene	240 U	240	8.26
132-64-9	Dibenzofuran	240 U	240	4.42
* ~~84-66-2~~	~~**Diethylphthalate**~~	~~**2000 E**~~ J,q	~~240~~	~~2.66~~ As 2/18/04
131-11-3	**Dimethylphthalate**	**32 J**	240	4.63
* ~~84-74-2~~	~~**Di-n-Butylphthalate**~~	~~**1200 E**~~ J,q	~~240~~	~~5.35~~ As 2/18/04
117-84-0	Di-n-Octylphthalate	240 U	240	4.34
206-44-0	Fluoranthene	240 U	240	3.29
86-73-7	Fluorene	240 U	240	2.35
118-74-1	Hexachlorobenzene	240 U	240	3.51
87-68-3	Hexachlorobutadiene	240 U	240	5.42
77-47-4	Hexachlorocyclopentadiene	240 U	240	2.77
67-72-1	Hexachloroethane	240 U	240	3.27
193-39-5	Indeno (1,2,3-cd) Pyrene	240 U	240	5.49
78-59-1	Isophorone	240 U	240	2.42
91-20-3	Naphthalene	240 U	240	3.85
98-95-3	Nitrobenzene	240 U	240	4.48

* See Dilution for these results, As 2/18/04

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB12B**	QC Batch:	90572 -114
Sample #:	**345887**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	240 U	240	4.61
86-30-6	**N-Nitroso-di-Phenylamine**	**900**	240	6.65
87-86-5	Pentachlorophenol	460 U	460	6.15
85-01-8	Phenanthrene	240 U	240	3.22
108-95-2	Phenol	240 U	240	5.54
129-00-0	Pyrene	240 U	240	2.07

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB12B**	QC Batch:	90572 -114
Sample #:	**345887**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	71
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	270	E	NJ,+
2-Ethyl-hexanoic Acid	149-57-5	180	E	NJ,+
7H-Dibenzo (a,g) carbazole	207-84-1	280	E	NJ,+
Benzene, 2-methyl-1,3,5-trinitro-	118-96-7	260	E	NJ,+
Benzeneamine, 2-nitro-N-phenyl-	119-75-5	900	E	NJ,+
Octacosane	630-02-4	180	E	NJ,+
Triacetin	102-76-1	1300	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB12B**	QC Batch:	90572 -114
Sample #:	**345887DL**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	2.8

AK 2/18/04

Do not use, See undiluted results

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	480 U		480	6.89
95-94-3	1,2,4,5-Tetrachloro-benzene	480 U		480	80.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	480 U		480	3.70
95-95-4	2,4,5-Trichlorophenol	480 U		480	9.35
88-06-2	2,4,6-Trichlorophenol	480 U		480	7.34
120-83-2	2,4-Dichlorophenol	480 U		480	9.86
105-67-9	2,4-Dimethylphenol	480 U		480	22.2
51-28-5	2,4-Dinitrophenol	930 U	UJC	930	8.96
121-14-2	**2,4-Dinitrotoluene**	**690**		480	8.82
606-20-2	2,6-Dinitrotoluene	480 U		480	77.6
91-58-7	2-Chloronaphthalene	480 U		480	6.44
95-57-8	2-Chlorophenol	480 U		480	5.63
91-57-6	2-Methylnaphthalene	480 U		480	7.67
95-48-7	2-Methylphenol	480 U		480	13.6
88-74-4	2-Nitroaniline	480 U		480	12.9
88-75-5	2-Nitrophenol	480 U		480	4.76
91-94-1	3,3'-Dichlorobenzidine	480 U		480	155
99-09-2	3-Nitroaniline	480 U		480	51.2
534-52-1	4,6-Dinitro-2-Methylphenol	480 U		480	12.6
101-55-3	4-Bromophenyl Phenylether	480 U		480	9.46
59-50-7	**4-Chloro-3-Methylphenol**	**17 J**		480	14.6
106-47-8	4-Chloroaniline	480 U		480	3.53
7005-72-3	4-Chlorophenylphenyl-Ether	480 U		480	9.16
106-44-5	4-Methylphenol	480 U		480	17.8
100-01-6	4-Nitroaniline	480 U		480	20.3
100-02-7	4-Nitrophenol	930 U		930	7.92
83-32-9	Acenaphthene	480 U		480	4.82
208-96-8	Acenaphthylene	480 U		480	4.20
98-86-2	Acetophenone	480 U		480	5.32

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB12B**	QC Batch:	90572 -114
Sample #:	**345887DL**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	2.8

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	480 U		480	12.9
1912-24-9	Atrazine	480 U		480	19.3
100-52-7	Benzaldehyde	480 U		480	11.3
56-55-3	Benzo (a) Anthracene	480 U		480	37.2
50-32-8	Benzo (a) Pyrene	480 U		480	16.0
205-99-2	Benzo (b) Fluoranthene	480 U		480	27.3
191-24-2	Benzo (g,h,i,) Perylene	480 U		480	24.4
207-08-9	Benzo (k) Fluoranthene	480 U		480	37.5
111-91-1	Bis (2-Chloroethoxy)-Methane	480 U		480	8.79
111-44-4	Bis (2-Chloroethyl) Ether	480 U		480	4.84
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**420 J**		480	5.80
85-68-7	Butyl Benzyl Phthalate	480 U		480	12.5
105-60-2	Caprolactam	930 U		930	17.9
86-74-8	Carbazole	480 U		480	17.1
218-01-9	Chrysene	480 U		480	28.6
53-70-3	Dibenzo (a,h) Anthracene	480 U		480	16.5
132-64-9	Dibenzofuran	480 U		480	8.85
84-66-2	**Diethylphthalate**	**2200**		480	5.32
131-11-3	**Dimethylphthalate**	**33 J**		480	9.27
84-74-2	**Di-n-Butylphthalate**	**1300**	J,f	480	10.7
117-84-0	Di-n-Octylphthalate	480 U		480	8.68
206-44-0	**Fluoranthene**	**7.0 J**		480	6.58
86-73-7	Fluorene	480 U		480	4.70
118-74-1	Hexachlorobenzene	480 U		480	7.03
87-68-3	Hexachlorobutadiene	480 U		480	10.8
77-47-4	Hexachlorocyclopentadiene	480 U	UJ,c	480	5.54
67-72-1	Hexachloroethane	480 U		480	6.54
193-39-5	Indeno (1,2,3-cd) Pyrene	480 U		480	11.0
78-59-1	Isophorone	480 U		480	4.84
91-20-3	Naphthalene	480 U		480	7.70
98-95-3	Nitrobenzene	480 U		480	8.96

2-18-04

2/18/04

* Use only these two results from this run

2/18/04

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB12B**	QC Batch:	90572 -114
Sample #:	**345887DL**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	2.8

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	480 U	480	9.21
86-30-6	**N-Nitroso-di-Phenylamine**	**1200**	480	13.3
87-86-5	Pentachlorophenol	930 U	930	12.3
85-01-8	Phenanthrene	480 U	480	6.44
108-95-2	Phenol	480 U	480	11.1
129-00-0	**Pyrene**	**7.0 J**	480	4.14

Do not use, ✱ 2/18/04
See neat run.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD8**	QC Batch:	90572 -114
Sample #:	**345888**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	250 U	250	3.69
95-94-3	1,2,4,5-Tetrachloro-benzene	250 U	250	43.1
108-60-1	Bis (2-Chloroisopropyl)-Ether	250 U	250	1.98
95-95-4	2,4,5-Trichlorophenol	250 U	250	5.01
88-06-2	2,4,6-Trichlorophenol	250 U	250	3.93
120-83-2	2,4-Dichlorophenol	250 U	250	5.28
105-67-9	2,4-Dimethylphenol	250 U	250	11.9
51-28-5	2,4-Dinitrophenol	490 U UJ,c	490	4.80
~~121-14-2~~	~~**2,4-Dinitrotoluene**~~	~~**1500 E**~~ J,q	~~250~~	~~4.73~~ see dilution ok, 2/18/04
606-20-2	**2,6-Dinitrotoluene**	**56 J**	250	41.6
91-58-7	2-Chloronaphthalene	250 U	250	3.45
95-57-8	2-Chlorophenol	250 U	250	3.02
91-57-6	2-Methylnaphthalene	250 U	250	4.11
95-48-7	2-Methylphenol	250 U	250	7.26
88-74-4	2-Nitroaniline	250 U	250	6.90
88-75-5	2-Nitrophenol	250 U	250	2.55
91-94-1	3,3'-Dichlorobenzidine	250 U	250	83.1
99-09-2	3-Nitroaniline	250 U	250	27.5
534-52-1	4,6-Dinitro-2-Methylphenol	250 U	250	6.77
101-55-3	4-Bromophenyl Phenylether	250 U	250	5.07
59-50-7	**4-Chloro-3-Methylphenol**	**23 J**	250	7.82
106-47-8	4-Chloroaniline	250 U	250	1.89
7005-72-3	4-Chlorophenylphenyl-Ether	250 U	250	4.91
106-44-5	4-Methylphenol	250 U	250	9.56
100-01-6	4-Nitroaniline	250 U	250	10.9
100-02-7	4-Nitrophenol	490 U	490	4.25
83-32-9	Acenaphthene	250 U	250	2.58
208-96-8	Acenaphthylene	250 U	250	2.25
98-86-2	Acetophenone	250 U	250	2.85

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD8**	QC Batch:	90572 -114
Sample #:	**345888**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL	
120-12-7	Anthracene	250 U	250	6.93	
1912-24-9	Atrazine	250 U	250	10.3	
100-52-7	Benzaldehyde	250 U	250	6.08	
56-55-3	Benzo (a) Anthracene	250 U	250	20.0	
50-32-8	Benzo (a) Pyrene	250 U	250	8.57	
205-99-2	Benzo (b) Fluoranthene	250 U	250	14.6	
191-24-2	Benzo (g,h,i,) Perylene	250 U	250	13.1	
207-08-9	Benzo (k) Fluoranthene	250 U	250	20.1	
111-91-1	Bis (2-Chloroethoxy)-Methane	250 U	250	4.71	
111-44-4	Bis (2-Chloroethyl) Ether	250 U	250	2.60	
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**300**	250	3.11	
85-68-7	Butyl Benzyl Phthalate	250 U	250	6.72	
105-60-2	Caprolactam	490 U	490	9.57	
86-74-8	Carbazole	250 U	250	9.15	
218-01-9	Chrysene	250 U	250	15.3	
53-70-3	Dibenzo (a,h) Anthracene	250 U	250	8.85	
132-64-9	Dibenzofuran	250 U	250	4.74	
~~84-66-2~~	~~**Diethylphthalate**~~	~~**2200 E**~~ J,q	250	2.85	see dilution 1, 2/18/04
131-11-3	Dimethylphthalate	250 U	250	4.97	
~~84-74-2~~	~~**Di-n-Butylphthalate**~~	~~**1800 E**~~ J,q	250	5.73	see dilution 1, 2/18/04
117-84-0	Di-n-Octylphthalate	250 U	250	4.65	
206-44-0	**Fluoranthene**	**21 J**	250	3.53	
86-73-7	Fluorene	250 U	250	2.52	
118-74-1	Hexachlorobenzene	250 U	250	3.77	
87-68-3	Hexachlorobutadiene	250 U	250	5.81	
77-47-4	Hexachlorocyclopentadiene	250 U	250	2.97	
67-72-1	Hexachloroethane	250 U	250	3.50	
193-39-5	Indeno (1,2,3-cd) Pyrene	250 U	250	5.88	
78-59-1	Isophorone	250 U	250	2.60	
91-20-3	Naphthalene	250 U	250	4.13	
98-95-3	Nitrobenzene	250 U	250	4.80	

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD8**	QC Batch:	90572 -114
Sample #:	**345888**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	250 U	250	4.94
86-30-6	**N-Nitroso-di-Phenylamine**	**700**	250	7.13
87-86-5	Pentachlorophenol	490 U	490	6.59
85-01-8	**Phenanthrene**	**9.0 J**	250	3.45
108-95-2	Phenol	250 U	250	5.94
129-00-0	**Pyrene**	**16 J**	250	2.22

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD8**	QC Batch:	90572 -114
Sample #:	**345888**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	67
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,1'-Biphenyl, bis(1-methylethyl)-	69009-90-1	66	E	NJ,+
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	400	E	NJ,+
2-Ethyl-hexanoic Acid	149-57-5	140	E	NJ,+
Benzene, 2-methyl-1,3,5-trinitro-	118-96-7	160	E	NJ,+
Benzeneamine, 2-nitro-N-phenyl-	119-75-5	600	E	NJ,+
Erucylamide	112-84-5	440	E	B,X
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~560~~	~~E~~	~~[illegible]~~ 2/18/04
Triacetin	102-76-1	1000	E	NJ,+
Triphenyl Phosphate	115-86-6	200	E	NJ,+
Urea, N,N'-dimethyl-N,N'-diphenyl-	611-92-7	100	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD8**	QC Batch:	90572 -114
Sample #:	**345888DL**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	510 U	510	7.38
95-94-3	1,2,4,5-Tetrachloro-benzene	510 U	510	86.1
108-60-1	Bis (2-Chloroisopropyl)-Ether	510 U	510	3.96
95-95-4	2,4,5-Trichlorophenol	510 U	510	10.0
88-06-2	2,4,6-Trichlorophenol	510 U	510	7.86
120-83-2	2,4-Dichlorophenol	510 U	510	10.6
105-67-9	2,4-Dimethylphenol	510 U	510	23.8
51-28-5	2,4-Dinitrophenol	980 U	980	9.60
121-14-2	**2,4-Dinitrotoluene**	**1500**	510	9.45
606-20-2	2,6-Dinitrotoluene	510 U	510	83.1
91-58-7	2-Chloronaphthalene	510 U	510	6.90
95-57-8	2-Chlorophenol	510 U	510	6.03
91-57-6	2-Methylnaphthalene	510 U	510	8.22
95-48-7	2-Methylphenol	510 U	510	14.5
88-74-4	2-Nitroaniline	510 U	510	13.8
88-75-5	2-Nitrophenol	510 U	510	5.10
91-94-1	3,3'-Dichlorobenzidine	510 U	510	166
99-09-2	3-Nitroaniline	510 U	510	54.9
534-52-1	4,6-Dinitro-2-Methylphenol	510 U	510	13.5
101-55-3	4-Bromophenyl Phenylether	510 U	510	10.1
59-50-7	**4-Chloro-3-Methylphenol**	**19 J**	510	15.6
106-47-8	4-Chloroaniline	510 U	510	3.78
7005-72-3	4-Chlorophenylphenyl-Ether	510 U	510	9.81
106-44-5	4-Methylphenol	510 U	510	19.1
100-01-6	4-Nitroaniline	510 U	510	21.8
100-02-7	4-Nitrophenol	980 U	980	8.49
83-32-9	Acenaphthene	510 U	510	5.16
208-96-8	Acenaphthylene	510 U	510	4.50
98-86-2	Acetophenone	510 U	510	5.70

UJ,C ✱ 2/18/04 ✱ 2/18/04

✱ Use only this result, ✱ 2/18/04

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD8**	QC Batch:	90572 -114
Sample #:	**345888DL**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
120-12-7	Anthracene	510 U	510	13.9
1912-24-9	Atrazine	510 U	510	20.6
100-52-7	Benzaldehyde	510 U	510	12.2
56-55-3	Benzo (a) Anthracene	510 U	510	39.9
50-32-8	Benzo (a) Pyrene	510 U	510	17.1
205-99-2	Benzo (b) Fluoranthene	510 U	510	29.3
191-24-2	Benzo (g,h,i,) Perylene	510 U	510	26.2
207-08-9	Benzo (k) Fluoranthene	510 U	510	40.2
111-91-1	Bis (2-Chloroethoxy)-Methane	510 U	510	9.42
111-44-4	Bis (2-Chloroethyl) Ether	510 U	510	5.19
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**320 J**	510	6.21
85-68-7	Butyl Benzyl Phthalate	510 U	510	13.4
105-60-2	Caprolactam	980 U	980	19.1
86-74-8	Carbazole	510 U	510	18.3
218-01-9	Chrysene	510 U	510	30.6
53-70-3	Dibenzo (a,h) Anthracene	510 U	510	17.7
132-64-9	Dibenzofuran	510 U	510	9.48
84-66-2	**Diethylphthalate**	**2400**	510	5.70
131-11-3	Dimethylphthalate	510 U	510	9.93
84-74-2	**Di-n-Butylphthalate**	**1900** J,f	510	11.5
117-84-0	Di-n-Octylphthalate	510 U	510	9.30
206-44-0	**Fluoranthene**	**21 J**	510	7.05
86-73-7	Fluorene	510 U	510	5.04
118-74-1	Hexachlorobenzene	510 U	510	7.53
87-68-3	Hexachlorobutadiene	510 U	510	11.6
77-47-4	Hexachlorocyclopentadiene	510 U UJ,c	510	5.94
67-72-1	Hexachloroethane	510 U	510	7.00
193-39-5	Indeno (1,2,3-cd) Pyrene	510 U	510	11.8
78-59-1	Isophorone	510 U	510	5.19
91-20-3	Naphthalene	510 U	510	8.25
98-95-3	Nitrobenzene	510 U	510	9.60

* Use only these results, AS 2/18/04

AS 2/18/04

AS 2/18/04

AS 2/18/04

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD8**	QC Batch:	90572 -114
Sample #:	**345888DL**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	510 U	510	9.87
86-30-6	**N-Nitroso-di-Phenylamine**	**820**	510	14.3
87-86-5	Pentachlorophenol	980 U	980	13.2
85-01-8	**Phenanthrene**	**8.0 J**	510	6.90
108-95-2	Phenol	510 U	510	11.9
129-00-0	**Pyrene**	**22 J**	510	4.44

Do not use See next analysis, TS 2/18/04

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB12C**	QC Batch:	90572 -114
Sample #:	**345889**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	62
Unit:	ug/kg dry	Dilution Factor:	1.6

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	270 U		270	3.94
95-94-3	1,2,4,5-Tetrachloro-benzene	270 U		270	45.9
108-60-1	Bis (2-Chloroisopropyl)-Ether	270 U		270	2.11
95-95-4	2,4,5-Trichlorophenol	270 U		270	5.34
88-06-2	2,4,6-Trichlorophenol	270 U		270	4.19
120-83-2	2,4-Dichlorophenol	270 U		270	5.63
105-67-9	2,4-Dimethylphenol	270 U		270	12.7
51-28-5	2,4-Dinitrophenol	530 U	VJ,C	530	5.12
121-14-2	**2,4-Dinitrotoluene**	**65 J**		270	5.04
606-20-2	2,6-Dinitrotoluene	270 U		270	44.3
91-58-7	2-Chloronaphthalene	270 U		270	3.68
95-57-8	2-Chlorophenol	270 U		270	3.22
91-57-6	2-Methylnaphthalene	270 U		270	4.38
95-48-7	2-Methylphenol	270 U		270	7.74
88-74-4	2-Nitroaniline	270 U		270	7.36
88-75-5	2-Nitrophenol	270 U		270	2.72
91-94-1	3,3'-Dichlorobenzidine	270 U		270	88.6
99-09-2	3-Nitroaniline	270 U		270	29.3
534-52-1	4,6-Dinitro-2-Methylphenol	270 U		270	7.22
101-55-3	4-Bromophenyl Phenylether	270 U		270	5.41
59-50-7	**4-Chloro-3-Methylphenol**	**24 J**		270	8.34
106-47-8	4-Chloroaniline	270 U		270	2.02
7005-72-3	4-Chlorophenylphenyl-Ether	270 U		270	5.23
106-44-5	4-Methylphenol	270 U		270	10.2
100-01-6	4-Nitroaniline	270 U		270	11.6
100-02-7	4-Nitrophenol	530 U		530	4.53
83-32-9	**Acenaphthene**	**3.0 J**		270	2.75
208-96-8	Acenaphthylene	270 U		270	2.40
98-86-2	Acetophenone	270 U		270	3.04

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB12C**	QC Batch:	90572 -114
Sample #:	**345889**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	62
Unit:	ug/kg dry	Dilution Factor:	1.6

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
120-12-7	Anthracene	270 U	270	7.39
1912-24-9	Atrazine	270 U	270	11.0
100-52-7	Benzaldehyde	270 U	270	6.48
56-55-3	**Benzo (a) Anthracene**	**25 J**	270	21.3
50-32-8	**Benzo (a) Pyrene**	**21 J**	270	9.14
205-99-2	**Benzo (b) Fluoranthene**	**40 J**	270	15.6
191-24-2	Benzo (g,h,i,) Perylene	270 U	270	14.0
207-08-9	**Benzo (k) Fluoranthene**	**22 J**	270	21.4
111-91-1	Bis (2-Chloroethoxy)-Methane	270 U	270	5.02
111-44-4	Bis (2-Chloroethyl) Ether	270 U	270	2.77
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**1000**	270	3.31
85-68-7	Butyl Benzyl Phthalate	270 U	270	7.17
105-60-2	Caprolactam	530 U	530	10.2
86-74-8	Carbazole	270 U	270	9.76
218-01-9	**Chrysene**	**24 J**	270	16.3
53-70-3	Dibenzo (a,h) Anthracene	270 U	270	9.44
132-64-9	Dibenzofuran	270 U	270	5.06
84-66-2	**Diethylphthalate**	**940**	270	3.04
131-11-3	Dimethylphthalate	270 U	270	5.30
84-74-2	**Di-n-Butylphthalate**	**650**	270	6.11
117-84-0	Di-n-Octylphthalate	270 U	270	4.96
206-44-0	**Fluoranthene**	**59 J**	270	3.76
86-73-7	**Fluorene**	**4.0 J**	270	2.69
118-74-1	Hexachlorobenzene	270 U	270	4.02
87-68-3	Hexachlorobutadiene	270 U	270	6.19
77-47-4	Hexachlorocyclopentadiene	270 U	270	3.17
67-72-1	Hexachloroethane	270 U	270	3.73
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**10 J**	270	6.27
78-59-1	Isophorone	270 U	270	2.77
91-20-3	**Naphthalene**	**15 J**	270	4.40
98-95-3	Nitrobenzene	270 U	270	5.12

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB12C**	QC Batch:	90572 -114
Sample #:	**345889**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	62
Unit:	ug/kg dry	Dilution Factor:	1.6

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	270 U	270	5.26
86-30-6	**N-Nitroso-di-Phenylamine**	**480**	270	7.60
87-86-5	Pentachlorophenol	530 U	530	7.02
85-01-8	**Phenanthrene**	**52 J**	270	3.68
108-95-2	Phenol	270 U	270	6.34
129-00-0	**Pyrene**	**54 J**	270	2.37

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB12C**	QC Batch:	90572 -114
Sample #:	**345889**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	62
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,1'-Biphenyl, (1,1-dimethylethoxy)-	72101-19-0	360	E	NJ,+
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	460	E	NJ,+
Benzeneamine, 2-nitro-N-phenyl-	119-75-5	250	E	NJ,+
Ether, bis(p-tert-butylphenyl)	24085-65-2	830	E	NJ,+
Triacetin	102-76-1	240	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB11A**	QC Batch:	90572 -114
Sample #:	**345890**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U		220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U		220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U		220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U		220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U		220	3.41
120-83-2	2,4-Dichlorophenol	220 U		220	4.58
105-67-9	2,4-Dimethylphenol	220 U		220	10.3
51-28-5	2,4-Dinitrophenol	430 U	VJ,c	430	4.16
121-14-2	**2,4-Dinitrotoluene**	**35 J**		220	4.10
606-20-2	2,6-Dinitrotoluene	220 U		220	36.0
91-58-7	2-Chloronaphthalene	220 U		220	2.99
95-57-8	2-Chlorophenol	220 U		220	2.61
91-57-6	**2-Methylnaphthalene**	**5.0 J**		220	3.56
95-48-7	2-Methylphenol	220 U		220	6.29
88-74-4	2-Nitroaniline	220 U		220	5.98
88-75-5	2-Nitrophenol	220 U		220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U		220	72.0
99-09-2	3-Nitroaniline	220 U		220	23.8
534-52-1	4,6-Dinitro-2-Methylphenol	220 U		220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U		220	4.39
59-50-7	**4-Chloro-3-Methylphenol**	**9.0 J**		220	6.77
106-47-8	4-Chloroaniline	220 U		220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U		220	4.25
106-44-5	4-Methylphenol	220 U		220	8.28
100-01-6	4-Nitroaniline	220 U		220	9.43
100-02-7	4-Nitrophenol	430 U		430	3.68
83-32-9	**Acenaphthene**	**8.0 J**		220	2.24
208-96-8	**Acenaphthylene**	**2.0 J**		220	1.95
98-86-2	Acetophenone	220 U		220	2.47

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB11A**	QC Batch:	90572 -114
Sample #:	**345890**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
120-12-7	**Anthracene**	**15 J**	220	6.01
1912-24-9	Atrazine	220 U	220	8.94
100-52-7	Benzaldehyde	220 U	220	5.27
56-55-3	**Benzo (a) Anthracene**	**51 J**	220	17.3
50-32-8	**Benzo (a) Pyrene**	**44 J**	220	7.42
205-99-2	**Benzo (b) Fluoranthene**	**78 J**	220	12.7
191-24-2	**Benzo (g,h,i,) Perylene**	**25 J**	220	11.3
207-08-9	**Benzo (k) Fluoranthene**	**28 J**	220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U	220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U	220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**59 J**	220	2.69
85-68-7	**Butyl Benzyl Phthalate**	**13 J**	220	5.82
105-60-2	Caprolactam	430 U	430	8.29
86-74-8	Carbazole	220 U	220	7.93
218-01-9	**Chrysene**	**57 J**	220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U	220	7.67
132-64-9	Dibenzofuran	220 U	220	4.11
84-66-2	**Diethylphthalate**	**93 J**	220	2.47
131-11-3	Dimethylphthalate	220 U	220	4.30
84-74-2	**Di-n-Butylphthalate**	**360**	220	4.97
117-84-0	Di-n-Octylphthalate	220 U	220	4.03
206-44-0	**Fluoranthene**	**150 J**	220	3.06
86-73-7	**Fluorene**	**6.0 J**	220	2.18
118-74-1	Hexachlorobenzene	220 U	220	3.26
87-68-3	Hexachlorobutadiene	220 U	220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U	220	2.57
67-72-1	Hexachloroethane	220 U	220	3.03
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**22 J**	220	5.10
78-59-1	Isophorone	220 U	220	2.25
91-20-3	**Naphthalene**	**4.0 J**	220	3.58
98-95-3	Nitrobenzene	220 U	220	4.16

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB11A**	QC Batch:	90572 -114
Sample #:	**345890**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	**N-Nitroso-di-Phenylamine**	**200 J**	220	6.18
87-86-5	Pentachlorophenol	430 U	430	5.71
85-01-8	**Phenanthrene**	**63 J**	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	**Pyrene**	**110 J**	220	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB11A**	QC Batch:	90572 -114
Sample #:	**345890**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	77
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
.Gamma.-sitosterol	83-47-6	500	E	NJ,+
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	360	E	NJ,+
1-Heneicosanol	15594-90-8	220	E	NJ,+
Benzene, 2-methyl-1,3,5-trinitro-	118-96-7	280	E	NJ,+
Butyl Ester Octadecanioc	123-95-5	130	E	NJ,+
Erucylamide	112-84-5	140	E	B,X NJ,+
Ethanol, 2-(hexadecyloxy)-	2136-71-2	390	E	NJ,+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~2200~~	~~E~~	AB 2/18/04
Stigmast-4-en-3-one	1058-61-3	140	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB11B**	QC Batch:	90572 -114
Sample #:	**345891**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	88
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	190 U		190	2.71
95-94-3	1,2,4,5-Tetrachloro-benzene	190 U		190	31.6
108-60-1	Bis (2-Chloroisopropyl)-Ether	190 U		190	1.45
95-95-4	2,4,5-Trichlorophenol	190 U		190	3.67
88-06-2	2,4,6-Trichlorophenol	190 U		190	2.88
120-83-2	2,4-Dichlorophenol	190 U		190	3.87
105-67-9	2,4-Dimethylphenol	190 U		190	8.73
51-28-5	2,4-Dinitrophenol	380 U	UJ,c	380	3.52
121-14-2	**2,4-Dinitrotoluene**	**87 J**		190	3.47
606-20-2	**2,6-Dinitrotoluene**	**32 J**		190	30.5
91-58-7	2-Chloronaphthalene	190 U		190	2.53
95-57-8	2-Chlorophenol	190 U		190	2.21
91-57-6	2-Methylnaphthalene	190 U		190	3.01
95-48-7	2-Methylphenol	190 U		190	5.32
88-74-4	2-Nitroaniline	190 U		190	5.06
88-75-5	2-Nitrophenol	190 U		190	1.87
91-94-1	3,3'-Dichlorobenzidine	190 U		190	60.9
99-09-2	3-Nitroaniline	190 U		190	20.1
534-52-1	4,6-Dinitro-2-Methylphenol	190 U		190	4.96
101-55-3	4-Bromophenyl Phenylether	190 U		190	3.72
59-50-7	**4-Chloro-3-Methylphenol**	**13 J**		190	5.73
106-47-8	4-Chloroaniline	190 U		190	1.39
7005-72-3	4-Chlorophenylphenyl-Ether	190 U		190	3.60
106-44-5	4-Methylphenol	190 U		190	7.01
100-01-6	4-Nitroaniline	190 U		190	7.98
100-02-7	4-Nitrophenol	380 U		380	3.11
83-32-9	Acenaphthene	190 U		190	1.89
208-96-8	**Acenaphthylene**	**2.0 J**		190	1.65
98-86-2	Acetophenone	190 U		190	2.09

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB11B**	QC Batch:	90572 -114
Sample #:	**345891**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	88
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
120-12-7	Anthracene	190 U	190	5.08
1912-24-9	Atrazine	190 U	190	7.57
100-52-7	Benzaldehyde	190 U	190	4.46
56-55-3	Benzo (a) Anthracene	190 U	190	14.6
50-32-8	**Benzo (a) Pyrene**	**7.0 J**	190	6.28
205-99-2	**Benzo (b) Fluoranthene**	**13 J**	190	10.7
191-24-2	Benzo (g,h,i,) Perylene	190 U	190	9.59
207-08-9	Benzo (k) Fluoranthene	190 U	190	14.7
111-91-1	Bis (2-Chloroethoxy)-Methane	190 U	190	3.45
111-44-4	Bis (2-Chloroethyl) Ether	190 U	190	1.90
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**380**	190	2.28
85-68-7	**Butyl Benzyl Phthalate**	**24 J**	190	4.93
105-60-2	Caprolactam	380 U	380	7.02
86-74-8	Carbazole	190 U	190	6.71
218-01-9	Chrysene	190 U	190	11.2
53-70-3	Dibenzo (a,h) Anthracene	190 U	190	6.49
132-64-9	Dibenzofuran	190 U	190	3.48
84-66-2	**Diethylphthalate**	**39 J**	190	2.09
131-11-3	**Dimethylphthalate**	**550**	190	3.64
84-74-2	**Di-n-Butylphthalate**	**600**	190	4.20
117-84-0	Di-n-Octylphthalate	190 U	190	3.41
206-44-0	**Fluoranthene**	**12 J**	190	2.59
86-73-7	Fluorene	190 U	190	1.85
118-74-1	Hexachlorobenzene	190 U	190	2.76
87-68-3	Hexachlorobutadiene	190 U	190	4.26
77-47-4	Hexachlorocyclopentadiene	190 U	190	2.18
67-72-1	Hexachloroethane	190 U	190	2.57
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**5.0 J**	190	4.31
78-59-1	Isophorone	190 U	190	1.90
91-20-3	Naphthalene	190 U	190	3.03
98-95-3	Nitrobenzene	190 U	190	3.52

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB11B**	QC Batch:	90572 -114
Sample #:	**345891**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	88
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	190 U	190	3.62
86-30-6	**N-Nitroso-di-Phenylamine**	**950**	190	5.23
87-86-5	Pentachlorophenol	380 U	380	4.83
85-01-8	**Phenanthrene**	**9.0 J**	190	2.53
108-95-2	Phenol	190 U	190	4.36
129-00-0	**Pyrene**	**11 J**	190	1.63

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB11B**	QC Batch:	90572 -114
Sample #:	**345891**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	88
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	430	E	NJ,+
Benzeneamine, 2-nitro-N-phenyl-	119-75-5	150	E	NJ,+
Bis(2-ethylhexyl)maleate	142-16-5	120	E	NJ,+
Erucylamide	112-84-5	510	E	NJ,+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~4500~~	~~E~~	~~A~~ 2/19/04
Triphenyl Phosphate	115-86-6	110	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB11C**	QC Batch:	90572 -114
Sample #:	**345892**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U	220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U	220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U	220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U	220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U	220	3.41
120-83-2	2,4-Dichlorophenol	220 U	220	4.58
105-67-9	2,4-Dimethylphenol	220 U	220	10.3
51-28-5	2,4-Dinitrophenol	430 U UJ,c	430	4.16
121-14-2	2,4-Dinitrotoluene	220 U	220	4.10
606-20-2	2,6-Dinitrotoluene	220 U	220	36.0
91-58-7	2-Chloronaphthalene	220 U	220	2.99
95-57-8	2-Chlorophenol	220 U	220	2.61
91-57-6	2-Methylnaphthalene	220 U	220	3.56
95-48-7	2-Methylphenol	220 U	220	6.29
88-74-4	2-Nitroaniline	220 U	220	5.98
88-75-5	2-Nitrophenol	220 U	220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U	220	72.0
99-09-2	3-Nitroaniline	220 U	220	23.8
534-52-1	4,6-Dinitro-2-Methylphenol	220 U	220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U	220	4.39
59-50-7	4-Chloro-3-Methylphenol	220 U	220	6.77
106-47-8	4-Chloroaniline	220 U	220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U	220	4.25
106-44-5	4-Methylphenol	220 U	220	8.28
100-01-6	4-Nitroaniline	220 U	220	9.43
100-02-7	4-Nitrophenol	430 U	430	3.68
83-32-9	Acenaphthene	220 U	220	2.24
208-96-8	Acenaphthylene	220 U	220	1.95
98-86-2	Acetophenone	220 U	220	2.47

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB11C**	QC Batch:	90572 -114
Sample #:	**345892**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	220 U		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U		220	5.27
56-55-3	Benzo (a) Anthracene	220 U		220	17.3
50-32-8	**Benzo (a) Pyrene**	**14 J**		220	7.42
205-99-2	**Benzo (b) Fluoranthene**	**24 J**		220	12.7
191-24-2	**Benzo (g,h,i,) Perylene**	**17 J**		220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**540**		220	2.69
85-68-7	**Butyl Benzyl Phthalate**	**40 J**		220	5.82
105-60-2	Caprolactam	430 U		430	8.29
86-74-8	Carbazole	220 U		220	7.93
218-01-9	**Chrysene**	**16 J**		220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U		220	7.67
132-64-9	Dibenzofuran	220 U		220	4.11
84-66-2	**Diethylphthalate**	**6.0 J**		220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**320**		220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	**Fluoranthene**	**16 J**		220	3.06
86-73-7	Fluorene	220 U		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U	UJ,C	220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**16 J**		220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	Naphthalene	220 U		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB11C**	QC Batch:	90572 -114
Sample #:	**345892**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	N-Nitroso-di-Phenylamine	220 U	220	6.18
87-86-5	Pentachlorophenol	430 U	430	5.71
85-01-8	**Phenanthrene**	**7.0 J**	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	**Pyrene**	**14 J**	220	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB11C**	QC Batch:	90572 -114
Sample #:	**345892**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	77
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, butyl cyclohexyl ester	84-64-0	310	E	NJ,+
Bis(2-ethylhexyl)maleate	142-16-5	140	E	NJ,+
Erucylamide	112-84-5	180	E	BJX
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~4900~~	~~E~~	~~BJ~~ 2/18/04

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB10A**	QC Batch:	90572 -114
Sample #:	**345893**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	240 U		240	3.44
95-94-3	1,2,4,5-Tetrachloro-benzene	240 U		240	40.2
108-60-1	Bis (2-Chloroisopropyl)-Ether	240 U		240	1.85
95-95-4	2,4,5-Trichlorophenol	240 U		240	4.68
88-06-2	2,4,6-Trichlorophenol	240 U		240	3.67
120-83-2	2,4-Dichlorophenol	240 U		240	4.93
105-67-9	2,4-Dimethylphenol	240 U		240	11.1
51-28-5	2,4-Dinitrophenol	460 U	UJc	460	4.48
121-14-2	2,4-Dinitrotoluene	240 U		240	4.41
606-20-2	2,6-Dinitrotoluene	240 U		240	38.8
91-58-7	2-Chloronaphthalene	240 U		240	3.22
95-57-8	2-Chlorophenol	240 U		240	2.81
91-57-6	**2-Methylnaphthalene**	**4.0 J**		240	3.84
95-48-7	2-Methylphenol	240 U		240	6.78
88-74-4	2-Nitroaniline	240 U		240	6.44
88-75-5	2-Nitrophenol	240 U		240	2.38
91-94-1	3,3'-Dichlorobenzidine	240 U		240	77.6
99-09-2	3-Nitroaniline	240 U		240	25.6
534-52-1	4,6-Dinitro-2-Methylphenol	240 U		240	6.31
101-55-3	4-Bromophenyl Phenylether	240 U		240	4.73
59-50-7	**4-Chloro-3-Methylphenol**	**15 J**		240	7.29
106-47-8	4-Chloroaniline	240 U		240	1.76
7005-72-3	4-Chlorophenylphenyl-Ether	240 U		240	4.58
106-44-5	4-Methylphenol	240 U		240	8.92
100-01-6	4-Nitroaniline	240 U		240	10.2
100-02-7	4-Nitrophenol	460 U		460	3.96
83-32-9	**Acenaphthene**	**9.0 J**		240	2.41
208-96-8	**Acenaphthylene**	**4.0 J**		240	2.10
98-86-2	Acetophenone	240 U		240	2.66

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB10A**	QC Batch:	90572 -114
Sample #:	**345893**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
120-12-7	**Anthracene**	**26 J**	240	6.47
1912-24-9	Atrazine	240 U	240	9.63
100-52-7	Benzaldehyde	240 U	240	5.67
56-55-3	**Benzo (a) Anthracene**	**89 J**	240	18.6
50-32-8	**Benzo (a) Pyrene**	**72 J**	240	7.99
205-99-2	**Benzo (b) Fluoranthene**	**120 J**	240	13.7
191-24-2	**Benzo (g,h,i,) Perylene**	**34 J**	240	12.2
207-08-9	**Benzo (k) Fluoranthene**	**49 J**	240	18.8
111-91-1	Bis (2-Chloroethoxy)-Methane	240 U	240	4.40
111-44-4	Bis (2-Chloroethyl) Ether	240 U	240	2.42
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**450**	240	2.90
85-68-7	**Butyl Benzyl Phthalate**	**38 J**	240	6.27
105-60-2	Caprolactam	460 U	460	8.93
86-74-8	Carbazole	240 U	240	8.54
218-01-9	**Chrysene**	**120 J**	240	14.3
53-70-3	Dibenzo (a,h) Anthracene	240 U	240	8.26
132-64-9	**Dibenzofuran**	**6.0 J**	240	4.42
84-66-2	**Diethylphthalate**	**110 J**	240	2.66
131-11-3	**Dimethylphthalate**	**140 J**	240	4.63
84-74-2	**Di-n-Butylphthalate**	**470**	240	5.35
117-84-0	Di-n-Octylphthalate	240 U	240	4.34
206-44-0	**Fluoranthene**	**350**	240	3.29
86-73-7	**Fluorene**	**12 J**	240	2.35
118-74-1	Hexachlorobenzene	240 U	240	3.51
87-68-3	Hexachlorobutadiene	240 U	240	5.42
77-47-4	Hexachlorocyclopentadiene	240 U	240	2.77
67-72-1	Hexachloroethane	240 U	240	3.27
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**32 J**	240	5.49
78-59-1	Isophorone	240 U	240	2.42
91-20-3	Naphthalene	240 U	240	3.85
98-95-3	Nitrobenzene	240 U	240	4.48

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB10A**	QC Batch:	90572 -114
Sample #:	**345893**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	240 U	240	4.61
86-30-6	N-Nitroso-di-Phenylamine	240 U	240	6.65
87-86-5	Pentachlorophenol	460 U	460	6.15
85-01-8	**Phenanthrene**	**170 J**	240	3.22
108-95-2	Phenol	240 U	240	5.54
129-00-0	**Pyrene**	**260**	240	2.07

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB10A**	QC Batch:	90572 -114
Sample #:	**345893**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	71
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
.Gamma.-sitosterol	83-47-6	2400	E	NJ,+
1,2-Benzenedicarboxylic acid, butyl 2-methylpropyl ester	17851-53-5	530	E	NJ,+
4,4,6a,6b,8a,11,11,14b-Octamethyl-1,4,4a,5,6,6a,6b	1000194624 1000019-46-24	710	E	NJ,+
Cholesterol	57-88-5	470	E	NJ,+
Erucylamide	112-84-5	400	E	B,X
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~5000~~	~~E~~	~~dh 2/18/04~~
Vitamin E	10191-41-0	600	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB10B**	QC Batch:	90572 -114
Sample #:	**345894**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U	220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U	220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U	220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U	220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U	220	3.41
120-83-2	2,4-Dichlorophenol	220 U	220	4.58
105-67-9	2,4-Dimethylphenol	220 U	220	10.3
51-28-5	2,4-Dinitrophenol	430 U UJ,c	430	4.16
121-14-2	**2,4-Dinitrotoluene**	**51 J**	220	4.10
606-20-2	2,6-Dinitrotoluene	220 U	220	36.0
91-58-7	2-Chloronaphthalene	220 U	220	2.99
95-57-8	2-Chlorophenol	220 U	220	2.61
91-57-6	**2-Methylnaphthalene**	**4.0 J**	220	3.56
95-48-7	2-Methylphenol	220 U	220	6.29
88-74-4	2-Nitroaniline	220 U	220	5.98
88-75-5	2-Nitrophenol	220 U	220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U	220	72.0
99-09-2	3-Nitroaniline	220 U	220	23.8
534-52-1	4,6-Dinitro-2-Methylphenol	220 U	220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U	220	4.39
59-50-7	4-Chloro-3-Methylphenol	220 U	220	6.77
106-47-8	4-Chloroaniline	220 U	220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U	220	4.25
106-44-5	4-Methylphenol	220 U	220	8.28
100-01-6	4-Nitroaniline	220 U	220	9.43
100-02-7	4-Nitrophenol	430 U	430	3.68
83-32-9	**Acenaphthene**	**4.0 J**	220	2.24
208-96-8	**Acenaphthylene**	**6.0 J**	220	1.95
98-86-2	Acetophenone	220 U	220	2.47

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB10B**	QC Batch:	90572 -114
Sample #:	**345894**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
120-12-7	**Anthracene**	**16 J**	220	6.01
1912-24-9	Atrazine	220 U	220	8.94
100-52-7	Benzaldehyde	220 U	220	5.27
56-55-3	**Benzo (a) Anthracene**	**73 J**	220	17.3
50-32-8	**Benzo (a) Pyrene**	**95 J**	220	7.42
205-99-2	**Benzo (b) Fluoranthene**	**150 J**	220	12.7
191-24-2	**Benzo (g,h,i,) Perylene**	**60 J**	220	11.3
207-08-9	**Benzo (k) Fluoranthene**	**64 J**	220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U	220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U	220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**200 J**	220	2.69
85-68-7	Butyl Benzyl Phthalate	220 U	220	5.82
105-60-2	Caprolactam	430 U	430	8.29
86-74-8	Carbazole	220 U	220	7.93
218-01-9	**Chrysene**	**100 J**	220	13.3
53-70-3	**Dibenzo (a,h) Anthracene**	**16 J**	220	7.67
132-64-9	Dibenzofuran	220 U	220	4.11
84-66-2	**Diethylphthalate**	**240**	220	2.47
131-11-3	Dimethylphthalate	220 U	220	4.30
84-74-2	**Di-n-Butylphthalate**	**470**	220	4.97
117-84-0	Di-n-Octylphthalate	220 U	220	4.03
206-44-0	**Fluoranthene**	**90 J**	220	3.06
86-73-7	**Fluorene**	**4.0 J**	220	2.18
118-74-1	Hexachlorobenzene	220 U	220	3.26
87-68-3	Hexachlorobutadiene	220 U	220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U	220	2.57
67-72-1	Hexachloroethane	220 U	220	3.03
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**54 J**	220	5.10
78-59-1	Isophorone	220 U	220	2.25
91-20-3	Naphthalene	220 U	220	3.58
98-95-3	Nitrobenzene	220 U	220	4.16

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB10B**	QC Batch:	90572 -114
Sample #:	**345894**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	**N-Nitroso-di-Phenylamine**	**120 J**	220	6.18
87-86-5	Pentachlorophenol	430 U	430	5.71
85-01-8	**Phenanthrene**	**43 J**	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	**Pyrene**	**83 J**	220	1.92

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB10B**	QC Batch:	90572 -114
Sample #:	**345894**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	77
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, butyl 2-methylpropyl ester	17851-53-5	47	E	NJ,+
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	150	E	NJ,+
Benzeneamine, 2-nitro-N-phenyl-	119-75-5	71	E	NJ,+
Erucylamide	112-84-5	900	E	NJ,+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~150~~	~~E~~	

AS 2/18/04

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB10C**	QC Batch:	90572 -114
Sample #:	**345895**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	230 U		230	3.44
95-94-3	1,2,4,5-Tetrachloro-benzene	230 U		230	40.2
108-60-1	Bis (2-Chloroisopropyl)-Ether	230 U		230	1.85
95-95-4	2,4,5-Trichlorophenol	230 U		230	4.68
88-06-2	2,4,6-Trichlorophenol	230 U		230	3.67
120-83-2	2,4-Dichlorophenol	230 U		230	4.93
105-67-9	2,4-Dimethylphenol	230 U		230	11.1
51-28-5	2,4-Dinitrophenol	450 U	UJ,C	450	4.48
121-14-2	2,4-Dinitrotoluene	230 U		230	4.41
606-20-2	2,6-Dinitrotoluene	230 U		230	38.8
91-58-7	2-Chloronaphthalene	230 U		230	3.22
95-57-8	2-Chlorophenol	230 U		230	2.81
91-57-6	2-Methylnaphthalene	230 U		230	3.84
95-48-7	2-Methylphenol	230 U		230	6.78
88-74-4	2-Nitroaniline	230 U		230	6.44
88-75-5	2-Nitrophenol	230 U		230	2.38
91-94-1	3,3'-Dichlorobenzidine	230 U		230	77.6
99-09-2	3-Nitroaniline	230 U		230	25.6
534-52-1	4,6-Dinitro-2-Methylphenol	230 U		230	6.31
101-55-3	4-Bromophenyl Phenylether	230 U		230	4.73
59-50-7	4-Chloro-3-Methylphenol	230 U		230	7.29
106-47-8	4-Chloroaniline	230 U		230	1.76
7005-72-3	4-Chlorophenylphenyl-Ether	230 U		230	4.58
106-44-5	4-Methylphenol	230 U		230	8.92
100-01-6	4-Nitroaniline	230 U		230	10.2
100-02-7	4-Nitrophenol	450 U		450	3.96
83-32-9	Acenaphthene	230 U		230	2.41
208-96-8	**Acenaphthylene**	**6.0 J**		230	2.10
98-86-2	Acetophenone	230 U		230	2.66

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB10C**	QC Batch:	90572 -114
Sample #:	**345895**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
120-12-7	**Anthracene**	**22 J**	230	6.47
1912-24-9	Atrazine	230 U	230	9.63
100-52-7	Benzaldehyde	230 U	230	5.67
56-55-3	**Benzo (a) Anthracene**	**50 J**	230	18.6
50-32-8	**Benzo (a) Pyrene**	**82 J**	230	7.99
205-99-2	**Benzo (b) Fluoranthene**	**140 J**	230	13.7
191-24-2	**Benzo (g,h,i,) Perylene**	**46 J**	230	12.2
207-08-9	**Benzo (k) Fluoranthene**	**48 J**	230	18.8
111-91-1	Bis (2-Chloroethoxy)-Methane	230 U	230	4.40
111-44-4	Bis (2-Chloroethyl) Ether	230 U	230	2.42
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**31 J**	230	2.90
85-68-7	**Butyl Benzyl Phthalate**	**9.0 J**	230	6.27
105-60-2	Caprolactam	450 U	450	8.93
86-74-8	Carbazole	230 U	230	8.54
218-01-9	**Chrysene**	**83 J**	230	14.3
53-70-3	**Dibenzo (a,h) Anthracene**	**13 J**	230	8.26
132-64-9	Dibenzofuran	230 U	230	4.42
84-66-2	**Diethylphthalate**	**71 J**	230	2.66
131-11-3	Dimethylphthalate	230 U	230	4.63
84-74-2	**Di-n-Butylphthalate**	**450**	230	5.35
117-84-0	Di-n-Octylphthalate	230 U	230	4.34
206-44-0	**Fluoranthene**	**29 J**	230	3.29
86-73-7	Fluorene	230 U	230	2.35
118-74-1	Hexachlorobenzene	230 U	230	3.51
87-68-3	Hexachlorobutadiene	230 U	230	5.42
77-47-4	Hexachlorocyclopentadiene	230 U	230	2.77
67-72-1	Hexachloroethane	230 U	230	3.27
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**45 J**	230	5.49
78-59-1	Isophorone	230 U	230	2.42
91-20-3	Naphthalene	230 U	230	3.85
98-95-3	Nitrobenzene	230 U	230	4.48

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB10C**	QC Batch:	90572 -114
Sample #:	**345895**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	230 U	230	4.61
86-30-6	N-Nitroso-di-Phenylamine	230 U	230	6.65
87-86-5	Pentachlorophenol	450 U	450	6.15
85-01-8	**Phenanthrene**	**14 J**	230	3.22
108-95-2	Phenol	230 U	230	5.54
129-00-0	**Pyrene**	**29 J**	230	2.07

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB10C**	QC Batch:	90572 -114
Sample #:	**345895**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	73
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	530	E	NJ,+
Erucylamide	112-84-5	180	E	B,X
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~1800~~	~~E~~	

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB9A**	QC Batch:	90572 -114
Sample #:	**345896**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U		220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U		220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U		220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U		220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U		220	3.41
120-83-2	2,4-Dichlorophenol	220 U		220	4.58
105-67-9	2,4-Dimethylphenol	220 U		220	10.3
51-28-5	2,4-Dinitrophenol	420 U	UJ,C	420	4.16
121-14-2	**2,4-Dinitrotoluene**	**220**		220	4.10
606-20-2	2,6-Dinitrotoluene	220 U		220	36.0
91-58-7	2-Chloronaphthalene	220 U		220	2.99
95-57-8	2-Chlorophenol	220 U		220	2.61
91-57-6	2-Methylnaphthalene	220 U		220	3.56
95-48-7	2-Methylphenol	220 U		220	6.29
88-74-4	2-Nitroaniline	220 U		220	5.98
88-75-5	2-Nitrophenol	220 U		220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U		220	72.0
99-09-2	3-Nitroaniline	220 U		220	23.8
534-52-1	4,6-Dinitro-2-Methylphenol	220 U		220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U		220	4.39
59-50-7	**4-Chloro-3-Methylphenol**	**25 J**		220	6.77
106-47-8	4-Chloroaniline	220 U		220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U		220	4.25
106-44-5	4-Methylphenol	220 U		220	8.28
100-01-6	4-Nitroaniline	220 U		220	9.43
100-02-7	4-Nitrophenol	420 U		420	3.68
83-32-9	**Acenaphthene**	**10 J**		220	2.24
208-96-8	**Acenaphthylene**	**7.0 J**		220	1.95
98-86-2	Acetophenone	220 U		220	2.47

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB9A**	QC Batch:	90572 -114
Sample #:	**345896**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
120-12-7	**Anthracene**	**25 J**	220	6.01
1912-24-9	Atrazine	220 U	220	8.94
100-52-7	Benzaldehyde	220 U	220	5.27
56-55-3	**Benzo (a) Anthracene**	**200 J**	220	17.3
50-32-8	**Benzo (a) Pyrene**	**140 J**	220	7.42
205-99-2	**Benzo (b) Fluoranthene**	**240**	220	12.7
191-24-2	**Benzo (g,h,i,) Perylene**	**46 J**	220	11.3
207-08-9	**Benzo (k) Fluoranthene**	**93 J**	220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U	220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U	220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**43 J**	220	2.69
85-68-7	Butyl Benzyl Phthalate	220 U	220	5.82
105-60-2	Caprolactam	420 U	420	8.29
86-74-8	Carbazole	220 U	220	7.93
218-01-9	**Chrysene**	**220**	220	13.3
53-70-3	**Dibenzo (a,h) Anthracene**	**13 J**	220	7.67
132-64-9	Dibenzofuran	220 U	220	4.11
84-66-2	**Diethylphthalate**	**230**	220	2.47
131-11-3	**Dimethylphthalate**	**18 J**	220	4.30
84-74-2	**Di-n-Butylphthalate**	**580**	220	4.97
117-84-0	Di-n-Octylphthalate	220 U	220	4.03
206-44-0	**Fluoranthene**	**260**	220	3.06
86-73-7	**Fluorene**	**6.0 J**	220	2.18
118-74-1	Hexachlorobenzene	220 U	220	3.26
87-68-3	Hexachlorobutadiene	220 U	220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U	220	2.57
67-72-1	Hexachloroethane	220 U	220	3.03
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**43 J**	220	5.10
78-59-1	Isophorone	220 U	220	2.25
91-20-3	Naphthalene	220 U	220	3.58
98-95-3	Nitrobenzene	220 U	220	4.16

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB9A**	QC Batch:	90572 -114
Sample #:	**345896**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	**N-Nitroso-di-Phenylamine**	**25 J**	220	6.18
87-86-5	Pentachlorophenol	420 U	420	5.71
85-01-8	**Phenanthrene**	**79 J**	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	**Pyrene**	**230**	220	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB9A**	QC Batch:	90572 -114
Sample #:	**345896**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	78
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
.Gamma.-sitosterol	83-47-6	160	E	NJ+
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	670	E	NJ+
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	75	E	NJ+
Erucylamide	112-84-5	570	E	NJ+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~780~~	~~E~~	

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD9**	QC Batch:	90572 -114
Sample #:	**345897**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	210 U		210	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	210 U		210	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	210 U		210	1.58
95-95-4	2,4,5-Trichlorophenol	210 U		210	4.01
88-06-2	2,4,6-Trichlorophenol	210 U		210	3.14
120-83-2	2,4-Dichlorophenol	210 U		210	4.22
105-67-9	2,4-Dimethylphenol	210 U		210	9.53
51-28-5	2,4-Dinitrophenol	410 U	UJ,C	410	3.84
121-14-2	**2,4-Dinitrotoluene**	**23 J**		210	3.78
606-20-2	2,6-Dinitrotoluene	210 U		210	33.2
91-58-7	2-Chloronaphthalene	210 U		210	2.76
95-57-8	2-Chlorophenol	210 U		210	2.41
91-57-6	2-Methylnaphthalene	210 U		210	3.29
95-48-7	2-Methylphenol	210 U		210	5.81
88-74-4	2-Nitroaniline	210 U		210	5.52
88-75-5	2-Nitrophenol	210 U		210	2.04
91-94-1	3,3'-Dichlorobenzidine	210 U		210	66.5
99-09-2	3-Nitroaniline	210 U		210	22.0
534-52-1	4,6-Dinitro-2-Methylphenol	210 U		210	5.41
101-55-3	4-Bromophenyl Phenylether	210 U		210	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**8.0 J**		210	6.25
106-47-8	4-Chloroaniline	210 U		210	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	210 U		210	3.92
106-44-5	4-Methylphenol	210 U		210	7.64
100-01-6	4-Nitroaniline	210 U		210	8.70
100-02-7	4-Nitrophenol	410 U		410	3.40
83-32-9	**Acenaphthene**	**7.0 J**		210	2.06
208-96-8	**Acenaphthylene**	**3.0 J**		210	1.80
98-86-2	Acetophenone	210 U		210	2.28

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD9**	QC Batch:	90572 -114
Sample #:	**345897**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	**Anthracene**	**18 J**		210	5.54
1912-24-9	Atrazine	210 U		210	8.26
100-52-7	Benzaldehyde	210 U		210	4.86
56-55-3	**Benzo (a) Anthracene**	**140 J**		210	16.0
50-32-8	**Benzo (a) Pyrene**	**120 J**		210	6.85
205-99-2	**Benzo (b) Fluoranthene**	**170 J**		210	11.7
191-24-2	**Benzo (g,h,i,) Perylene**	**58 J**		210	10.5
207-08-9	**Benzo (k) Fluoranthene**	**85 J**		210	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	210 U		210	3.77
111-44-4	Bis (2-Chloroethyl) Ether	210 U		210	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**33 J**		210	2.48
85-68-7	Butyl Benzyl Phthalate	210 U		210	5.38
105-60-2	Caprolactam	410 U		410	7.66
86-74-8	**Carbazole**	**37 J**		210	7.32
218-01-9	**Chrysene**	**160 J**		210	12.2
53-70-3	**Dibenzo (a,h) Anthracene**	**18 J**		210	7.08
132-64-9	Dibenzofuran	210 U		210	3.79
84-66-2	**Diethylphthalate**	**44 J**		210	2.28
131-11-3	Dimethylphthalate	210 U		210	3.97
84-74-2	**Di-n-Butylphthalate**	**430**		210	4.58
117-84-0	Di-n-Octylphthalate	210 U		210	3.72
206-44-0	**Fluoranthene**	**190 J**		210	2.82
86-73-7	**Fluorene**	**4.0 J**		210	2.02
118-74-1	Hexachlorobenzene	210 U		210	3.01
87-68-3	Hexachlorobutadiene	210 U		210	4.64
77-47-4	Hexachlorocyclopentadiene	210 U	UJ,C	210	2.38
67-72-1	Hexachloroethane	210 U		210	2.80
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**52 J**		210	4.70
78-59-1	Isophorone	210 U		210	2.08
91-20-3	Naphthalene	210 U		210	3.30
98-95-3	Nitrobenzene	210 U		210	3.84

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD9**	QC Batch:	90572 -114
Sample #:	**345897**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	210 U	210	3.95
86-30-6	**N-Nitroso-di-Phenylamine**	**46 J**	210	5.70
87-86-5	Pentachlorophenol	410 U	410	5.27
85-01-8	**Phenanthrene**	**60 J**	210	2.76
108-95-2	Phenol	210 U	210	4.75
129-00-0	**Pyrene**	**170 J**	210	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD9**	QC Batch:	90572 -114
Sample #:	**345897**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	80
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	45	E	BX
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~820~~	~~E~~	
Stigmasterol, 22,23-dihydro-	1000214207 100021-42-07	160	E	NJ+
Urea, N,N'-dimethyl-N,N'-diphenyl-	611-92-7	48	E	NJ+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB9B**	QC Batch:	90572 -114
Sample #:	**345898**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	230 U		230	3.44
95-94-3	1,2,4,5-Tetrachloro-benzene	230 U		230	40.2
108-60-1	Bis (2-Chloroisopropyl)-Ether	230 U		230	1.85
95-95-4	2,4,5-Trichlorophenol	230 U		230	4.68
88-06-2	2,4,6-Trichlorophenol	230 U		230	3.67
120-83-2	2,4-Dichlorophenol	230 U		230	4.93
105-67-9	2,4-Dimethylphenol	230 U		230	11.1
51-28-5	2,4-Dinitrophenol	450 U	VJC	450	4.48
121-14-2	2,4-Dinitrotoluene	230 U		230	4.41
606-20-2	2,6-Dinitrotoluene	230 U		230	38.8
91-58-7	2-Chloronaphthalene	230 U		230	3.22
95-57-8	2-Chlorophenol	230 U		230	2.81
91-57-6	2-Methylnaphthalene	230 U		230	3.84
95-48-7	2-Methylphenol	230 U		230	6.78
88-74-4	2-Nitroaniline	230 U		230	6.44
88-75-5	2-Nitrophenol	230 U		230	2.38
91-94-1	3,3'-Dichlorobenzidine	230 U		230	77.6
99-09-2	3-Nitroaniline	230 U		230	25.6
534-52-1	4,6-Dinitro-2-Methylphenol	230 U		230	6.31
101-55-3	4-Bromophenyl Phenylether	230 U		230	4.73
59-50-7	4-Chloro-3-Methylphenol	230 U		230	7.29
106-47-8	4-Chloroaniline	230 U		230	1.76
7005-72-3	4-Chlorophenylphenyl-Ether	230 U		230	4.58
106-44-5	4-Methylphenol	230 U		230	8.92
100-01-6	4-Nitroaniline	230 U		230	10.2
100-02-7	4-Nitrophenol	450 U		450	3.96
83-32-9	Acenaphthene	230 U		230	2.41
208-96-8	Acenaphthylene	230 U		230	2.10
98-86-2	Acetophenone	230 U		230	2.66

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB9B**	QC Batch:	90572 -114
Sample #:	**345898**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	230 U		230	6.47
1912-24-9	Atrazine	230 U		230	9.63
100-52-7	Benzaldehyde	230 U		230	5.67
56-55-3	**Benzo (a) Anthracene**	**22 J**		230	18.6
50-32-8	**Benzo (a) Pyrene**	**22 J**		230	7.99
205-99-2	**Benzo (b) Fluoranthene**	**25 J**		230	13.7
191-24-2	**Benzo (g,h,i,) Perylene**	**15 J**		230	12.2
207-08-9	Benzo (k) Fluoranthene	230 U		230	18.8
111-91-1	Bis (2-Chloroethoxy)-Methane	230 U		230	4.40
111-44-4	Bis (2-Chloroethyl) Ether	230 U		230	2.42
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**24 J**		230	2.90
85-68-7	Butyl Benzyl Phthalate	230 U		230	6.27
105-60-2	Caprolactam	450 U		450	8.93
86-74-8	Carbazole	230 U		230	8.54
218-01-9	**Chrysene**	**30 J**		230	14.3
53-70-3	Dibenzo (a,h) Anthracene	230 U		230	8.26
132-64-9	Dibenzofuran	230 U		230	4.42
84-66-2	**Diethylphthalate**	**8.0 J**		230	2.66
131-11-3	Dimethylphthalate	230 U		230	4.63
84-74-2	**Di-n-Butylphthalate**	**270**		230	5.35
117-84-0	Di-n-Octylphthalate	230 U		230	4.34
206-44-0	**Fluoranthene**	**37 J**		230	3.29
86-73-7	Fluorene	230 U		230	2.35
118-74-1	Hexachlorobenzene	230 U		230	3.51
87-68-3	Hexachlorobutadiene	230 U		230	5.42
77-47-4	Hexachlorocyclopentadiene	230 U	UJ,c	230	2.77
67-72-1	Hexachloroethane	230 U		230	3.27
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**10 J**		230	5.49
78-59-1	Isophorone	230 U		230	2.42
91-20-3	Naphthalene	230 U		230	3.85
98-95-3	Nitrobenzene	230 U		230	4.48

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB9B**	QC Batch:	90572 -114
Sample #:	**345898**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	230 U	230	4.61
86-30-6	N-Nitroso-di-Phenylamine	230 U	230	6.65
87-86-5	Pentachlorophenol	450 U	450	6.15
85-01-8	**Phenanthrene**	**17 J**	230	3.22
108-95-2	Phenol	230 U	230	5.54
129-00-0	**Pyrene**	**33 J**	230	2.07

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB9B**	QC Batch:	90572 -114
Sample #:	**345898**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	73
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	83	E	NJ,+
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	420	E	NJ,+
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	45	E	NJ,+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~1000~~	~~E~~	~~✓~~ 2/18/04

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB9C**	QC Batch:	90572 -114
Sample #:	**345899**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U		220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U		220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U		220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U		220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U		220	3.41
120-83-2	2,4-Dichlorophenol	220 U		220	4.58
105-67-9	2,4-Dimethylphenol	220 U		220	10.3
51-28-5	2,4-Dinitrophenol	420 U	UJ,c	420	4.16
121-14-2	2,4-Dinitrotoluene	220 U		220	4.10
606-20-2	2,6-Dinitrotoluene	220 U		220	36.0
91-58-7	2-Chloronaphthalene	220 U		220	2.99
95-57-8	2-Chlorophenol	220 U		220	2.61
91-57-6	2-Methylnaphthalene	220 U		220	3.56
95-48-7	2-Methylphenol	220 U		220	6.29
88-74-4	2-Nitroaniline	220 U		220	5.98
88-75-5	2-Nitrophenol	220 U		220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U		220	72.0
99-09-2	3-Nitroaniline	220 U		220	23.8
534-52-1	4,6-Dinitro-2-Methylphenol	220 U		220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U		220	4.39
59-50-7	4-Chloro-3-Methylphenol	220 U		220	6.77
106-47-8	4-Chloroaniline	220 U		220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U		220	4.25
106-44-5	4-Methylphenol	220 U		220	8.28
100-01-6	4-Nitroaniline	220 U		220	9.43
100-02-7	4-Nitrophenol	420 U		420	3.68
83-32-9	Acenaphthene	220 U		220	2.24
208-96-8	Acenaphthylene	220 U		220	1.95
98-86-2	Acetophenone	220 U		220	2.47

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB9C**	QC Batch:	90572 -114
Sample #:	**345899**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	220 U		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U		220	5.27
56-55-3	Benzo (a) Anthracene	220 U		220	17.3
50-32-8	Benzo (a) Pyrene	220 U		220	7.42
205-99-2	Benzo (b) Fluoranthene	220 U		220	12.7
191-24-2	Benzo (g,h,i,) Perylene	220 U		220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**15 J**		220	2.69
85-68-7	Butyl Benzyl Phthalate	220 U		220	5.82
105-60-2	Caprolactam	420 U		420	8.29
86-74-8	Carbazole	220 U		220	7.93
218-01-9	Chrysene	220 U		220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U		220	7.67
132-64-9	Dibenzofuran	220 U		220	4.11
84-66-2	**Diethylphthalate**	**3.0 J**		220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**180 J**		220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	Fluoranthene	220 U		220	3.06
86-73-7	Fluorene	220 U		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U	UJ,c	220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	Indeno (1,2,3-cd) Pyrene	220 U		220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	Naphthalene	220 U		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB9C**	QC Batch:	90572 -114
Sample #:	**345899**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	N-Nitroso-di-Phenylamine	220 U	220	6.18
87-86-5	Pentachlorophenol	420 U	420	5.71
85-01-8	Phenanthrene	220 U	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	**Pyrene**	**3.0 J**	220	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB9C**	QC Batch:	90572 -114
Sample #:	**345899**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	78
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
1,2-Benzenedicarboxylic acid, butyl 2-methylpropyl ester	17851-53-5	350	E
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~300~~	~~E~~

NJ+

~~AS~~ 2-18-04

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 15:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB8A**	QC Batch:	90572 -114
Sample #:	**345900**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U		220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U		220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U		220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U		220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U		220	3.41
120-83-2	2,4-Dichlorophenol	220 U		220	4.58
105-67-9	2,4-Dimethylphenol	220 U		220	10.3
51-28-5	2,4-Dinitrophenol	430 U	UJ,C	430	4.16
121-14-2	2,4-Dinitrotoluene	220 U		220	4.10
606-20-2	2,6-Dinitrotoluene	220 U		220	36.0
91-58-7	2-Chloronaphthalene	220 U		220	2.99
95-57-8	2-Chlorophenol	220 U		220	2.61
91-57-6	**2-Methylnaphthalene**	**22 J**		220	3.56
95-48-7	2-Methylphenol	220 U		220	6.29
88-74-4	2-Nitroaniline	220 U		220	5.98
88-75-5	2-Nitrophenol	220 U		220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U		220	72.0
99-09-2	3-Nitroaniline	220 U		220	23.8
534-52-1	4,6-Dinitro-2-Methylphenol	220 U		220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U		220	4.39
59-50-7	4-Chloro-3-Methylphenol	220 U		220	6.77
106-47-8	4-Chloroaniline	220 U		220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U		220	4.25
106-44-5	4-Methylphenol	220 U		220	8.28
100-01-6	4-Nitroaniline	220 U		220	9.43
100-02-7	4-Nitrophenol	430 U		430	3.68
83-32-9	**Acenaphthene**	**19 J**		220	2.24
208-96-8	**Acenaphthylene**	**2.0 J**		220	1.95
98-86-2	Acetophenone	220 U		220	2.47

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 15:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB8A**	QC Batch:	90572 -114
Sample #:	**345900**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	**Anthracene**	**37 J**		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U		220	5.27
56-55-3	**Benzo (a) Anthracene**	**100 J**		220	17.3
50-32-8	**Benzo (a) Pyrene**	**120 J**		220	7.42
205-99-2	**Benzo (b) Fluoranthene**	**180 J**		220	12.7
191-24-2	**Benzo (g,h,i,) Perylene**	**72 J**		220	11.3
207-08-9	**Benzo (k) Fluoranthene**	**68 J**		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**35 J**		220	2.69
85-68-7	Butyl Benzyl Phthalate	220 U		220	5.82
105-60-2	Caprolactam	430 U		430	8.29
86-74-8	Carbazole	220 U		220	7.93
218-01-9	**Chrysene**	**140 J**		220	13.3
53-70-3	**Dibenzo (a,h) Anthracene**	**18 J**		220	7.67
132-64-9	**Dibenzofuran**	**13 J**		220	4.11
84-66-2	**Diethylphthalate**	**33 J**		220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**62 J**		220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	**Fluoranthene**	**370**		220	3.06
86-73-7	**Fluorene**	**20 J**		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U	UJ,c	220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**73 J**		220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	**Naphthalene**	**10 J**		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB8A**	QC Batch:	90572 -114
Sample #:	**345900**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	**N-Nitroso-di-Phenylamine**	**21 J**	220	6.18
87-86-5	Pentachlorophenol	430 U	430	5.71
85-01-8	**Phenanthrene**	**130 J**	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	**Pyrene**	**260**	220	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB8A**	QC Batch:	90572 -114
Sample #:	**345900**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	77
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
.Gamma.-sitosterol	83-47-6	780	E	NJ,+
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	120	E	NJ,+
Cholesterol	57-88-5	120	E	NJ,+
Erucylamide	112-84-5	220	E	B,X
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~2600~~	~~E~~	* 2/18/04
Stigmast-4-en-3-one	1058-61-3	240	E	NJ,+
Taraxerol	127-22-0	290	E	NJ,+
Vitamin E	10191-41-0	160	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 15:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB8B**	QC Batch:	90572 -114
Sample #:	**345901**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U		220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U		220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U		220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U		220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U		220	3.41
120-83-2	2,4-Dichlorophenol	220 U		220	4.58
105-67-9	2,4-Dimethylphenol	220 U		220	10.3
51-28-5	2,4-Dinitrophenol	420 U	UJ,C	420	4.16
121-14-2	2,4-Dinitrotoluene	220 U		220	4.10
606-20-2	2,6-Dinitrotoluene	220 U		220	36.0
91-58-7	2-Chloronaphthalene	220 U		220	2.99
95-57-8	2-Chlorophenol	220 U		220	2.61
91-57-6	2-Methylnaphthalene	220 U		220	3.56
95-48-7	2-Methylphenol	220 U		220	6.29
88-74-4	2-Nitroaniline	220 U		220	5.98
88-75-5	2-Nitrophenol	220 U		220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U		220	72.0
99-09-2	3-Nitroaniline	220 U		220	23.8
534-52-1	4,6-Dinitro-2-Methylphenol	220 U		220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U		220	4.39
59-50-7	**4-Chloro-3-Methylphenol**	**24 J**		220	6.77
106-47-8	4-Chloroaniline	220 U		220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U		220	4.25
106-44-5	4-Methylphenol	220 U		220	8.28
100-01-6	4-Nitroaniline	220 U		220	9.43
100-02-7	4-Nitrophenol	420 U		420	3.68
83-32-9	Acenaphthene	220 U		220	2.24
208-96-8	Acenaphthylene	220 U		220	1.95
98-86-2	Acetophenone	220 U		220	2.47

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 15:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB8B**	QC Batch:	90572 -114
Sample #:	**345901**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	220 U		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U		220	5.27
56-55-3	Benzo (a) Anthracene	220 U		220	17.3
50-32-8	**Benzo (a) Pyrene**	**21 J**		220	7.42
205-99-2	**Benzo (b) Fluoranthene**	**36 J**		220	12.7
191-24-2	**Benzo (g,h,i,) Perylene**	**14 J**		220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**190 J**		220	2.69
85-68-7	**Butyl Benzyl Phthalate**	**6.0 J**		220	5.82
105-60-2	Caprolactam	420 U		420	8.29
86-74-8	Carbazole	220 U		220	7.93
218-01-9	**Chrysene**	**25 J**		220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U		220	7.67
132-64-9	Dibenzofuran	220 U		220	4.11
84-66-2	**Diethylphthalate**	**40 J**		220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**190 J**		220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	**Fluoranthene**	**35 J**		220	3.06
86-73-7	Fluorene	220 U		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U	UJ/C	220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**12 J**		220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	Naphthalene	220 U		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB8B**	QC Batch:	90572 -114
Sample #:	**345901**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	N-Nitroso-di-Phenylamine	220 U	220	6.18
87-86-5	Pentachlorophenol	420 U	420	5.71
85-01-8	**Phenanthrene**	**10 J**	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	**Pyrene**	**32 J**	220	1.92

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 15:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB8B**	QC Batch:	90572 -114
Sample #:	**345901**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	78
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
.Gamma.-sitosterol	83-47-6	76	E	NJ,+
1,2-Benzenedicarboxylic acid, butyl 2-methylpropyl ester	17851-53-5	320	E	NJ,+
9-Octadecenoic acid, (E)-	112-79-8	74	E	NJ,+
Erucylamide	112-84-5	890	E	NJ,+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~990~~	~~E~~	
Tetradecanamide	638-58-4	60	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**69SB2A**	QC Batch:	90834 -115
Sample #:	**345745**	Anal. Batch:	209212
Matrix:	Soil	Percent Solids:	83
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	120 U	120	11.3
208-96-8	Acenaphthylene	250 U	250	13.9
120-12-7	Anthracene	25 U	25	0.840
56-55-3	**Benzo (a) Anthracene**	**2.9 J**	25	0.960
50-32-8	Benzo (a) Pyrene	25 U	25	1.20
205-99-2	Benzo (b) Fluoranthene	25 U	25	1.56
191-24-2	Benzo (g,h,i,) Perylene	25 U	25	15.0
207-08-9	Benzo (k) Fluoranthene	25 U	25	1.20
218-01-9	**Chrysene**	**2.9 J**	25	1.44
53-70-3	Dibenzo (a,h) Anthracene	25 U	25	1.68
206-44-0	**Fluoranthene**	**18 J**	25	2.04
86-73-7	Fluorene	25 U	25	1.56
193-39-5	Indeno (1,2,3-cd) Pyrene	25 U	25	0.840
91-20-3	Naphthalene	120 U	120	9.48
85-01-8	**Phenanthrene**	**7.2 J**	25	0.720
129-00-0	**Pyrene**	**13 J**	25	1.08

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**69SB2B**	QC Batch:	90834 -115
Sample #:	**345746**	Anal. Batch:	209212
Matrix:	Soil	Percent Solids:	79
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	130 U VLS	130	12.2
208-96-8	Acenaphthylene	270 U	270	15.1
120-12-7	Anthracene	27 U	27	0.910
56-55-3	Benzo (a) Anthracene	27 U	27	1.04
50-32-8	Benzo (a) Pyrene	27 U	27	1.30
205-99-2	Benzo (b) Fluoranthene	27 U	27	1.69
191-24-2	Benzo (g,h,i,) Perylene	27 U	27	16.3
207-08-9	Benzo (k) Fluoranthene	27 U	27	1.30
218-01-9	Chrysene	27 U	27	1.56
53-70-3	Dibenzo (a,h) Anthracene	27 U	27	1.82
206-44-0	Fluoranthene	27 U	27	2.21
86-73-7	Fluorene	27 U	27	1.69
193-39-5	Indeno (1,2,3-cd) Pyrene	27 U	27	0.910
91-20-3	Naphthalene	130 U	130	10.3
85-01-8	Phenanthrene	27 U	27	0.780
129-00-0	Pyrene	27 U	27	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by TAJ
		Anal. Method:	USEPA-8310
Sample ID:	**69SB2C**	QC Batch:	90834 -115
Sample #:	**345747**	Anal. Batch:	209212
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	130 U VL,S	130	12.2
208-96-8	Acenaphthylene	280 U	280	15.1
120-12-7	Anthracene	28 U	28	0.910
56-55-3	Benzo (a) Anthracene	28 U	28	1.04
50-32-8	Benzo (a) Pyrene	28 U	28	1.30
205-99-2	Benzo (b) Fluoranthene	28 U	28	1.69
191-24-2	Benzo (g,h,i,) Perylene	28 U	28	16.3
207-08-9	Benzo (k) Fluoranthene	28 U	28	1.30
218-01-9	Chrysene	28 U	28	1.56
53-70-3	Dibenzo (a,h) Anthracene	28 U	28	1.82
206-44-0	Fluoranthene	28 U	28	2.21
86-73-7	Fluorene	28 U	28	1.69
193-39-5	Indeno (1,2,3-cd) Pyrene	28 U	28	0.910
91-20-3	Naphthalene	130 U	130	10.3
85-01-8	Phenanthrene	28 U	28	0.780
129-00-0	Pyrene	28 U	28	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**57SB4B**	QC Batch:	90834 -115
Sample #:	**345748**	Anal. Batch:	209212
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	140 U	140	13.2
208-96-8	Acenaphthylene	280 U	280	16.2
120-12-7	Anthracene	28 U	28	0.980
56-55-3	Benzo (a) Anthracene	28 U	28	1.12
50-32-8	Benzo (a) Pyrene	28 U	28	1.40
205-99-2	Benzo (b) Fluoranthene	28 U	28	1.82
191-24-2	Benzo (g,h,i,) Perylene	28 U	28	17.5
207-08-9	Benzo (k) Fluoranthene	28 U	28	1.40
218-01-9	Chrysene	28 U	28	1.68
53-70-3	Dibenzo (a,h) Anthracene	28 U	28	1.96
206-44-0	Fluoranthene	28 U	28	2.38
86-73-7	Fluorene	28 U	28	1.82
193-39-5	Indeno (1,2,3-cd) Pyrene	28 U	28	0.980
91-20-3	Naphthalene	140 U	140	11.1
85-01-8	Phenanthrene	28 U	28	0.840
129-00-0	Pyrene	28 U	28	1.26

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**13SB7A**	QC Batch:	90834 -115
Sample #:	**345883**	Anal. Batch:	209212
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	120 U	120	11.3
208-96-8	Acenaphthylene	260 U	260	13.9
120-12-7	Anthracene	26 U	26	0.840
56-55-3	**Benzo (a) Anthracene**	**2.1 J**	26	0.960
50-32-8	Benzo (a) Pyrene	26 U	26	1.20
205-99-2	Benzo (b) Fluoranthene	26 U	26	1.56
191-24-2	Benzo (g,h,i,) Perylene	26 U	26	15.0
207-08-9	Benzo (k) Fluoranthene	26 U	26	1.20
218-01-9	**Chrysene**	**2.6 J**	26	1.44
53-70-3	Dibenzo (a,h) Anthracene	26 U	26	1.68
206-44-0	**Fluoranthene**	**5.0 J**	26	2.04
86-73-7	Fluorene	26 U	26	1.56
193-39-5	Indeno (1,2,3-cd) Pyrene	26 U	26	0.840
91-20-3	Naphthalene	120 U	120	9.48
85-01-8	**Phenanthrene**	**2.1 J**	26	0.720
129-00-0	**Pyrene**	**3.6 J**	26	1.08

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**13SB7B**	QC Batch:	90834 -115
Sample #:	**345884**	Anal. Batch:	209212
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	130	12.2
208-96-8	Acenaphthylene	260 U	260	15.1
120-12-7	**Anthracene**	**1.0 J**	26	0.910
56-55-3	**Benzo (a) Anthracene**	**3.9 J**	26	1.04
50-32-8	Benzo (a) Pyrene	26 U	26	1.30
205-99-2	Benzo (b) Fluoranthene	26 U	26	1.69
191-24-2	Benzo (g,h,i,) Perylene	26 U	26	16.3
207-08-9	Benzo (k) Fluoranthene	26 U	26	1.30
218-01-9	**Chrysene**	**6.5 J**	26	1.56
53-70-3	Dibenzo (a,h) Anthracene	26 U	26	1.82
206-44-0	**Fluoranthene**	**3.3 J**	26	2.21
86-73-7	Fluorene	26 U	26	1.69
193-39-5	Indeno (1,2,3-cd) Pyrene	26 U	26	0.910
91-20-3	Naphthalene	130 U	130	10.3
85-01-8	**Phenanthrene**	**1.8 J**	26	0.780
129-00-0	**Pyrene**	**3.0 J**	26	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**13SB7C**	QC Batch:	91080 -118
Sample #:	**345885**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	79
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	130	12.2
208-96-8	Acenaphthylene	270 U	270	15.1
120-12-7	Anthracene	27 U	27	0.910
56-55-3	Benzo (a) Anthracene	27 U	27	1.04
50-32-8	Benzo (a) Pyrene	27 U	27	1.30
205-99-2	Benzo (b) Fluoranthene	27 U	27	1.69
191-24-2	Benzo (g,h,i,) Perylene	27 U	27	16.3
207-08-9	Benzo (k) Fluoranthene	27 U	27	1.30
218-01-9	Chrysene	27 U	27	1.56
53-70-3	Dibenzo (a,h) Anthracene	27 U	27	1.82
206-44-0	Fluoranthene	27 U	27	2.21
86-73-7	Fluorene	27 U	27	1.69
193-39-5	Indeno (1,2,3-cd) Pyrene	27 U	27	0.910
91-20-3	Naphthalene	130 U	130	10.3
85-01-8	Phenanthrene	27 U	27	0.780
129-00-0	Pyrene	27 U	27	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**13SB12A**	QC Batch:	91080 -118
Sample #:	**345886**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	130	12.2
208-96-8	Acenaphthylene	270 U	270	15.1
120-12-7	Anthracene	27 U	27	0.910
56-55-3	**Benzo (a) Anthracene**	**3.8 J**	27	1.04
50-32-8	**Benzo (a) Pyrene**	**6.5 J**	27	1.30
205-99-2	**Benzo (b) Fluoranthene**	**4.9 J**	27	1.69
191-24-2	Benzo (g,h,i,) Perylene	27 U	27	16.3
207-08-9	Benzo (k) Fluoranthene	27 U	27	1.30
218-01-9	**Chrysene**	**2.4 J**	27	1.56
53-70-3	Dibenzo (a,h) Anthracene	27 U	27	1.82
206-44-0	**Fluoranthene**	**9.2 J**	27	2.21
86-73-7	Fluorene	27 U	27	1.69
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**5.9 J**	27	0.910
91-20-3	Naphthalene	130 U	130	10.3
85-01-8	**Phenanthrene**	**2.5 J**	27	0.780
129-00-0	**Pyrene**	**6.4 J**	27	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**13SB12B**	QC Batch:	91080 -118
Sample #:	**345887**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	140 U	140	13.2
208-96-8	Acenaphthylene	300 U	300	16.2
120-12-7	Anthracene	30 U	30	0.980
56-55-3	**Benzo (a) Anthracene**	**1.7 J**	30	1.12
50-32-8	Benzo (a) Pyrene	30 U	30	1.40
205-99-2	Benzo (b) Fluoranthene	30 U	30	1.82
191-24-2	Benzo (g,h,i,) Perylene	30 U	30	17.5
207-08-9	Benzo (k) Fluoranthene	30 U	30	1.40
218-01-9	Chrysene	30 U	30	1.68
53-70-3	Dibenzo (a,h) Anthracene	30 U	30	1.96
206-44-0	**Fluoranthene**	**7.4 J**	30	2.38
86-73-7	Fluorene	30 U	30	1.82
193-39-5	Indeno (1,2,3-cd) Pyrene	30 U	30	0.980
91-20-3	Naphthalene	140 U	140	11.1
85-01-8	**Phenanthrene**	**2.2 J**	30	0.840
129-00-0	**Pyrene**	**3.9 J**	30	1.26

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**SBD8**	QC Batch:	91080 -118
Sample #:	**345888**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	150 U	150	14.1
208-96-8	Acenaphthylene	310 U	310	17.4
120-12-7	Anthracene	31 U	31	1.05
56-55-3	**Benzo (a) Anthracene**	**6.4 J**	31	1.20
50-32-8	**Benzo (a) Pyrene**	**8.0 J**	31	1.50
205-99-2	**Benzo (b) Fluoranthene**	**6.7 J**	31	1.95
191-24-2	**Benzo (g,h,i,) Perylene**	**21 J**	31	18.8
207-08-9	Benzo (k) Fluoranthene	31 U	31	1.50
218-01-9	**Chrysene**	**6.7 J**	31	1.80
53-70-3	Dibenzo (a,h) Anthracene	31 U	31	2.10
206-44-0	**Fluoranthene**	**16 J**	31	2.55
86-73-7	Fluorene	31 U	31	1.95
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**6.8 J**	31	1.05
91-20-3	Naphthalene	150 U	150	11.9
85-01-8	**Phenanthrene**	**2.7 J**	31	0.900
129-00-0	**Pyrene**	**10 J**	31	1.35

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**13SB12C**	QC Batch:	91080 -118
Sample #:	**345889**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	62
Unit:	ug/kg dry	Dilution Factor:	1.6

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	160 U	160	15.0
208-96-8	Acenaphthylene	340 U	340	18.6
120-12-7	**Anthracene**	**11 J**	34	1.12
56-55-3	**Benzo (a) Anthracene**	**32 J**	34	1.28
50-32-8	Benzo (a) Pyrene	34 U	34	1.60
205-99-2	Benzo (b) Fluoranthene	34 U	34	2.08
191-24-2	**Benzo (g,h,i,) Perylene**	**37**	34	20.0
207-08-9	Benzo (k) Fluoranthene	34 U	34	1.60
218-01-9	Chrysene	34 U	34	1.92
53-70-3	Dibenzo (a,h) Anthracene	34 U	34	2.24
206-44-0	**Fluoranthene**	**130**	34	2.72
86-73-7	Fluorene	34 U	34	2.08
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**17 J**	34	1.12
91-20-3	Naphthalene	160 U	160	12.6
85-01-8	**Phenanthrene**	**80**	34	0.960
129-00-0	**Pyrene**	**99**	34	1.44

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**13SB11A**	QC Batch:	91080 -118
Sample #:	**345890**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	130	12.2
208-96-8	Acenaphthylene	270 U	270	15.1
120-12-7	**Anthracene**	**6.6 J**	27	0.910
56-55-3	**Benzo (a) Anthracene**	**31**	27	1.04
50-32-8	**Benzo (a) Pyrene**	**45**	27	1.30
205-99-2	**Benzo (b) Fluoranthene**	**32**	27	1.69
191-24-2	**Benzo (g,h,i,) Perylene**	**82**	27	16.3
207-08-9	**Benzo (k) Fluoranthene**	**20 J**	27	1.30
218-01-9	**Chrysene**	**37**	27	1.56
53-70-3	Dibenzo (a,h) Anthracene	27 U	27	1.82
206-44-0	**Fluoranthene**	**73**	27	2.21
86-73-7	Fluorene	27 U	27	1.69
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**37**	27	0.910
91-20-3	Naphthalene	130 U	130	10.3
85-01-8	**Phenanthrene**	**26 J**	27	0.780
129-00-0	**Pyrene**	**59**	27	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**13SB11B**	QC Batch:	91080 -118
Sample #:	**345891**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	88
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	110 U	UL,S	110	10.3
208-96-8	Acenaphthylene	240 U	↓	240	12.8
120-12-7	**Anthracene**	**8.7 J**	L,S	24	0.770
56-55-3	**Benzo (a) Anthracene**	**24**		24	0.880
50-32-8	**Benzo (a) Pyrene**	**33**		24	1.10
205-99-2	**Benzo (b) Fluoranthene**	**21 J**		24	1.43
191-24-2	**Benzo (g,h,i,) Perylene**	**77**		24	13.8
207-08-9	**Benzo (k) Fluoranthene**	**15 J**		24	1.10
218-01-9	**Chrysene**	**40**		24	1.32
53-70-3	Dibenzo (a,h) Anthracene	24 U	UL,S	24	1.54
206-44-0	Fluoranthene	24 U	↓	24	1.87
86-73-7	**Fluorene**	**12 J**	L,S	24	1.43
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**21 J**	↓	24	0.770
91-20-3	Naphthalene	110 U	UL,S	110	8.69
85-01-8	**Phenanthrene**	**110**	L,S	24	0.660
129-00-0	**Pyrene**	**79**	↓	24	0.990

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**13SB11C**	QC Batch:	91080 -118
Sample #:	**345892**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	130	12.2
208-96-8	Acenaphthylene	270 U	270	15.1
120-12-7	**Anthracene**	**1.1 J**	27	0.910
56-55-3	**Benzo (a) Anthracene**	**4.1 J**	27	1.04
50-32-8	**Benzo (a) Pyrene**	**13 J**	27	1.30
205-99-2	**Benzo (b) Fluoranthene**	**8.8 J**	27	1.69
191-24-2	**Benzo (g,h,i,) Perylene**	**46**	27	16.3
207-08-9	**Benzo (k) Fluoranthene**	**4.5 J**	27	1.30
218-01-9	**Chrysene**	**7.6 J**	27	1.56
53-70-3	Dibenzo (a,h) Anthracene	27 U	27	1.82
206-44-0	**Fluoranthene**	**6.5 J**	27	2.21
86-73-7	Fluorene	27 U	27	1.69
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**16 J**	27	0.910
91-20-3	Naphthalene	130 U	130	10.3
85-01-8	**Phenanthrene**	**3.4 J**	27	0.780
129-00-0	**Pyrene**	**5.6 J**	27	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**13SB10A**	QC Batch:	91080 -118
Sample #:	**345893**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	**Acenaphthene**	**14 J**	140	13.2
208-96-8	Acenaphthylene	300 U	300	16.2
120-12-7	**Anthracene**	**38**	30	0.980
56-55-3	**Benzo (a) Anthracene**	**140**	30	1.12
50-32-8	**Benzo (a) Pyrene**	**190**	30	1.40
205-99-2	**Benzo (b) Fluoranthene**	**140**	30	1.82
191-24-2	**Benzo (g,h,i,) Perylene**	**260**	30	17.5
207-08-9	**Benzo (k) Fluoranthene**	**80**	30	1.40
218-01-9	**Chrysene**	**150**	30	1.68
53-70-3	**Dibenzo (a,h) Anthracene**	**5.2 J**	30	1.96
206-44-0	**Fluoranthene**	**470**	30	2.38
86-73-7	**Fluorene**	**17 J**	30	1.82
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**130**	30	0.980
91-20-3	Naphthalene	140 U	140	11.1
85-01-8	**Phenanthrene**	**210**	30	0.840
129-00-0	**Pyrene**	**320**	30	1.26

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/24/03 by TAJ
		Anal. Method:	USEPA-8310
Sample ID:	**13SB10B**	QC Batch:	91080 -118
Sample #:	**345894**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	130	12.2
208-96-8	Acenaphthylene	270 U	270	15.1
120-12-7	**Anthracene**	**14 J**	27	0.910
56-55-3	**Benzo (a) Anthracene**	**56**	27	1.04
50-32-8	**Benzo (a) Pyrene**	**130**	27	1.30
205-99-2	**Benzo (b) Fluoranthene**	**91**	27	1.69
191-24-2	**Benzo (g,h,i,) Perylene**	**290**	27	16.3
207-08-9	**Benzo (k) Fluoranthene**	**52**	27	1.30
218-01-9	**Chrysene**	**80**	27	1.56
53-70-3	**Dibenzo (a,h) Anthracene**	**8.0 J**	27	1.82
206-44-0	**Fluoranthene**	**64**	27	2.21
86-73-7	Fluorene	27 U	27	1.69
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**110**	27	0.910
91-20-3	Naphthalene	130 U	130	10.3
85-01-8	**Phenanthrene**	**27**	27	0.780
129-00-0	**Pyrene**	**50**	27	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**13SB10C**	QC Batch:	91080 -118
Sample #:	**345895**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	140 U	140	13.2
208-96-8	Acenaphthylene	290 U	290	16.2
120-12-7	**Anthracene**	**6.1 J**	29	0.980
56-55-3	**Benzo (a) Anthracene**	**18 J**	29	1.12
50-32-8	**Benzo (a) Pyrene**	**59**	29	1.40
205-99-2	**Benzo (b) Fluoranthene**	**47**	29	1.82
191-24-2	**Benzo (g,h,i,) Perylene**	**140**	29	17.5
207-08-9	**Benzo (k) Fluoranthene**	**20 J**	29	1.40
218-01-9	**Chrysene**	**33**	29	1.68
53-70-3	**Dibenzo (a,h) Anthracene**	**5.3 J**	29	1.96
206-44-0	**Fluoranthene**	**12 J**	29	2.38
86-73-7	Fluorene	29 U	29	1.82
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**58**	29	0.980
91-20-3	Naphthalene	140 U	140	11.1
85-01-8	**Phenanthrene**	**7.0 J**	29	0.840
129-00-0	**Pyrene**	**9.5 J**	29	1.26

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**13SB9A**	QC Batch:	91080 -118
Sample #:	**345896**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	**Acenaphthene**	**17**	**J**	130	12.2
208-96-8	Acenaphthylene	270	U	270	15.1
120-12-7	**Anthracene**	**38**		27	0.910
56-55-3	**Benzo (a) Anthracene**	**130**		27	1.04
50-32-8	**Benzo (a) Pyrene**	**170**		27	1.30
205-99-2	**Benzo (b) Fluoranthene**	**120**		27	1.69
191-24-2	**Benzo (g,h,i,) Perylene**	**540**	J,f	27	16.3
207-08-9	**Benzo (k) Fluoranthene**	**77**		27	1.30
218-01-9	**Chrysene**	**150**		27	1.56
53-70-3	Dibenzo (a,h) Anthracene	27	U	27	1.82
206-44-0	**Fluoranthene**	**290**	J,f	27	2.21
86-73-7	**Fluorene**	**11**	**J**	27	1.69
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**100**		27	0.910
91-20-3	Naphthalene	130	U	130	10.3
85-01-8	**Phenanthrene**	**130**		27	0.780
129-00-0	**Pyrene**	**240**	J,f	27	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**SBD9**	QC Batch:	91080 -118
Sample #:	**345897**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	130 U		130	12.2
208-96-8	Acenaphthylene	260 U		260	15.1
120-12-7	**Anthracene**	**15 J**		26	0.910
56-55-3	**Benzo (a) Anthracene**	**61**		26	1.04
50-32-8	**Benzo (a) Pyrene**	**73**		26	1.30
205-99-2	**Benzo (b) Fluoranthene**	**56**		26	1.69
191-24-2	**Benzo (g,h,i,) Perylene**	**240**	J,f	26	16.3
207-08-9	**Benzo (k) Fluoranthene**	**36**		26	1.30
218-01-9	**Chrysene**	**74**		26	1.56
53-70-3	Dibenzo (a,h) Anthracene	26 U		26	1.82
206-44-0	**Fluoranthene**	**120**	J,f	26	2.21
86-73-7	Fluorene	26 U		26	1.69
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**46**		26	0.910
91-20-3	Naphthalene	130 U		130	10.3
85-01-8	**Phenanthrene**	**50**		26	0.780
129-00-0	**Pyrene**	**110**	J,f	26	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**13SB9B**	QC Batch:	91080 -118
Sample #:	**345898**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	140 U	140	13.2
208-96-8	Acenaphthylene	290 U	290	16.2
120-12-7	**Anthracene**	**4.2 J**	29	0.980
56-55-3	**Benzo (a) Anthracene**	**12 J**	29	1.12
50-32-8	**Benzo (a) Pyrene**	**15 J**	29	1.40
205-99-2	**Benzo (b) Fluoranthene**	**10 J**	29	1.82
191-24-2	Benzo (g,h,i,) Perylene	29 U	29	17.5
207-08-9	**Benzo (k) Fluoranthene**	**6.0 J**	29	1.40
218-01-9	**Chrysene**	**15 J**	29	1.68
53-70-3	Dibenzo (a,h) Anthracene	29 U	29	1.96
206-44-0	**Fluoranthene**	**30**	29	2.38
86-73-7	Fluorene	29 U	29	1.82
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**9.4 J**	29	0.980
91-20-3	Naphthalene	140 U	140	11.1
85-01-8	**Phenanthrene**	**14 J**	29	0.840
129-00-0	**Pyrene**	**27 J**	29	1.26

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**13SB9C**	QC Batch:	91080 -118
Sample #:	**345899**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	130	12.2
208-96-8	Acenaphthylene	270 U	270	15.1
120-12-7	Anthracene	27 U	27	0.910
56-55-3	**Benzo (a) Anthracene**	**1.4 J**	27	1.04
50-32-8	Benzo (a) Pyrene	27 U	27	1.30
205-99-2	Benzo (b) Fluoranthene	27 U	27	1.69
191-24-2	Benzo (g,h,i,) Perylene	27 U	27	16.3
207-08-9	Benzo (k) Fluoranthene	27 U	27	1.30
218-01-9	**Chrysene**	**1.7 J**	27	1.56
53-70-3	Dibenzo (a,h) Anthracene	27 U	27	1.82
206-44-0	**Fluoranthene**	**3.8 J**	27	2.21
86-73-7	Fluorene	27 U	27	1.69
193-39-5	Indeno (1,2,3-cd) Pyrene	27 U	27	0.910
91-20-3	Naphthalene	130 U	130	10.3
85-01-8	**Phenanthrene**	**1.8 J**	27	0.780
129-00-0	**Pyrene**	**5.1 J**	27	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**13SB8A**	QC Batch:	91080 -118
Sample #:	**345900**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	130	12.2
208-96-8	Acenaphthylene	270 U	270	15.1
120-12-7	**Anthracene**	**12 J**	27	0.910
56-55-3	**Benzo (a) Anthracene**	**49**	27	1.04
50-32-8	**Benzo (a) Pyrene**	**71**	27	1.30
205-99-2	**Benzo (b) Fluoranthene**	**54**	27	1.69
191-24-2	**Benzo (g,h,i,) Perylene**	**120**	27	16.3
207-08-9	**Benzo (k) Fluoranthene**	**32**	27	1.30
218-01-9	**Chrysene**	**57**	27	1.56
53-70-3	**Dibenzo (a,h) Anthracene**	**2.3 J**	27	1.82
206-44-0	**Fluoranthene**	**120**	27	2.21
86-73-7	Fluorene	27 U	27	1.69
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**53**	27	0.910
91-20-3	Naphthalene	130 U	130	10.3
85-01-8	**Phenanthrene**	**43**	27	0.780
129-00-0	**Pyrene**	**97**	27	1.17

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**13SB8B**	QC Batch:	91080 -118
Sample #:	**345901**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	130	12.2
208-96-8	Acenaphthylene	270 U	270	15.1
120-12-7	Anthracene	27 U	27	0.910
56-55-3	**Benzo (a) Anthracene**	**3.1 J**	27	1.04
50-32-8	Benzo (a) Pyrene	27 U	27	1.30
205-99-2	Benzo (b) Fluoranthene	27 U	27	1.69
191-24-2	Benzo (g,h,i,) Perylene	27 U	27	16.3
207-08-9	Benzo (k) Fluoranthene	27 U	27	1.30
218-01-9	**Chrysene**	**3.5 J**	27	1.56
53-70-3	Dibenzo (a,h) Anthracene	27 U	27	1.82
206-44-0	**Fluoranthene**	**7.9 J**	27	2.21
86-73-7	Fluorene	27 U	27	1.69
193-39-5	Indeno (1,2,3-cd) Pyrene	27 U	27	0.910
91-20-3	Naphthalene	130 U	130	10.3
85-01-8	**Phenanthrene**	**2.9 J**	27	0.780
129-00-0	**Pyrene**	**8.8 J**	27	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**69SB2A**	QC Batch:	90508 -116
Sample #:	**345745**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	83
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,c	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,c	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**69SB2B**	QC Batch:	90508 -116
Sample #:	**345746**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	79
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**69SB2C**	QC Batch:	90508 -116
Sample #:	**345747**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	75
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	VJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	VJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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Client:	**URS Corporation**	Sampled:	10/08/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**57SB4B**	QC Batch:	90508 -116
Sample #:	**345748**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	74
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,c	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,c	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 09:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**13SB7A**	QC Batch:	90508 -116
Sample #:	**345883**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	82
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**13SB7B**	QC Batch:	90508 -116
Sample #:	**345884**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	80
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/21/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**13SB7C**	QC Batch:	90908 -121
Sample #:	**345885**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	79
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/21/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**13SB12A**	QC Batch:	90908 -121
Sample #:	**345886**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	78
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	**2,4,6-Trinitrotoluene**	**0.27 J**		0.50	0.167
121-14-2	**2,4-Dinitrotoluene**	**0.39 J**		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/21/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**13SB12B**	QC Batch:	90908 -121
Sample #:	**345887**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	71
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	**2,4,6-Trinitrotoluene**	**0.55**		0.50	0.167
121-14-2	**2,4-Dinitrotoluene**	**0.19 J**		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	VJ/C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	**Hexahydro-1,3,5-trinitro-1,3,5-triazine**	**0.29 J**	J/C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/21/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**SBD8**	QC Batch:	90908 -121
Sample #:	**345888**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	67
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	**1,3-Dinitrobenzene**	**0.32 J**		0.50	0.159
118-96-7	**2,4,6-Trinitrotoluene**	**0.56**		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/21/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**13SB12C**	QC Batch:	90908 -121
Sample #:	**345889**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	62
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	**2,4,6-Trinitrotoluene**	**0.54**		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/21/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**13SB11A**	QC Batch:	90908 -121
Sample #:	**345890**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	77
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	**2,4,6-Trinitrotoluene**	**0.43 J**		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/21/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**13SB11B**	QC Batch:	90908 -121
Sample #:	**345891**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	88
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/21/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**13SB11C**	QC Batch:	90908 -121
Sample #:	**345892**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	77
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/21/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**13SB10A**	QC Batch:	90908 -121
Sample #:	**345893**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	71
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,c	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,c	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/21/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**13SB10B**	QC Batch:	90908 -121
Sample #:	**345894**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	77
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/21/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**13SB10C**	QC Batch:	90908 -121
Sample #:	**345895**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	73
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/21/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**13SB9A**	QC Batch:	90908 -121
Sample #:	**345896**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	78
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/21/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**SBD9**	QC Batch:	90908 -121
Sample #:	**345897**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	80
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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Individual sample results relate only to the sample tested.
5560 Corporate Exchange Court SE • Grand Rapids, MI 49512 • (616) 975-4500 • Fax (616) 942-7463

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/21/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/24/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**13SB9B**	QC Batch:	90908 -121
Sample #:	**345898**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	73
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/21/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**13SB9C**	QC Batch:	90908 -121
Sample #:	**345899**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	78
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,c	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,c	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 15:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/21/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/24/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**13SB8A**	QC Batch:	90908 -121
Sample #:	**345900**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	77
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 15:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/21/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/24/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**13SB8B**	QC Batch:	90908 -121
Sample #:	**345901**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	78
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/16/03 by JRR
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/31/03 by JLRM
	RAAP	Anal. Method:	USEPA-8081A
Sample ID:	**69SB2A**	QC Batch:	90181 -116
Sample #:	**345745**	Anal. Batch:	208635
Matrix:	Soil	Percent Solids:	83
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Chlorinated Pesticides OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
72-54-8	4,4'-DDD	24 U	24	0.286
72-55-9	4,4'-DDE	24 U	24	0.210
50-29-3	4,4'-DDT	24 U	24	0.216
309-00-2	**Aldrin**	**0.11 J**	24	0.365
319-84-6	Alpha-BHC	24 U	24	0.364
57-74-9	A-Chlordane	24 U	24	0.521
5103-74-2	G-Chlordane	24 U	24	0.844
319-85-7	Beta-BHC	24 U	24	1.36
319-86-8	**Delta-BHC**	**2.5 J**	24	0.982
60-57-1	Dieldrin	24 U	24	0.371
115-29-7	Endosulfan I	24 U	24	1.09
33213-65-9	Endosulfan II	24 U	24	0.257
1031-07-8	Endosulfan Sulfate	24 U	24	0.604
72-20-8	Endrin	24 U	24	0.358
7421-93-4	Endrin Aldehyde	24 U	24	1.33
53494-70-5	Endrin Ketone	24 U	24	0.330
58-89-9	Lindane	24 U	24	0.233
76-44-8	Heptachlor	24 U	24	0.846
1024-57-3	Heptachlor Epoxide	24 U	24	0.546
72-43-5	Methoxychlor	24 U	24	0.336
8001-35-2	Toxaphene	200 U	200	28.0

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/16/03 by JRR
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/31/03 by JLRM
	RAAP	Anal. Method:	USEPA-8081A
Sample ID:	**13SB9A**	QC Batch:	90181 -116
Sample #:	**345896**	Anal. Batch:	208635
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Chlorinated Pesticides OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
72-54-8	4,4'-DDD	26 U	26	0.309
72-55-9	4,4'-DDE	26 U	26	0.228
50-29-3	4,4'-DDT	26 U	26	0.234
309-00-2	Aldrin	26 U	26	0.395
319-84-6	Alpha-BHC	26 U	26	0.394
57-74-9	A-Chlordane	26 U	26	0.564
5103-74-2	G-Chlordane	26 U	26	0.914
319-85-7	Beta-BHC	26 U	26	1.47
319-86-8	Delta-BHC	26 U	26	1.06
60-57-1	Dieldrin	26 U	26	0.402
115-29-7	Endosulfan I	26 U	26	1.18
33213-65-9	Endosulfan II	26 U	26	0.278
1031-07-8	Endosulfan Sulfate	26 U	26	0.654
72-20-8	Endrin	26 U	26	0.387
7421-93-4	Endrin Aldehyde	26 U	26	1.44
53494-70-5	Endrin Ketone	26 U	26	0.358
58-89-9	Lindane	26 U	26	0.252
76-44-8	Heptachlor	26 U	26	0.917
1024-57-3	Heptachlor Epoxide	26 U	26	0.592
72-43-5	Methoxychlor	26 U	26	0.364
8001-35-2	Toxaphene	220 U	220	30.3

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/16/03 by JRR
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/31/03 by JLRM
	RAAP	Anal. Method:	USEPA-8081A
Sample ID:	**SBD9**	QC Batch:	90181 -116
Sample #:	**345897**	Anal. Batch:	208635
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Chlorinated Pesticides OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
72-54-8	4,4'-DDD	24 U	24	0.286
72-55-9	4,4'-DDE	24 U	24	0.210
50-29-3	4,4'-DDT	24 U	24	0.216
309-00-2	Aldrin	24 U	24	0.365
319-84-6	Alpha-BHC	24 U	24	0.364
57-74-9	A-Chlordane	24 U	24	0.521
5103-74-2	G-Chlordane	24 U	24	0.844
319-85-7	Beta-BHC	24 U	24	1.36
319-86-8	Delta-BHC	24 U	24	0.982
60-57-1	Dieldrin	24 U	24	0.371
115-29-7	Endosulfan I	24 U	24	1.09
33213-65-9	Endosulfan II	24 U	24	0.257
1031-07-8	Endosulfan Sulfate	24 U	24	0.604
72-20-8	Endrin	24 U	24	0.358
7421-93-4	Endrin Aldehyde	24 U	24	1.33
53494-70-5	Endrin Ketone	24 U	24	0.330
58-89-9	Lindane	24 U	24	0.233
76-44-8	Heptachlor	24 U	24	0.846
1024-57-3	Heptachlor Epoxide	24 U	24	0.546
72-43-5	Methoxychlor	24 U	24	0.336
8001-35-2	Toxaphene	200 U	200	28.0

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/16/03 by JRR
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/20/03 by JLRM
		Anal. Method:	USEPA-8082
Sample ID:	**69SB2A**	QC Batch:	89881 -116
Sample #:	**345745**	Anal. Batch:	207923
Matrix:	Soil	Percent Solids:	83
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polychlorinated Biphenyls OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
12674-11-2	PCB-1016	80 U	80	19.2
11104-28-2	PCB-1221	40 U	40	2.40
11141-16-5	PCB-1232	40 U	40	6.00
53469-21-9	PCB-1242	40 U	40	3.60
12672-29-6	PCB-1248	40 U	40	6.00
11097-69-1	**PCB-1254**	**220**	40	3.60
11096-82-5	PCB-1260	40 U	40	8.40

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/16/03 by JRR
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JLRM
	RAAP	Anal. Method:	USEPA-8082
Sample ID:	**13SB9A**	QC Batch:	89881 -116
Sample #:	**345896**	Anal. Batch:	207924
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polychlorinated Biphenyls OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
12674-11-2	PCB-1016	85 U	85	20.8
11104-28-2	PCB-1221	42 U	42	2.60
11141-16-5	PCB-1232	42 U	42	6.50
53469-21-9	PCB-1242	42 U	42	3.90
12672-29-6	PCB-1248	42 U	42	6.50
11097-69-1	PCB-1254	42 U	42	3.90
11096-82-5	PCB-1260	42 U	42	9.10

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/16/03 by JRR
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JLRM
	RAAP	Anal. Method:	USEPA-8082
Sample ID:	**SBD9**	QC Batch:	89881 -116
Sample #:	**345897**	Anal. Batch:	207924
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polychlorinated Biphenyls OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
12674-11-2	PCB-1016	82 U	82	19.2
11104-28-2	PCB-1221	41 U	41	2.40
11141-16-5	PCB-1232	41 U	41	6.00
53469-21-9	PCB-1242	41 U	41	3.60
12672-29-6	PCB-1248	41 U	41	6.00
11097-69-1	PCB-1254	41 U	41	3.60
11096-82-5	PCB-1260	41 U	41	8.40

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8151A
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by MSN
	RAAP	Anal. Method:	USEPA-8151A
Sample ID:	**69SB2A**	QC Batch:	90218 -110
Sample #:	**345745**	Anal. Batch:	208309
Matrix:	Soil	Percent Solids:	83
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Herbicides	Analytical Result	Reporting Limit	MDL
93-76-5	2,4,5-T	60 U	60	2.40
93-72-1	2,4,5-TP (Silvex)	60 U	60	4.80
94-75-7	2,4-D	240 U	240	19.2
94-82-6	2,4-DB	240 U	240	74.4
75-99-0	Dalapon	300 U	300	68.4
1918-00-9	Dicamba	240 U	240	2.40
120-36-5	Dichlorprop	240 U	240	20.4
~~88-85-7~~	~~* Dinoseb~~	~~240 R~~ R,1	~~240~~	~~25.2~~ AZ, 2/18/04
94-74-6	MCPA	24000 U	24000	1680
93-65-2	MCPP	24000 U	24000	6070

* See attached Statement of Data Qualifications.

See re-extraction, AZ 2/18/04

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

VALUE CHANGES

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/17/03 ~~10/10/03~~ by DJM ~~RS~~ 2/18/04
Submittal #:	**36440-5**	Prep. Method:	USEPA-8151A
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/28/03 by JLRM
		Anal. Method:	USEPA-8151A
Sample ID:	**69SB2A**	QC Batch:	90218 -110
Sample #:	**345745DL**	Anal. Batch:	208365
Matrix:	Soil	Percent Solids:	83
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Herbicides	Analytical Result	Reporting Limit	MDL
93-76-5	2,4,5-T	60 U	60	~~2.40~~
93-72-1	2,4,5-TP (Silvex)	60 U	60	4.80
94-75-7	2,4-D	~~240 U~~	240	19.2
94-82-6	2,4-DB	240 U	240	74.4
75-99-0	Dalapon	300 U	300	68.4
1918-00-9	Dicamba	240 U	240	2.40
~~120-36-5~~	Dichlorprop	240 U	240	20.4
88-85-7	Dinoseb	240 U	240	25.2
94-74-6	MCPA	~~24000 U~~	~~24000~~	~~1680~~
~~93-65-2~~	MCPP	24000 U	24000	6070

Use only Dinoseb, RS 2/18/04

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8151A
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by MSN
	RAAP	Anal. Method:	USEPA-8151A
Sample ID:	**13SB9A**	QC Batch:	90218 -110
Sample #:	**345896**	Anal. Batch:	208309
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Herbicides	Analytical Result	Reporting Limit	MDL
93-76-5	2,4,5-T	64 U	64	2.60
93-72-1	2,4,5-TP (Silvex)	64 U	64	5.20
94-75-7	2,4-D	260 U	260	20.8
94-82-6	2,4-DB	260 U	260	80.6
75-99-0	Dalapon	320 U	320	74.1
1918-00-9	Dicamba	260 U	260	2.60
120-36-5	Dichlorprop	260 U	260	22.1
~~88-85-7~~	~~* Dinoseb~~	~~260 R~~ R,1	~~260~~	~~27.3~~ * 2/18/04
94-74-6	MCPA	26000 U	26000	1810
93-65-2	MCPP	26000 U	26000	6570

* See attached Statement of Data Qualifications.

See re-extraction for Dinoseb * 2/18/04

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ANALYTICAL REPORT

VALUE CHANGES

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/17/03 ~~10/10/03~~ by DJM ✱ 2/18/03
Submittal #:	**36440-5**	Prep. Method:	USEPA-8151A
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/27/03 by JLRM
		Anal. Method:	USEPA-8151A
Sample ID:	**13SB9A**	QC Batch:	90218 -110
Sample #:	**345896DL**	Anal. Batch:	208365
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Herbicides	Analytical Result	Reporting Limit	MDL
93-76-5	2,4,5-T	64 U	64	~~2.60~~
93-72-1	2,4,5-TP (Silvex)	64 U	~~64~~	5.20
94-75-7	2,4-D	~~260 U~~	260	20.8
94-82-6	2,4-DB	260 U	260	80.6
75-99-0	Dalapon	320 U	320	74.1
1918-00-9	Dicamba	260 U	260	2.60
~~120-36-5~~	Dichlorprop	~~260 U~~	260	22.1
88-85-7	Dinoseb	260 U	260	27.3
94-74-6	MCPA	~~26000 U~~	~~26000~~	~~1810~~
~~93-65-2~~	MCPP	26000 U	26000	6570

Use only Dinoseb, ✱ 2/18/04

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8151A
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by MSN
	RAAP	Anal. Method:	USEPA-8151A
Sample ID:	**SBD9**	QC Batch:	90218 -110
Sample #:	**345897**	Anal. Batch:	208309
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Herbicides	Analytical Result	Reporting Limit	MDL
93-76-5	2,4,5-T	62 U	62	2.40
93-72-1	2,4,5-TP (Silvex)	62 U	62	4.80
94-75-7	2,4-D	250 U	250	19.2
94-82-6	2,4-DB	250 U	250	74.4
75-99-0	Dalapon	310 U	310	68.4
1918-00-9	Dicamba	250 U	250	2.40
120-36-5	Dichlorprop	250 U	250	20.4
~~88-85-7~~	~~*Dinoseb~~	~~250 R~~ R,1	~~250~~	~~25.2~~ AS 2/18/04
94-74-6	MCPA	25000 U	25000	1680
93-65-2	MCPP	25000 U	25000	6070

* See attached Statement of Data Qualifications.

See re-extraction for dinoseb, AS 2/18/04

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ANALYTICAL REPORT

VALUE CHANGES

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
Submittal #:	**36440-5**	Prepared:	10/17/03 ~~10/10/03~~ by DJM AS 2/18/04
Submittal:	Delivery Order 0046 RAAP	Prep. Method:	USEPA-8151A
		Analyzed:	10/27/03 by JLRM
Sample ID:	**SBD9**	Anal. Method:	USEPA-8151A
Sample #:	**345897DL**	QC Batch:	90218 -110
Matrix:	Soil	Anal. Batch:	208365
Unit:	ug/kg dry	Percent Solids:	80
		Dilution Factor:	1.2

CAS Number	Herbicides	Analytical Result	Reporting Limit	MDL
93-76-5	2,4,5-T	62 U	62	~~2.40~~
93-72-1	2,4,5-TP (Silvex)	62 U	62	4.80
94-75-7	2,4-D	~~250~~ U	250	19.2
94-82-6	2,4-DB	250 U	250	74.4
75-99-0	Dalapon	310 U	310	68.4
1918-00-9	Dicamba	250 U	250	2.40
~~120-36-5~~	Dichlorprop	250 U	250	20.4
88-85-7	Dinoseb	250 U	250	25.2
94-74-6	MCPA	~~25000~~ U	~~25000~~	~~1680~~
~~93-65-2~~	MCPP	25000 U	25000	6070

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/08/03 @ 15:00
Sampler: B.F. & J.S.
Received: 10/09/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **69SB2A**
Sample #: **345745**
Matrix: Soil

Percent Solids: 83

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	24600	250	5.10	mg/kg dry	10/23/03	DSC	USEPA-6010B
Antimony, Total	9.5	0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	0.64	0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	65	5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	0.62 J	1.0	0.0333	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Cadmium, Total	0.57 J	1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	840 J,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	50 J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	16 J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	17 J,S	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	32700	1000	71.6	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	1.0 U	1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	2270 J,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	894	5.0	0.264	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Mercury, Total	0.091 J	0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	0.50 U	0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1580	100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	1.0 U	1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.085 J	3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	114	100	8.92	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Thallium, Total	0.33 J B,X	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	54	1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	51	4.0	0.517	mg/kg dry	10/23/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/08/03 @ 15:15
Sampler: B.F. & J.S.
Received: 10/09/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **69SB2B**
Sample #: **345746**
Matrix: Soil

Percent Solids: 79

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	34800		250	5.10	mg/kg dry	10/23/03	DSC	USEPA-6010B
Antimony, Total	8.8		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	6.5		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	70		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	0.91 J		1.0	0.0333	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Cadmium, Total	1.5		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	568	J,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	50	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	12	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	23	J,S	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	42400		1000	71.6	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	14		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	6020	J,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	303		5.0	0.264	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Mercury, Total	0.070 J		0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	30		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	3680		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.47 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.10 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	353		100	8.92	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Thallium, Total	0.37 J	B,X	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	71		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	54		4.0	0.517	mg/kg dry	10/23/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/08/03 @ 15:30
Sampler: B.F. & J.S.
Received: 10/09/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **69SB2C**
Sample #: **345747**
Matrix: Soil

Percent Solids: 75

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	31400		250	5.10	mg/kg dry	10/23/03	DSC	USEPA-6010B
Antimony, Total	7.2		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	9.9		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	63		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	1.0		1.0	0.0333	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Cadmium, Total	0.90 J		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	483	J,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	41	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	16	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	24	J,S	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	41200		1000	71.6	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	15		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	8790	J,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	585		5.0	0.264	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Mercury, Total	0.077 J		0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	25		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	4720		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.45 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.11 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	434		100	8.92	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Thallium, Total	0.39 J	B,X	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	57		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	45		4.0	0.517	mg/kg dry	10/23/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/08/03 @ 16:00
Sampler: B.F. & J.S.
Received: 10/09/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **57SB4B**
Sample #: **345748**
Matrix: Soil

Percent Solids: 74

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	33300		250	9.15	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Antimony, Total	9.7		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	2.0		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	51		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	0.45 J		1.0	0.0333	mg/kg dry	10/29/03	DSC	USEPA-6010B
Cadmium, Total	1.6		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	372	J,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	45	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	13	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	18	J,S	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	59000		200	42.4	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Lead, Total	18		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	971	J,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	273		5.0	0.264	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Mercury, Total	0.041 J		0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	12		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1080		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.40 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.063 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	497		100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.18 J	B,X	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	66		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	88		4.0	0.517	mg/kg dry	10/23/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 09:45
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB7A**
Sample #: **345883**
Matrix: Soil

Percent Solids: 82

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	14000		50	1.83	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Antimony, Total	0.50 U		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	2.5		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	170		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	1.0		1.0	0.167	mg/kg dry	11/03/03	KLVM	USEPA-6010B
Cadmium, Total	1.3		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	2290	J,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	28	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	9.0	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	13	J,S	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	31000		200	42.4	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Lead, Total	141		25	0.545	mg/kg dry	10/24/03	DWJ	USEPA-6020
Magnesium, Total	3370	J,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	1040		25	1.32	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Mercury, Total	0.027 J		0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	14		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1670		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.57 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.084 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	58 J		100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.52	B,X	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	24		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	471		40	5.17	mg/kg dry	10/27/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 10:00
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB7B**
Sample #: **345884**
Matrix: Soil

Percent Solids: 80

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	13900		50	1.83	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Antimony, Total	0.12 J	B,P	0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	3.5		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	199		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	0.98 J		1.0	0.167	mg/kg dry	11/03/03	KLVM	USEPA-6010B
Cadmium, Total	1.5		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	2650	J,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	30	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	13	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	16	J,S	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	41600		200	42.4	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Lead, Total	235		50	1.09	mg/kg dry	10/24/03	DWJ	USEPA-6020
Magnesium, Total	3140	J,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	1650		25	1.32	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Mercury, Total	0.038 J		0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	13		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1320		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.70 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.096 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	46 J		100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.69	B,X	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	24		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	688		40	5.17	mg/kg dry	10/27/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 10:15
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB7C**
Sample #: **345885**
Matrix: Soil

Percent Solids: 79

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	21400		50	1.83	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Antimony, Total	0.085 J	B,P	0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	2.4		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	208		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	1.3		1.0	0.167	mg/kg dry	11/03/03	KLVM	USEPA-6010B
Cadmium, Total	1.3		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
* Calcium, Total	2310	J,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
* Chromium, Total	37	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	13	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	19	J,S	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	41900		200	42.4	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Lead, Total	239		50	1.09	mg/kg dry	10/24/03	DWJ	USEPA-6020
* Magnesium, Total	3940	J,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	1380		25	1.32	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Mercury, Total	0.034 J		0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	19		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1890		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.84 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.11 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	53 J		100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.86	B,X	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	36		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	847		40	5.17	mg/kg dry	10/27/03	KLVM	USEPA-6010B

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 10:45
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB12A**
Sample #: **345886**
Matrix: Soil

Percent Solids: 78

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	6630		50	1.83	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Antimony, Total	1.1		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	1.6		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	78		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	1.0 U		1.0	0.0391	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cadmium, Total	1.1		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	12400	J,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	18	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	5.1	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	45	J,S	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	14800		100	21.2	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Lead, Total	176		25	0.545	mg/kg dry	10/24/03	DWJ	USEPA-6020
Magnesium, Total	5330	J,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	301		5.0	0.264	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Mercury, Total	0.016 J		0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	8.3		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1050		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.32 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.059 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	102		100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.13 J	B,X	0.50	0.0270	mg/kg dry	10/30/03	DWJ	USEPA-6020
Vanadium, Total	14		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	214		20	2.59	mg/kg dry	10/27/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 11:00
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB12B**
Sample #: **345887**
Matrix: Soil

Percent Solids: 71

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	9910		50	1.83	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Antimony, Total	1.1		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	1.2		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	106		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	1.0 U		1.0	0.0391	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cadmium, Total	1.4		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	4820	J,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	27	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	6.4	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	37	J,S	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	15000		100	21.2	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Lead, Total	325		50	1.09	mg/kg dry	10/24/03	DWJ	USEPA-6020
Magnesium, Total	3270	J,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	280		5.0	0.264	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Mercury, Total	0.041 J		0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	11		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1420		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.39 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.027 J	B,P	3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	252		100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.23 J	B,X	0.50	0.0270	mg/kg dry	10/30/03	DWJ	USEPA-6020
Vanadium, Total	17		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	377		40	5.17	mg/kg dry	10/27/03	KLVM	USEPA-6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 00:00
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **SBD8**
Sample #: **345888**
Matrix: Soil

Percent Solids: 67

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	8930		50	1.83	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Antimony, Total	1.3		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	1.2		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	102		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	1.0 U		1.0	0.0391	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cadmium, Total	1.6		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	4640	J,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	26	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	6.3	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	36	J,S	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	14700		100	21.2	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Lead, Total	318		50	1.09	mg/kg dry	10/24/03	DWJ	USEPA-6020
Magnesium, Total	3050	J,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	291		5.0	0.264	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Mercury, Total	0.035 J		0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	9.6		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1290		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.41 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.030 J	B,P	3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	88 J		100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.15 J	B,X	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	17		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	426		40	5.17	mg/kg dry	10/27/03	KLVM	USEPA-6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 11:15
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB12C**
Sample #: **345889**
Matrix: Soil

Percent Solids: 62

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	15000		50	1.83	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Antimony, Total	1.5		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	2.2		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	161		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	1.0 U		1.0	0.0391	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cadmium, Total	2.3		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	3840	J,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	34	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	9.9	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	94	J,S	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	18700		100	21.2	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Lead, Total	1140		200	4.36	mg/kg dry	10/24/03	DWJ	USEPA-6020
Magnesium, Total	3980	J,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	272		5.0	0.264	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Mercury, Total	0.13		0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	17		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	2150		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.67 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.063 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	95 J		100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.29 J	B,X	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	26		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	476		40	5.17	mg/kg dry	10/27/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 12:15
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB11A**
Sample #: **345890**
Matrix: Soil

Percent Solids: 77

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	19800		50	1.83	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Antimony, Total	0.27 J	B,P	0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	2.2		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	171		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	1.0		1.0	0.167	mg/kg dry	11/03/03	KLVM	USEPA-6010B
Cadmium, Total	1.2		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	4020	J,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	38	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	13	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	26	J,S	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	32600		200	42.4	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Lead, Total	111		25	0.545	mg/kg dry	10/24/03	DWJ	USEPA-6020
Magnesium, Total	4650	J,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	1140		25	1.32	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Mercury, Total	0.052 J		0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	17		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	2680		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.86 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.10 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	51 J		100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.42 J	B,X	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	34		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	294		40	5.17	mg/kg dry	10/27/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 12:30
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB11B**
Sample #: **345891**
Matrix: Soil

Percent Solids: 88

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	10800		50	1.83	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Antimony, Total	4.7		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	2.8		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	143		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	0.65 J		1.0	0.0333	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Cadmium, Total	1.2		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	2120	J,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	29	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	9.4	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	98	J,S	5.0	1.84	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Iron, Total	33800		200	42.4	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Lead, Total	26500		5000	109	mg/kg dry	10/24/03	DWJ	USEPA-6020
Magnesium, Total	2520	J,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	942		5.0	0.264	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Mercury, Total	0.045 J		0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	12		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1280		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.53 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.26 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	63 J		100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.45 J	B,X	0.50	0.0270	mg/kg dry	10/30/03	DWJ	USEPA-6020
Vanadium, Total	18		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	502		40	5.17	mg/kg dry	10/27/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 12:45
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB11C**
Sample #: **345892**
Matrix: Soil

Percent Solids: 77

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	20900		50	1.83	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Antimony, Total	0.62		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	4.7		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	211		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	1.2		1.0	0.167	mg/kg dry	11/03/03	KLVM	USEPA-6010B
Cadmium, Total	2.7		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	2970	J,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	39	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	16	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	33	J,S	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	48600		200	42.4	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Lead, Total	295		50	1.09	mg/kg dry	10/24/03	DWJ	USEPA-6020
Magnesium, Total	3940	J,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	1700		125	6.60	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Mercury, Total	0.071 J		0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	21		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1720		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	1.5		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.15 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	64 J		100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.68	B,X	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	34		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	1070		100	12.9	mg/kg dry	10/27/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 13:00
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB10A**
Sample #: **345893**
Matrix: Soil

Percent Solids: 71

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	10900		50	1.83	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Antimony, Total	0.19 J	B,P	0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	2.5		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	111		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	0.85 J		1.0	0.167	mg/kg dry	11/03/03	KLVM	USEPA-6010B
Cadmium, Total	1.1		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	4570	J,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	27	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	11	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	16	J,S	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	25700		200	42.4	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Lead, Total	111		25	0.545	mg/kg dry	10/24/03	DWJ	USEPA-6020
Magnesium, Total	3850	J,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	853		5.0	0.264	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Mercury, Total	0.040 J		0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	14		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1540		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.67 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.085 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	36 J		100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.32 J	B,X	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	22		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	287		20	2.59	mg/kg dry	10/27/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 13:15
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB10B**
Sample #: **345894**
Matrix: Soil

Percent Solids: 77

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	14100		50	1.83	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Antimony, Total	3.0		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	3.9		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	160		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	0.97 J		1.0	0.167	mg/kg dry	11/03/03	KLVM	USEPA-6010B
Cadmium, Total	1.5		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	2240	J,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	35	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	12	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	44	J,S	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	37500		200	42.4	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Lead, Total	320		50	1.09	mg/kg dry	10/24/03	DWJ	USEPA-6020
Magnesium, Total	2890	J,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	1310		25	1.32	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Mercury, Total	0.089 J		0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	16		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1200		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.77 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.18 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	52 J		100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.45 J	B,X	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	25		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	578		40	5.17	mg/kg dry	10/27/03	KLVM	USEPA-6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 13:30
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB10C**
Sample #: **345895**
Matrix: Soil

Percent Solids: 73

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	17500		50	1.83	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Antimony, Total	0.78		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	3.6		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	142		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	0.89 J		1.0	0.0333	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Cadmium, Total	1.0		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	1820	J,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	35	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	14	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	34	J,S	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	39600		200	42.4	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Lead, Total	204		25	0.545	mg/kg dry	10/24/03	DWJ	USEPA-6020
Magnesium, Total	3230	J,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	1150		25	1.32	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Mercury, Total	0.083 J		0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	16		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1410		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.96 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.11 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	48 J		100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.50	B,Y	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	30		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	540		40	5.17	mg/kg dry	10/27/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 14:00
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB9A**
Sample #: **345896**
Matrix: Soil

Percent Solids: 78

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	20400	50	1.83	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Antimony, Total	0.095 J B,P	0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	2.7	0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	175	5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	1.2	1.0	0.167	mg/kg dry	11/03/03	KLVM	USEPA-6010B
Cadmium, Total	2.2	1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	1890 J,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	36 J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	13 J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	25 J,S	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	36500	200	42.4	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Lead, Total	434	50	1.09	mg/kg dry	10/24/03	DWJ	USEPA-6020
Magnesium, Total	3690 J,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	1240	25	1.32	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Mercury, Total	0.043 J	0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	19	0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1980	100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.93 J	1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.12 J	3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	44 J	100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.78 B,X	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	37	1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	1010	100	12.9	mg/kg dry	10/27/03	KLVM	USEPA-6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 00:00
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **SBD9**
Sample #: **345897**
Matrix: Soil

Percent Solids: 80

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	18600		50	1.83	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Antimony, Total	0.10 J	B,P	0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	2.4		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	178		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	1.1		1.0	0.167	mg/kg dry	11/03/03	KLVM	USEPA-6010B
Cadmium, Total	2.4		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	2070	J,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	34	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	13	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	26	J,S	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	35900		200	42.4	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Lead, Total	396		50	1.09	mg/kg dry	10/24/03	DWJ	USEPA-6020
Magnesium, Total	3690	J,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	1390		25	1.32	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Mercury, Total	0.043 J		0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	17		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1910		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.84 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.12 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	45 J		100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.95	B,P	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	35		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	969		100	12.9	mg/kg dry	10/27/03	KLVM	USEPA-6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 14:15
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB9B**
Sample #: **345898**
Matrix: Soil

Percent Solids: 73

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	16200	50	1.83	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Antimony, Total	0.50 U	0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	1.1	0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	121	5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	1.0 U	1.0	0.0391	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cadmium, Total	1.2	1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	1490 J,m	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	31 J,m	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	9.8 J,s	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	13 J,s	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	20400	200	42.4	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Lead, Total	113	25	0.545	mg/kg dry	10/24/03	DWJ	USEPA-6020
Magnesium, Total	2970 J,m	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	689	5.0	0.264	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Mercury, Total	0.027 J	0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	17	0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1490	100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.72 J	1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.060 J	3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	54 J	100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.25 J B,x	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	30	1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	194	20	2.59	mg/kg dry	10/27/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 14:30
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB9C**
Sample #: **345899**
Matrix: Soil

Percent Solids: 78

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	4250	50	1.83	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Antimony, Total	0.50 U	0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	0.12 J	0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	29	5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	1.0 U	1.0	0.0391	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cadmium, Total	1.1	1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	1300 J,m	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	11 B,x	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	3.9 J,s	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	2.5 J,s	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	5330	20	4.24	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Lead, Total	12	1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	1210 J,m	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	59	5.0	0.264	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Mercury, Total	0.10 U	0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	3.8	0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	548	100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.23 J	1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.023 J B,p	3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	69 J	100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.047 J B,x	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	11	1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	46	4.0	0.517	mg/kg dry	10/23/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 15:15
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB8A**
Sample #: **345900**
Matrix: Soil

Percent Solids: 77

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	12600		50	1.83	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Antimony, Total	0.069 J	B,P	0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	2.4		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	124		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	0.66 J		1.0	0.0333	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Cadmium, Total	0.91 J		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	3290	J,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	28	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	10	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	18	J,S	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	29200		200	42.4	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Lead, Total	8620		1000	21.8	mg/kg dry	10/24/03	DWJ	USEPA-6020
Magnesium, Total	3240	J,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	1160		25	1.32	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Mercury, Total	0.033 J		0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	14		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1480		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.66 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.14 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	40 J		100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.36 J	B,P	0.50	0.0270	mg/kg dry	10/30/03	DWJ	USEPA-6020
Vanadium, Total	23		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	363		20	2.59	mg/kg dry	10/27/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 15:30
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB8B**
Sample #: **345901**
Matrix: Soil

Percent Solids: 78

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	7650		50	1.83	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Antimony, Total	0.50 U		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	0.65		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	66		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	1.0 U		1.0	0.0391	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cadmium, Total	0.72 J		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	1750	J,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	19	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	6.0	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	8.3	J,S	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	12400		100	21.2	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Lead, Total	46		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	2160	J,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	270		5.0	0.264	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Mercury, Total	0.0087 J		0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	7.8		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	939		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.35 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.45 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	63 J		100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.14 J	B,J	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	15		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	154		20	2.59	mg/kg dry	10/27/03	KLVM	USEPA-6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
Submittal #:	**36440-5**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**69SB2A**		
Sample #:	**345745**		
Matrix:	Soil	Percent Solids:	83

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	83	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.14 J	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
Submittal #:	**36440-5**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**69SB2B**		
Sample #:	**345746**		
Matrix:	Soil	Percent Solids:	79

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	79	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
Submittal #:	**36440-5**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**69SB2C**		
Sample #:	**345747**		
Matrix:	Soil	Percent Solids:	75

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	75	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.05 J	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
Submittal #:	**36440-5**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**57SB4B**		
Sample #:	**345748**		
Matrix:	Soil	Percent Solids:	74

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	74	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
Submittal #:	**36440-5**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**13SB7A**		
Sample #:	**345883**		
Matrix:	Soil	Percent Solids:	82

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	82	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.07 J	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
Submittal #:	**36440-5**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**13SB7B**		
Sample #:	**345884**		
Matrix:	Soil	Percent Solids:	80

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	80	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.18 J	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
Submittal #:	**36440-5**		
Submittal:	Delivery Order 0046 RAAP		
Sample ID:	**13SB7C**		
Sample #:	**345885**		
Matrix:	Soil	Percent Solids:	79

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	79	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 10:45
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB12A**
Sample #: **345886**
Matrix: Soil

Percent Solids: 78

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	78	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.18 J	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
Submittal #:	**36440-5**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**13SB12B**		
Sample #:	**345887**		
Matrix:	Soil	Percent Solids:	71

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	71	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.39 J	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
Submittal #:	**36440-5**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**SBD8**		
Sample #:	**345888**		
Matrix:	Soil	Percent Solids:	67

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	67	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.23 J	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
Submittal #:	**36440-5**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**13SB12C**		
Sample #:	**345889**		
Matrix:	Soil	Percent Solids:	62

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	62	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.11 J	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
Submittal #:	**36440-5**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**13SB11A**		
Sample #:	**345890**		
Matrix:	Soil	Percent Solids:	77

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	77	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.22 J	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 12:30
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB11B**
Sample #: **345891**
Matrix: Soil

Percent Solids: 88

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	88	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.35 J	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 12:45
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB11C**
Sample #: **345892**
Matrix: Soil

Percent Solids: 77

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	77	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.25 J	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
Submittal #:	**36440-5**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**13SB10A**		
Sample #:	**345893**		
Matrix:	Soil	Percent Solids:	71

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	71	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.17 J	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 13:15
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB10B**
Sample #: **345894**
Matrix: Soil

Percent Solids: 77

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	77	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.22 J	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
Submittal #:	**36440-5**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**13SB10C**		
Sample #:	**345895**		
Matrix:	Soil	Percent Solids:	73

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	73	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.11 J	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
Submittal #:	**36440-5**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**13SB9A**		
Sample #:	**345896**		
Matrix:	Soil	Percent Solids:	78

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	78	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.35 J	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
Submittal #:	**36440-5**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**SBD9**		
Sample #:	**345897**		
Matrix:	Soil	Percent Solids:	80

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	80	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.26 J	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 14:15
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB9B**
Sample #: **345898**
Matrix: Soil

Percent Solids: 73

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	73	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.12 J	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 14:30
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB9C**
Sample #: **345899**
Matrix: Soil

Percent Solids: 78

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	78	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 15:15
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB8A**
Sample #: **345900**
Matrix: Soil

Percent Solids: 77

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	77	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.25 J	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
Submittal #:	**36440-5**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**13SB8B**		
Sample #:	**345901**		
Matrix:	Soil	Percent Solids:	78

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	78	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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DATA VALIDATION WORKSHEET

Volatile Organic Analysis by GC/MS

Reviewer: AS
Date: February-04
DV Level: II III IV
Review Document:
X NFG - Region III Modifications
X Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-5
Test Name: 8260B
Method No.: VOC

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Do sample preservation, collection and storage condition meet method requirement?	x		
	If the temperature of the cooler was elevated (> 10 °C) or bubble size in aqueous sample was too big (tiny bubble is OK.), then flag all positive results with a "L" and all non-detects "UL".			
1.5	Do any soil samples contain more than 50% water?		x	
	If any sample analyzed as a soil, other than TCLP, contains % moisture greater than 50%, noted in the DV report.			

Notes: *four coolers @ 2.3C, 0.4C, 0.9C, & 0.8C*

2.0 Holding Times		Yes	No	NA
2.1	Were sample preserved as specified in the method or project QAPP?	see above		
2.2	Have any technical holding times, determined from date of sampling to date of analysis, been exceeded? If yes, L(+)/UL(-). For aqueous unpreserved - 7 days for aromatic compounds All others - 14 days.		x	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, L(+)/R(-) .		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per GCMS, 20 samples, batch, matrix, and level)?	x		
3.2	Do any method blanks have positive results? Action: If yes, positive sample results should be reported and qualified "B", if the concentration of the compound in the sample is less than or equal to 5 times (or 10 times for the common volatile lab contaminants - methylene chloride, acetone, and 2-butanone) the amount in the associated blank.	x		
3.3	Do any field equipment blanks/trip blanks have positive results? If Yes, use same rules above.	x		
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, noted in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If no, use professional judgement to determine the effect on the data and note in the reviewer narrative.	x		
4.3	Has a continuing calibration standard been analyzed for every 12 hours of sample analysis per instrument?	x		
4.4	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 15% and %D < ± 20%		x	
	For initial Calibration: for %RSD > ±15%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 20% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >20%, J(+).			
4.5	Do any SPCC compounds have an RRF < control limit? Control limits: >0.10 for chloromethane, 1,1-dichloroethane, & bromoform or >0.30 for chlorobenzene & 1,1,2,2-tetrachloroethane. If yes, L(+)/R(-).		x	

Notes: *The second source for methyl acetate was analyzed after sample analyses, but passed at 89% - no action was taken.*

5.0 GC/MS Instrument Performance Check		Yes	No	NA
5.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?	x		
5.2	Are BFB enchanced bar graph spectrum and mass/charge (m/z) listing provided for each 12-hour shift?	x		
5.3	Have all samples been analyzed within twelve hours of the BFB tune?	x		
	If twelve hours have elapsed according to the system clock, and the laboratory had analyzed standards, blanks, field samples or QC samples after twelve (12) hours, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
5.4	Have ion abundance criteria for BFB been met for each instrument used?	x		
	If the BFB criteria were not met prior to the analyses of the standards, blanks, field samples and QC samples, all standards, blanks, field samples and QC samples are rejected "R".			

Notes:

6.0 Surrogate Recovery		Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
6.2	Are surrogate recoveries within acceptance criteria (not to exceed 50-150%) for all samples and method blanks?	x		
6.3	If No in Section 6.2, are these sample(s) or method blank(s) reanalyzed?			x
	If any system monitoring compound(s) in the volatile fraction is out of specification, there should be a reanalysis to confirm that the non-compliance is because of sample matrix effects rather than laboratory deficiencies.			
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? DV report should indicate that extraction efficiency/ method accuracy cannot be verified.			x
	1 or more <10% / 1 high/low / 2 or 3 high/low / 2 or 3 all low / 2 or 3 all high Positives: L / J / J / L / K Non-detects: R / UJ / UJ / UL / NONE			
	Note: The B qualifier remains over surrogate flagging.			

Notes:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 50-150%?	x		
7.4	Are there any RPD outside the QC limits not to exceed 50%?	x		
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

8.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)		Yes	No	NA
8.1	Is the LCS/LCSD recovery form present?	x		
8.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
8.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 50-150%?	x		
	If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
8.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 50%?			x
	If Yes, J(+) only.			

Notes:

9.0 Internal Standard		Yes	No	NA
9.1	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration? If not, J(+)/UJ(-).		x	
	If extremely low area counts are reported, or performance exhibits a major abrupt drop-off, then a severe loss of sensitivity is indicated. Non-detect target compounds should then be qualified as unusable (R).			
9.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	x		
	The chromatographic profile for that sample must be examined to determine if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction. Positive results should not needed to be qualified as "R", if the mass spectral criteria are met.			

Notes: *13SB12C*

10.0 Field Duplicate		Yes	No	NA
10.1	Was a field duplicate prepared and analyzed at the correct frequency (one per 20 samples, matrix, and level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
10.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

11.0 Tentatively Identified Compounds (TICs) and Detection Limit Verification		Yes	No	NA
11.1	Are any TICs detected in the field samples? If Yes, all TIC results should be flagged "NJ" (tentatively identified and approximate concentration).	x		
11.2	Do detection limits meet those required by the project QAPP and were they properly adjusted to reflect all sample dilutions and dry weight factors?	x		
11.3	Were sample concentrations above the highest standard run at a dilution? If not, for ion saturation flag "L", unsaturated results "J".			x

Notes:

12.0 Data Completeness		Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit 90%)	x		
	Number of samples: 23			
	Number of target compounds in each analysis:50			
	Number of results rejected and not reported:0			
	% Completeness = (12.1.1 x 12.1.2 - 12.1.3) x 100/(12.1.1 x 12.1.2)			
	% Completeness = 100.0%			

Notes:

DATA VALIDATION WORKSHEET

Semivolatile Organic Analysis

Reviewer: AS
Date: February-04
DV Level: II III IV
Review Document:
X NFG - Region III Modifications
X Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-5
Test Name: SVOC
Method No.: 8270C

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	
1.4	Do sample preservation, collection and storage condition meet method requirement?		x	
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 20 ^{O}C), then flag all positive results with a "L" and all non-detects "UL".			
1.5	Do any soil samples contain more than 50% water?		x	
	If any sample analyzed as a soil, other than TCLP, contains % moisture greater than 50%, noted in the DV report.			

Notes: *four coolers @ 2.3C, 0.4C, 0.9C, & 0.8C*

2.0 Holding Times		Yes	No	NA
2.1	Were sample preserved as specified in the method or project QAPP?	x		
2.2	Have any technical holding times, determined from date of sampling to date of analysis, been exceeded? If yes, L(+)/UL(-). For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, L(+)/R(-) .		x	

Notes:

3.0 Blanks (Laboratory and Field)

		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x		
3.2	Do any preparation/instrument/reagent blanks have positive results? Action: If yes, positive sample results should be reported and qualified "B", if the concentrationof the compound in the sample is less than or equal to 5 times (or 10 times for the common phthalate contaminants) the amount in the associated blank.	x		
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.	x		
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, noted in the Dv report.	x		

Notes:

4.0 Initial and Continuing Calibration

		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If no, use professional judgement to determine the effect on the data and note in the reviewer narrative.	x		
4.3	Has a continuing calibration standard been analyzed for every 12 hours of sample analysis per instrument?	x		
4.4	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD ≤ 15%, ICV %D < 30%, and CCV %D ≤ 20%.		x	
	For initial Calibration: for %RSD > ±15%, but < ± 50%, J(+) only. for %RSD > ±50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 20% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >20%, J(+).			
4.5	Do any SPCC compounds have an RRF < 0.05? (n-nitroso-di-n-propylamine,hexachlorocyclopentadiene,2,4-dinitrophenol, & 4-nitrophenol) If yes, J(+)/R(-).		x	

Notes: ***1,2,4,5-tetrachlorobenzene was not in the ICV for the 10/31/03 calibration. It is found in the LCS, MS, and MSD from a second source.***

5.0 GC/MS Instrument Performance Check		Yes	No	NA
5.1	Are GC/MS Tuning and Mass Calibration forms present for decafluorotriphenylphosphine (DFTPP)?	x		
5.2	Are DFTPP enchanced bar graph spectrum and mass/charge (m/z) listing provided for each 12-hour shift?	x		
	If DFTPP was analyzed simultaneously with any calibration standard or blank, the instrument performance check (IPC) is rejected "R" as well as all associated data.			
5.3	Have all samples been analyzed within twelve hours of the DFTPP tune?	x		
	If twelve hours have elapsed according to the system clock, and the laboratory had analyzed standards, blanks, field samples or QC samples after twelve (12) hours, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
5.4	Have ion abundance criteria for DFTPP been met for each instrument used?	x		
	If the DFTPP criteria were not met prior to the analyses of the standards, blanks, field samples and QC samples, all standards, blanks, field samples and QC samples are rejected "R".			

Notes:

6.0 Surrogate Recovery		Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
6.2	Are surrogate recoveries within acceptance criteria not to exceed 10-150% for all samples and method blanks?	x		
6.3	If No in Section 6.2, are these sample(s) or method blank(s) reanalyzed?			x
	If any two base/neutral or acid fraction are out of specification, or if any one base/neutral or acid extractable surrogate has a recovery of less than 10%, then there should be a reanalysis to confirm that the non-compliance is because of sample matrix effects rather than laboratory deficiencies.			
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? (recoveries may be diluted out.)			x
	1 or more <10% / 2 or 3 high/low / 2 or 3 all low / 2 or 3 all high Positives: L / J / L / K Non-detects: R / UJ / UL / NONE			
	Note: The B qualifier remains over surrogate flagging.			

Notes:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 10-150%?	x		
7.4	Are there any RPDs outside the QC limits not to exceed 60%?	x		
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

8.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)		Yes	No	NA
8.1	Is the LCS/LCSD recovery form present?	x		
8.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
8.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 10-150%?	x		
	If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
8.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 50%?			x
	If Yes, J(+) only.			

Notes:

9.0 Internal Standard		Yes	No	NA
9.1	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration? If not, J(+)/UJ(-).	x		
	If extremely low area counts are reported, or performance exhibits a major abrupt drop-off, then a severe loss of sensitivity is indicated. Non-detect target compounds should then be qualified as unusable (R).			
9.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	x		
	The chromatographic profile for that sample must be examined to determine if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction. Positive results should not needed to be qualified as "R", if the mass spectral criteria are met.			

Notes:

10.0 Field Duplicate		Yes	No	NA
10.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
10.2	Are all analyte duplicate results within control limits? Generally, no action is taken on the basis of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.		x	

Notes:

11.0 Tentatively Identified Compounds (TICs) and Detection Limit Verification		Yes	No	NA
11.1	Are any TICs detected in the field samples? If Yes, all TIC results should be flagged "NJ" (tentativelyidenified, and approximate concentration).	x		
11.2	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture?	x		
11.3	Were sample concentrations above the highest standard run at a dilution? If not, for ion saturation flag "L", unsaturated results "J".	x		

Notes:

12.0 Data Completeness		Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit 90%)	x		
	Number of samples: 23			
	Number of target compounds in each analysis:66			
	Number of results rejected and not reported:0			
	% Completeness = (12.1.1 x 12.1.2 - 12.1.3) x 100/(12.1.1 x 12.1.2)			
	% Completeness = 100.0%			

Notes:

DATA VALIDATION WORKSHEET

Polyaromatic Hydrocarbons

Reviewer: AS
Date: February-04
DV Level: II III IV

Review Document:

__X__ Region III Modified for National Functional Guidelines
_____ NFG for organic Data review (February 1994)
__X__ Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-5
Test Name: PAH
Method No.: 8310-HPLC

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. % solids		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes: *four coolers @ 2.3C, 0.4C, 0.9C, & 0.8C*

2.0 Holding Times		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?		see above	
	Action: If the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyses, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%	x		
	For initial Calibration: for %RSD > ±20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?		x	
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?			x
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.			x
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 40-150%?		x	
	Are there any RPDs outside the QC limits not to exceed 60%?		x	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

7.0 Laboratory Control Sample (LCS)		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 40-150%?		x	
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?		x	
	Action: If Yes, J(+) only.			

Notes:

8.0 Field Duplicate		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.		x	

Notes:

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.	x		
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.			x
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	x		

Notes:

10.0 Data Completeness			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		x		
	Number of samples:	23			
	Number of target compounds in each analysis:	16			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

DATA VALIDATION WORKSHEET

Explosives

Reviewer: AS
Date: February-04
DV Level: II III IV
Review Document:
X Region III Modified for National Functional Guidelines
___ NFG for organic Data review (February 1994)
X Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-5
Test Name: Explosives
Method No.: 8330-HPLC

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. % solids		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes: *four coolers @ 2.3C, 0.4C, 0.9C, & 0.8C*

2.0 Holding Times		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?		see above	
	Action: If the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyese, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%		x	
	For initial Calibration: for %RSD > ±20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?	x		
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?			x
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.			x
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 40-150%?		x	
6.4	Are there any RPDs outside the QC limits not to exceed 60%?		x	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

7.0 Laboratory Control Sample (LCS)		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 40-150%?		x	
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?			x
	Action: If Yes, J(+) only.			

Notes:

8.0 Field Duplicate		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.	x		
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.	x		
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	x		

Notes:

10.0 Data Completeness			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		x		
	Number of samples:	23			
	Number of target compounds in each analysis:	14			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

DATA VALIDATION WORKSHEET

Pesticides/PCBs

Reviewer: AS
Date: February-04
DV Level: II III IV
Review Document:
X SW-846 - 8081/8082
X NFG - Region III Modifications
___ CLP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-5
Test Name: PEST/PCB
Method No.: 8081A/8082

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Do any soil samples contain more than 50% water?		x	
	If any sample analyzed as a soil, other than TCLP, contains % moisture greater than 50%, noted in the DV report.			

Notes: *four coolers @ 2.3C, 0.4C, 0.9C, & 0.8C*

2.0 Preservation/ Holding Times		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?		see above	
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 20 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampleing to date of analysis, been exceeded? If yes, J(+)/UJ(-). For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, J(+)/R(-) .		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix)?	x		
3.2	Do any preparation/instrument/reagent blanks have positive results? Action: If yes, positive sample results should be reported and qualified "B", if the concentration of the compound in the sample is less than or equal to five times the amount in the associated blank.		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note it in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards included in the calibration curve? 1016 and 1260 need at least three peaks at five concentrations. The multi-component target compounds (the other Aroclors, Toxaphene, & Chlordane) must each be analyzed separately at a single concentration level during the initial calibration sequence.	x		
4.2	Has a continuing calibration standard been analyzed for every 12 hours or twenty samples?	x		
4.3	Are all calibration standard (IC and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r>0.99, %RSD < ± 20% and %D < ± 15%		x	
	For initial Calibration: for %RSD > ± 20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Do all standard retention times in the continuing calibration fall within the RT windows established during the initial calibration sequence? If No, the associated sample result should be carefully evaluated.	x		

Notes:

5.0 GC/ECD Instrument Performance Check for Pesticides		Yes	No	NA
5.1	Is the 4,4'-DDT breakdown </= to 15%? If No, for positive DDT results, DDT-L(+), DDD/DDE - NJ(+). For non-detect DDT results, DDD/DDE - R(+).	x		
5.2	Is the endrin breakdown </= to 15%? If No, for positive endrin results, endrin-L(+), endrin aldehyde/ketone - NJ(+). For non-detect DDT results, endrin aldehyde/ketone - R(+).	x		

Notes:

6.0 Surrogate Recovery		Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
6.2	Do all surrogate retention times fall within the RT windows established during the initial calibration sequence? If No, the associated sample result should be carefully evaluated.	x		
6.3	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?	x		
6.4	If No in Section 6.3, are these sample(s) or method blank(s) reanalyzed?			x
6.5	If No in Section 6.4, is any sample dilution factor greater than 10? (recoveries may be diluted out.)			x

	# of outliers	Recovery	Sample result from column with non-conformance	Sample result from column without non-conformance
	1 out	high/low	No action	No action
	2 out	2 high same column	K	No action
		2 low same column	L, UL	No action
		mixed same column	J, UJ	No action
		2 high diff columns	J	Not applicable
		2 low diff columns	J, UJ	Not applicable
		mixed diff columns	Professional judgement	Not applicable
	3 out	All high	K	Not applicable
		All low	L, UL	Not applicable
		2 high, 1 low	K (2 high)	J (1 low 2nd column)
		2 low, 1 high	L, UJ (2 low)	J (1 high 2nd column)
		other mixed	J, UJ	Not applicable
	4 out	All high	K	Not applicable
		All low	L, UL	Not applicable
		Mixed	J, UJ	Not applicable
	If any recovery is >0% and <10% then L(+)/R(-).			
	If any recovery is 0% then R(+/-).			

Notes:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 30-150%?	pest	pcb	
7.4	Are there any RPDs outside the QC limits not to exceed 60%?	pest	pcb	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes: MS/MSD from SDG 36440-1

8.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)		Yes	No	NA
8.1	Is the LCS/LCSD recovery form present?	x		
8.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
8.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 30-150%?		x	
	If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
8.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?			x
	If Yes, J(+) only.			

Notes:

9.0 Field Duplicate		Yes	No	NA
9.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
9.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

10.0 Compound Identification and Detection Limit Verification		Yes	No	NA
10.1	Is the percent difference calculated for the positive sample results on both columns < 40%? If No, J(+).	x		
10.2	Do detection limits meet those required by the project QAPP and were properly adjusted for dilution factors and moisture?	x		

Notes:

11.0 Pesticide Cleanup Checks		Yes	No	NA
11.1	Is Form IX PEST-1 present and complete for each lot of Florisil Cartridges used? (Florisil Cleanup is required for all Pest/PCB extracts to reduce matrix interference caused by polar compounds.)			x
	Every lot number of Florisil cartridges used for sample cleanup must be checked by spiking with 2,4,5-trichlorophenol and the midpoint concentration of Individual Standard Mixture A.			
11.2	Are all samples listed on the Pesticide Florisil cartridge Check Form?			
11.3	Are percent recoveries of pesticide and surrogate compounds within control limit, 80-120%(if the recovery of 2,4,5-trichlorophenol < 5%), for the florisil cartridge check? If No, the raw data should be examined for the presence of polar interferences and professional judgement should be used in qualifying the data.			

Notes:

Florisil cleanup was performed, no laboratory submission for these CLP descriptors was provided.

12.0 Data Completeness				Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit 90%)	Pest	PCB	x		
	Number of samples:	3	3			
	Number of target compounds in each analysis:	21	7			
	Number of results rejected and not reported:	0	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)					
	% Completeness =	100%	100%			

Notes:

DATA VALIDATION WORKSHEET

Herbicides

Reviewer: AS
Date: February-04
DV Level: II III IV
Review Document:
__X__ Region III Modified for National Functional Guidelines
_____ NFG for organic Data review (February 1994)
__X__ Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-5
Test Name: Herbicides
Method No.: 8151A

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. % solids		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes: *four coolers @ 2.3C, 0.4C, 0.9C, & 0.8C*

2.0 Holding Times		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?		see above	
	Action: If the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyese, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%		x	
	For initial Calibration: for %RSD > ±20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 25-150% for all samples and method blanks?		x	
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?		x	
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.		x	
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 25-150%?	x		
6.4	Are there any RPDs outside the QC limits not to exceed 60%?	x		
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes: MS/MSD see SDG 36440-1

7.0 Laboratory Control Sample (LCS)		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 25-150%?	x		
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?		x	
	Action: If Yes, J(+) only.			

Notes: original extraction Dinoseb LCS recovery low, re-extraction passed.

8.0 Field Duplicate		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.			x
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.			x
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	x		

Notes:

10.0 Data Completeness			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		x		
	Number of samples:	3			
	Number of target compounds in each analysis:	10			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

DATA VALIDATION WORKSHEET
INORGANIC - ICP, CVAA, AND CYANIDE
REGION III - NATIONAL FUNCTIONAL GUIDELINES

SDG No.: 36440-5
Project No.: 15291974.30000

Project Name: Radford SSP
Reviewer: AS
Date: February-04

1.0 Chain of Custody/Sample Condition/Raw Data		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples which were analyzed?	x			x			x			x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x			x			x			x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x			x			x			x	
1.4	Does sample preservation, collection and storage meet method requirement? (For metal: water samples: with Nitric Acid to pH < 2, and soil/sediment samples: 4 ^{o}C $\pm$ 2 ^{o}C)		x			x			x			x	
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes. % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	x			x			x			x		

Note: *four coolers @ 2.3C, 0.4C, 0.9C, & 0.8C*

2.0 Holding Time		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, CN: 14 days, other metals: 6 months) Action:L(+)/UL(-). If the holding time is grossly exceeded (twice the holding time criteria), L(+)/R(-).		x			x			x			x	

Note:

3.0 Instrument Calibration

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? (ICP& ICPMS: blank + one standard & a RL standard OR 3 standards and a blank with one standard at the RL; CVAA: blank + five standards with one standard at the RL). If not, qualify with "R".	7 + BLK			4 + BLK			5 + BLK			6 + BLK		
3.2	Are the correlation coefficients > 0.99? Action: J(+)/UJ(-).	x			x			x			x		
3.3	Once per calibration, did a high and low distilled standard recovery within 85-115%? If no, follow 3.6.										x		
3.4	Was an initial calibration check standard (labelled LCS by TriMatrix) analyzed immediately after instrument system had been calibrated? Action: If no, all associated data are rejected "R".	x			x			x			x		
3.5	Was continuing calibration standard (CCS) analyzed at a minimum frequency of 10% (every 10 samples) during an analytical run and at the end of the analytical run? If not, document and flag based on professional judgement.	x			x			x			x		
3.6	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? FOR ICP 90%-110%, FOR Hg 80-120%, FOR CN 85-115%.	x			x			x			x		
	ICV and CCV: Action: L(+)/R(-) L(+)/UL(-) K(+) Mercury < 65% 65% - 79% > 120% Cyanide < 65% 65% - 84% > 115% Other Metals < 75% 75% - 89% > 110%												
3.7	For ICP & ICPMS, did the CRDL standard recover between 80-120%?	x					x	x			x		
	<50% 50%-79% >120% 2xCRDL>[sample]>IDL L(+)/R(-) L(+)/UL(-) K							passed within 70-130%			passed within 80-120%		

Note: ***A high point added to Al, Ba, Ca, Fe, Mg, Mn, & K curves and the RLs were elevated by 5.***

4.0 Blanks		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were method blank (MB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x			x			x			x		
4.2	Were calibration blanks (ICB and CCBs) analyzed immediately after each and every ICV and CCVs? Action: If no ICB was run, all associated data are rejected. If the frequency of the CCBs does not follow requirement, all associated data are qualified "J".	x			x			x			x		
4.3	Are there reported MB or ICB/CCBs values > RL?	x			x				x			x	
	Sample Results > RL												
	< 5X Blank Contamination B												
4.4	Are there negative blank results with the absolute value > RL?		x			x			x			x	
	Sample Results Non-detects > RL												
	< 5X absolute Blank Contamination UL L												
4.5	Are there reported field blank > ± RL?	x			x				x			x	
	Sample Results > RL												
	< 5X Blank Contamination B												

Note: _____

5.0 ICP Interference Check Sample (ICS)		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1	Was ICS analyzed at beginning of each ICP run?	x			x								
5.2	Are the ICS AB recoveries within 80% - 120%?	x			x								
5.3	Are the results for unspiked analytes (in ICS A) < ± RL?	x			x								
5.4	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?			x			x						
	If not...												
	Action: Not Spiked Analytes: < -IDL L(+)/UL(-); > IDL K(+). Spiked analytes (ICS AB analytes): < 50% L(+)/R(-); 50% - 79% L(+)/UL(-); >120% K(+)												

Note: _____

6.0 Laboratory Control Sample (LCS)		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	x			x			x			x		
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)		x			x			x			x	
	Action: Solid: < LCL L(+)/UL(-); > UCL K(+). Aqueous: < 50% L(+)/R(-); 50% - 79% L(+)/UL(-); > 120% K(+)												

Note:

7.0 Laboratory Duplicates (MSD)		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), using professional judgement, analytes not associated with duplicate results.	x			x			x			x		
	For aqueous 6010B and Hg - RPD< 25%, aqueous CN - RPD < 20%, aqueous 6020 - RPD < 20%, and for soil - use laboratory generated limits for MS/MSD.												
7.2	Are all analyte duplicate results within control limits? If no, qualify all associated field samples J(+)/UJ(-) for the analyte with results that fall outside criteria.	x			x			x			x		

Note:

8.0 Spike Sample Analysis -Pre-Digestion/Post-Digestion		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
8.1	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, batch, matrix and level)? If not, J(+) with professional judgement.	x			x			x			x		
8.2	For all analytes with sample concentration > 4 x spike concentration, are spike recoveries within the control limit of 75-125% for aqueous and lab limits for soil?												
	%R > 125% 30%< %R < 74% < 30%	x				x		x			x		
	Positive K L L												
	Non-detect None UL R												
8.3	Where pre-digestion matrix spike analytes were outside the acceptable recovery limits(except Ag), was a post-digestion spike performed? Note any failures in DV report, but no data qualifying action is required.	x			x			x					x

Note: ***13SB7C Ca 129%/133% (121%), Cr 114%/119% (112%), Mg 127%/142% (111%)***

9.0 Instrument Detection Limits (IDL)		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1	Are all IDLs/RLs equal to or less than the reporting limits specified?	x			x			x			x		

Note:

10.0 ICP/AA Serial Dilutions (Not for Mercury Analysis)		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	x			x								
10.2	Was a five-fold dilution performed?	x			x								
10.3	Did the serial dilution results agree within 10% for ICP analyte concentration > 5 X the RL for 6010 or > 20 X the RL for 6020 in the original sample? If no, J(+).	x				x							

Note: ***Serial Dilution: 13SB7C - Co 53.8% and Cu 21.1%; post digestion spike recovery passes for Co and Cu***

11.0 Field Duplicate Samples		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?	x			x			x			x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.												
11.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report	x				x		x			x		

Note: _____

12.0 Result Verification/ Internal Standards/ Tune		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?	x			x			x			x		
12.2	Were all dilution reflected in the positive results and detection limits?	x			x			x			x		
12.3	Were the Internal Standard recoveries within 30-120%	x			x								
12.4	Were the tunes run at a minimum of four times with RSD < 5% for analytes in solution?	x											
12.5	Were the tune mass calibrations < 0.1 amu from the true value?	x											
12.6	Was the resolution check peak width < 0.9 amu at 10% peak height?	x											

Note: *6010B: Several samples displayed yttrium out high. The samples were reanalyzed at DF5 elevating Be MDL but not RL as MDLx3 is still <RL.*

6020: high lead interfered with internal used to quantitate Th concentrations in samples 13SB11B and 13SB8A. Lab used a different internal.

New MDL could not be inserted into EDD.

13.0 Completeness Calculation		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
13.1	Is % completeness within the control limits? (Control limit 90%)	x			x			x			x		
13.1.1	Number of samples: 23												
13.1.2	Number of target compounds in each analysis: various												
13.1.3	Number of results rejected and not reported: 0												
	% Completeness = (13.1.1 x 13.1.2 - 13.1.3) x 100/(13.1.1 x 13.1.2)												
	% Completeness = 100%	100%			100%			100%			100%		

Note: _____

TM0301 Cart, 5 Volatile Soil

№ 1149

Radford Army Ammunition Plant
Chain Of Custody Record

Project Number	Project Name
09604317	RFAAP

Project Contact (Name and Phone Number): Darren Fenne (804)965-9060

Samplers: Brett Fisher / John Spangler

LAB: Tri-Matrix

AIRBILL No: 0000063

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330[redacted])	Dioxin/Furan(8290)	TAL Metals (Including Mercury) (ILM)	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	[redacted] HERB	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
675B2A	10/8/03 1500	5		X	5	F	/	7	X	X	X	X	X	X		X						X	
675B2B	10/8/03 1515	5		X	5	F	/	5	X	X	X			X		X							
675B2C	10/8/03 1530	5		X	5	F	/	5	X	X	X			X		X							
SF [redacted]5784B	10/8/03 1600	5		X	5	F	/	5	X	X	X			X		X							

2 2 2

TM0360 Cart 2 Volatile Soil

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1144

Project Number	Project Name
09604317	RFAAP

Project Contact (Name and Phone Number): Darren Renne (804) 965 9000

Samplers: Brett Fisher / John Spangler

LAB: Tri-Matrix

AIRBILL No:

Courier:

000067

ANALYSES

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, [redacted])	Dioxin/Furan(8290)	TAL Metals (Including Mercury) /CN	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	[redacted] NETCB	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
13SB7 A	10/9/03 945	S		X	S	F	/	5	X	X	X			X		X							
13SB7 B	10/9/03 1000	S		X	S	F	/	5	X	X	X			X		X							
13SB7 C	10/9/03 1015	S		X	S	F	/	5	X	X	X			X		X							
13SB7CMS	10/9/03 1015	S		X	S	F	/	5	X	X	X			X		X							—
13SB7CMSD	10/9/03 1015	S		X	S	F	/	5	X	X	X			X		X							—
13SB12A	10/9/03 1045	S		X	S	F	/	5	X	X	X			X		X							
13SB12B	10/9/03 1100	S		X	S	F	/	5	X	X	X			X		X							
13BD8	10/9/03 —	S		X	S	F	/	5	X	X	X			X		X							
13SB12C	10/9/03 1115	S		X	S	F	/	5	X	X	X			X		X							
13SB11A	10/9/03 1215	S		X	S	F	/	5	X	X	X			X		X							
13SB11.B	10/9/03 1230	S		X	S	F	/	5	X	X	X			X		X							
13SB11 C	10/9/03 1245	S		X	S	F	/	5	X	X	X			X		X							

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
Brett Fisher	10/9/03 1800				
Relinquished by:	Date/time	Received by: (for lab) [signature]	Date/Time 10/10/03 8:40	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

36440-5

21-4

Volatile Cart 4
Soil TM0341
№ 1147

Radford Army Ammunition Plant
Chain Of Custody Record

Project Number	Project Name
09604317	RFAAP

Project Contact (Name and Phone Number): Darren Rayne (804) 965 7000

Samplers: Brett Fisher / John Spangler

LAB: Tri-Matrix

AIRBILL No: 000068

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330 [redacted])	Dioxin/Furan(8290)	TAL Metals (Including Mercury) /CN	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	[redacted] NERB	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
135B10A	10/9/03 1300	5		X	5	F	/	5	X	X	X			X		X							TC
135B10B	10/9/03 1315	5		X	5	F	/	5	X	X	X			X		X							2
135B10C	10/9/03 1330	5		X	5	F	/	5	X	X	X			X		X							↓
135B9A	10/9/03 1400	5		X	5	F	/	7	X	X	X	X	X	X		X						X	2
[redacted]5BD9	10/9/03 —	5		X	5	F	/	7	X	X	X	X	X	X		X						X	2
135B9B	10/9/03 1415	5		X	5	F	/	5	X	X	X			X		X							2
135B9C	10/9/03 1430	5		X	5	F	/	5	X	X	X			X		X							↓
135B8A	10/9/03 1515	5		X	5	F	/	5	X	X	X			X		X							2
135B8B	10/9/03 1530	5		X	5	F	/	5	X	X	X			X		X							N/C for 135B8
~~135B8C~~	~~10/9/03 1545~~	~~5~~		X	5	F	/	6	X	X	X			X		X	BT						

Box #1			Box #2			Box #3	Box #4	
1. Surface Water	6. Trip Blank		A. HCl + Ice	F. Ice Only		F. Filtered	R. Rush - 3 Day	
2. Ground Water	7. Oil		B. HNO3 + Ice	G. Other _____		U. Unfiltered	S. Standard 28 Day	
3. Leachate	8. Waste		C. NaOH + Ice	H. NaHSO4 + Ice			T. Timely 14 Day	
4. Rinsate	9. Other _____		D. H2SO4 + Ice	I. ZnAc + NaOH + Ice			O. Other _____	
5. Soil Sediment/Sludge			E. Unpreserved					

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
[signature]	10/9/03 1800				
Relinquished by:	Date/time	Received by: (for lab) [signature]	Date/Time 10/10/03 8:40	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

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36440-5

DATA VALIDATION REPORT - Level III Review

SDG No.: 36440-6 **Fraction:** VOCs, SVOCs, PAHs, Explosives, Pesticides, PCBs, Herbicides, Metals, & Cyanide

Lab: TriMatrix **Project Name:** Radford_SSP

Reviewer: AS **Date:** January_20,_2004

This report presents the findings of a review of the referenced data. The report consists of this summary, copies of data reports with data qualifying flags applied (as required), the completed data validation checklist, supporting documentation, and an explanation of the data qualifying flags employed. The review performed is based on the USEPA Region III Modifications to the National Functional Guidelines for Organic and Inorganic Data Review as pertains to the specifics of the analytical methods employed and provisions of the approved project-specific Quality Assurance Project Plan (QAPP).

Major Anomalies: None.

Minor Anomalies: For the VOC analyses, the method blank for batch 89888-115 contained acetone at 13.0 ug/L and methylene chloride at 0.410 ug/L. The method blank for batch 89888-122 contained methylene chloride at 0.540 ug/L. The method blank for batch 90257-121 contained acetone at 10 ug/Kg. The method blank for batch 90601-122 contained acetone at 9.7 ug/Kg. The method blank for batch 90601-123 contained acetone at 14 ug/Kg and methylene chloride at 3.9 ug/Kg. Positive results less than ten times the blank concentrations were flagged "B,z" in the associated samples.

The equipment blank EQB5 displayed positive detections for acetone at 1.6 ug/L and methylene chloride at 0.60 ug/L. The associated trip blank displayed positive detections for methylene chloride at 1.2 ug/L and toluene at 0.24 ug/L. The equipment blank EQB6 displayed positive detections for acetone at 1.4 ug/L and methylene chloride at 0.68 ug/L. The associated trip blank displayed a positive detection for methylene chloride at 1.1 ug/L. The trip blank associated with the investigative field samples contained methylene chloride at 0.96 ug/L. The field blank detections for methylene chloride were previously qualified due to method blank detections. Since EQB5 was non-detect for toluene, no data qualifying action was required based on the associated trip blank detection for toluene. Positive associated soil boring sample results for acetone were previously flagged for method blank detections. No further data qualifying action was taken.

The continuing calibration analyzed on 10/15/03 at 0919 displayed a percent difference greater than the control limit (i.e., 20%) with a negative bias for carbon disulfide at 27.5%. All associated field sample results were non-detect and were flagged "UJ,c".

The continuing calibration analyzed on 10/22/03 at 1151 displayed percent differences greater than the control limit with a negative bias for acetone at 28.4%, 4-methyl-2-pentanone at 26.8%, and 2-hexanone at 27.7% and with a positive bias for carbon disulfide at 22.5%. Positive associated field sample results for acetone, 4-methyl-2-pentanone, and 2-hexanone were flagged "J,c" while non-detects were flagged "UJ,c". All associated field sample results for carbon disulfide were non-detect while the continuing calibration displayed a positive bias; thus, no data qualifying action was required.

The continuing calibration analyzed on 10/21/03 at 0901 displayed percent differences greater than the control limit with a negative bias for chloroethane at 24.1% and with a positive bias for trans-1,3-dichloropropene at 23.1%, dibromochloromethane at 24.8%, bromoform at 20.7%, and 1,2-dibromo-3-chloropropane at 31.6%. The associated field sample results for chloroethane were non-detect and were flagged "UJ,c". All associated field sample results for trans-1,3-dichloropropene, dibromochloromethane, bromoform, and 1,2-dibromo-3-chloropropane were non-detect while the continuing calibration displayed a positive bias; thus, no data qualifying action was required.

The continuing calibration analyzed on 10/22/03 at 1203 displayed percent differences greater than the control limit with a negative bias for chloroethane at 25.3% and acetone at 21.8% and with a positive bias for dibromochloromethane at 22.9%. The associated field sample results for chloroethane were non-detect and were flagged "UJ,c". All associated field sample results for acetone were positive and were previously flagged for a method blank detection; thus, no further data qualifying action was taken. All associated field sample results for dibromochloro-methane were non-detect while the continuing calibration displayed a positive bias; thus, no data qualifying action was required.

The continuing calibration analyzed on 10/23/03 at 1121 displayed percent differences greater than the control limit with a negative bias for carbon disulfide at 20.8% and methyl acetate at 20.7% and with a positive bias for methyl-tert-butyl ether at 27.3%, bromochloromethane at 25.8%, and trans-1,3-dichloropropene at 24.5%. The associated field sample results for carbon disulfide and methyl acetate were non-detect and were flagged "UJ,c". All associated field sample results for methyl-tert-butyl ether, bromochloromethane, and trans-1,3-dichloropropene were non-detect while the continuing calibration displayed a positive bias; thus, no data qualifying action was required.

The laboratory control spike analyzed for batch 90257-121 displayed percent recoveries greater than the laboratory generated upper control limits for 1,2-dibromo3-chloropropane at 132% and methyl acetate at 131%. Since the associated field sample results were non-detect while the laboratory control spike displayed a positive bias, no data qualifying action was required.

The matrix spike pair for sample 13SD2 displayed several percent recoveries less than the laboratory generated lower control limits or relative percent differences greater than the laboratory generated control limits. Positive associated parent sample results were flagged "J,m" while non-detect parent sample results were flagged "UJ,m", except for the result for chloroethane that was previously flagged for a low continuing calibration percent difference. The matrix spike pair for sample 13SW2 displayed acceptable recoveries. The matrix spike for sample ASB2C displayed percent recoveries less than the lower control limits for 1,1,2-trichloro-1,2,2-trifluoroethane at 69% and trans-1,3-dichloroethene at 73%. The matrix spike duplicate displayed a percent recovery less than the laboratory generated lower control limit (i.e., 49%) for acetone at 49%. This matrix spike pair displayed relative percent differences greater than the laboratory generated control limits for carbon tetrachloride at 20%, methyl-cyclohexane at 22%, and vinyl chloride at 26%. Since one of the matrix spikes displayed an acceptable recovery and the parent sample was non-detect for the compounds that displayed imprecision anomalies, no data qualifying action was taken.

For the SVOC analyses, the method blank for extraction batch 90165-116 displayed positive detections for bis(2-ethylhexyl)phthalate at 0.700 ug/L, butyl benzyl phthalate at 0.350 ug/L,

and diethylphthalate at 0.080 ug/L. Positive associated field sample results less than ten times the blank concentrations were flagged "B,z".

The equipment blank EQB5 contained bis(2-ethylhexyl)phthalate at 0.35 ug/L, butyl benzyl phthalate at 0.060 ug/L, and several tentatively identified compounds (TICs). The equipment blank EQB6 contained bis(2-ethylhexyl)phthalate at 0.29 ug/L, butyl benzyl phthalate at 0.050 ug/L, and several TICs. The equipment blank detections for these phthalates were previously flagged due to method blank detections and no further data qualifying action was taken. Positive results less than five times the blank concentration of the TICs were flagged "B,x" in the associated soil boring field samples.

The continuing calibration analyzed on 11/02/03 at 1249 displayed percent differences greater than the control limit (i.e., 20%) with a negative bias for hexachlorocyclopentadiene at 28.0% and 2,4-dinitrophenol at 22.4%. The continuing calibration analyzed on 11/03/03 at 1053 displayed percent differences greater than the control limit with a negative bias for carbazole at 31.6% and 2,4-dinitrophenol at 20.1%. The continuing calibration analyzed on 11/04/03 at 0845 displayed percent differences greater than the control limit with a negative bias for 4-chloroaniline at 32.1%, caprolactam at 26.4%, 3-nitroaniline at 54.6%, 4-nitrophenol at 37.9%, carbazole at 43.9%, and 2,4-dinitrophenol at 32.9%. The continuing calibration analyzed on 11/05/03 at 1252 displayed a percent difference greater than the control limit with a negative bias for caprolactam at 22.5%. The associated field sample results were non-detect for these anomalous compounds and were flagged "UJ,c".

The laboratory control spike for batch 89985-118 displayed recoveries less than the laboratory generated lower control limits but greater than the QAPP lower control limit (i.e., 10%) for 2,4-dimethylphenol (17%) and 4-chloroaniline (11%). The laboratory control spike for batch 90165-116 displayed recoveries less than the laboratory generated lower control limits but greater than the QAPP lower control limit for 2,4-dinitrophenol (23%), caprolactam (20%), and hexachlorocyclopentadiene (18%). The associated field sample results were non-detect and were flagged "UJ,l", unless previously flagged for a negative bias in the continuing calibration.

The laboratory control spike for batch 89985-118 displayed recoveries greater than the laboratory generated upper control limits for benzo(b)fluoranthene at 119% and benzo(k) fluoranthene at 129%. The laboratory control spike for batch 90165-116 displayed recoveries greater than the laboratory generated upper control limits for benzo(a)pyrene at 129%, benzo(k)fluoranthene at 136%, dibenzo(a,h)anthracene at 132%, and indeno(1,2,3-cd)pyrene at 131%. The laboratory control spike for batch 90572-114 displayed a recovery greater than the laboratory generated upper control limit for 3,3'-dichlorobenzidine at 120%. Sample ASB1A displayed a positive detection for benzo(b)fluoranthene that was flagged "J,l". All other associated field sample results were non-detect while the laboratory control spike displayed a positive bias. No further data qualifying action was taken.

The matrix spike pair for sample 13SD2 displayed percent recoveries outside the laboratory generated control limits for 4-chloroaniline (13%/11%), anthracene (60%/64%), atrazine (118%/120%), bis(2-ethylhexyl)phthalate (125%/125%), fluoranthene (133%/136%), and hexachlorocyclopentadiene (20%/21%). The positive associated parent sample results for bis(2-ethylhexyl)phthalate and fluoranthene were flagged "J,m". The non-detect parent sample results for 4-chloroaniline, anthracene, and hexachlorocyclopentadiene were flagged "UJ,m". The parent sample result for atrazine was non-detect while the matrix spike recoveries displayed a positive bias; thus, no data qualifying action was required. This matrix spike pair

also displayed relative percent differences greater than the laboratory generated control limits for 4-methylphenol at 12%, diethylphthalate at 18%, and isophorone at 15%. The positive parent sample result for diethylphthalate was flagged "J,d". The parent sample results for 4-methylphenol and isophorone were non-detect while the matrix spikes displayed imprecision; thus, no data qualifying action was required.

The matrix spike pair for sample 13SW2 displayed percent recoveries less than the laboratory generated lower control limits for 2,4-dimethylphenol (42%), 2,4-dinitrophenol (20%/23%), 4,6-dinitro-2-methylphenol (24%/16%), 4-nitrophenol (19%/14%), caprolactam (18%/18%), hexachlorocyclopentadiene (14%/21%), and pentachlorophenol (16%). The associated parent sample results were non-detect and were flagged "UJ,m", unless previously flagged for low bias anomalies for the continuing calibration or laboratory control spike. This matrix spike pair displayed percent recoveries greater than the laboratory generated upper control limits for benzo(a)pyrene at 124%, benzo(k)fluoranthene at 130%, and n-nitroso-diphenylamine at 96%. This matrix spike pair also displayed relative percent differences greater than the laboratory generated control limits for 2-nitrophenol at 25%, 4,6-dinitro-2-methylphenol at 40%, and hexachlorocyclopentadiene at 35%. The parent sample result was non-detect while the matrix spikes displayed a high bias or imprecision; thus, no data qualifying action was required.

The matrix spike pair for sample ASB2C displayed percent recoveries less than the laboratory generated lower control limits for 2,4-dimethylphenol (21%/29%), 2,4-dinitrophenol (26%/25%), 3,3'-dichlorobenzidine (24%), 4-chloroaniline (10%/10%), 4-nitroaniline (53%), and hexachlorocyclopentadiene (43%). The associated parent sample results were non-detect and were flagged "UJ,m", unless previously flagged for low bias anomalies for the continuing calibration or laboratory control spike. This matrix spike pair displayed a percent recovery greater than the laboratory generated upper control limit for benzo(k)fluoranthene at 129%. The parent sample results were non-detect while the matrix spikes displayed a high bias; thus, no data qualifying action was required.

Sample ASB3A displayed an internal standard area count marginally less than the lower control limit (i.e., -50%) for perylene-d_{10} at -57.8%. Positive associated field sample results were flagged "J,i" while non-detects were flagged "UJ,i".

The acid fraction surrogate 2,4,6-tribromophenol displayed percent recoveries less than the laboratory generated lower control limit (i.e., 26%) for samples 13SW2 at 22% and SBD10 at 18%. Since these samples only displayed one acid fraction surrogate recovery less than the lower control limits, no data qualifying action was required.

Sample ASB1A displayed positive concentrations that exceeded the linear range of the instrument initial calibration. These detections were flagged "J,q". This sample was re-analyzed at a dilution factor of five with acceptable results that should be used for data interpretation. Sample ASB3A displayed positive concentrations that exceeded the linear range of the instrument initial calibration. These detections were flagged "J,q". This sample was re-analyzed at a dilution factor of two hundred and fifty with acceptable results for 2,4-dinitrotoluene, di-n-butylphthalate, and n-nitroso-diphenylamine that should be used for data interpretation. Sample ASB2A displayed a positive concentration for di-n-butylphthalate that exceeded the linear range of the instrument initial calibration. This detection was flagged "J,q". This sample was re-analyzed at a dilution factor of five with an acceptable result that should be used for data interpretation.

The field duplicate pair (13SD3/SDD1) displayed a difference greater than the control limit (i.e., 1080 ug/Kg) for dimethylphthalate at 1130 ug/Kg. The positive dimethylphthalate result for sample 13SD3 was flagged "J,f" while the non-detect dimethylphthalate result for sample SDD1 was flagged "UJ,f".

For the PAH analyses, the opening continuing calibration analyzed on 11/25/2003 at 1207 displayed percent differences greater than the control limit (i.e., 15%) with a negative bias for benzo(a)pyrene at 21.03% and with a positive bias for indeno(1,2,3-cd)pyrene at 17.02%. The closing continuing calibration analyzed on 11/25/2003 at 1531 displayed percent differences greater than the control limit with a negative bias for benzo(a)pyrene at 17.92% and with a positive bias for fluoranthene at 17.10%, benzo(k)fluoranthene at 16.82%, and indeno(1,2,3-cd)pyrene at 19.10%. The associated field sample ASB1A was non-detect for benzo(a)pyrene and was flagged "UJ,c". The associated field sample result for fluoranthene was positive and was flagged "J,c". This associated field sample was non-detect for benzo(k)fluoranthene and indeno(1,2,3-cd)pyrene while the continuing calibration displayed a positive bias; thus, no data qualifying action was required.

Sample ASB3B displayed a surrogate percent recovery less than the laboratory lower control limit (i.e., 49%) for 2-fluorobiphenyl at 46%. All associated field sample results were non-detect and were flagged "UL,s".

The matrix spike pair for sample 13SW2 displayed several percent recoveries greater than the laboratory generated upper control limits. The parent sample was non-detect for all target compounds. Based on professional judgement, no data qualifying action was taken based on these matrix spike anomalies.

For the explosive analyses, the opening continuing calibration analyzed on 10/24/03 at 0146 displayed a percent difference greater than the control limit (i.e., 15%) with a positive bias for 2,6-dinitrotoluene at 16.0%. The closing continuing calibration analyzed on 10/24/03 at 0646 displayed a percent difference greater than the control limit with a positive bias for 2,6-dinitrotoluene at 15.2%. The associated field sample results for 2,6-dinitrotoluene were non-detect while the continuing calibration displayed a positive bias; thus, no data qualifying action was required. The closing continuing calibration analyzed on 10/28/03 at 1126 displayed a percent difference greater than the control limit with a positive bias for HMX at 16.7%. The associated field sample results for HMX were non-detect while the continuing calibration displayed a positive bias; thus, no data qualifying action was required.

The matrix spike pair for sample 13SD2 displayed relative percent differences greater than the laboratory generated control limits (i.e., 40%) for 1,3,5-trinitrobenzene at 44% and 4-amino-2,6-dinitrotoluene at 41%. The matrix spike pair for sample ASB2C displayed relative percent differences greater than the laboratory generated control limits for 2,4-dinitrotoluene at 41%, 4-nitrotoluene at 45%, nitrobenzene at 45%, and RDX at 56%. The parent sample results were non-detect while the matrix spike results displayed imprecision; thus, no data qualifying action was taken. The matrix spike pair for sample 13SW2 displayed percent recoveries less than the laboratory generated lower control limit (i.e., 50%) for tetryl (42%/40%). The parent sample result for tetryl was non-detect and was flagged "UJ,m".

Sample ASB3A displayed a positive concentration for 2,4-dinitrotoluene that exceeded the linear range of the instrument initial calibration. This detection was flagged "J,q". This sample was re-analyzed at a dilution factor of five with an acceptable result that should be used for data interpretation.

For the pesticide analyses, closing continuing calibration analyzed on 10/18/03 displayed percent differences greater than the control limit (i.e., 15%) with a positive bias on column one for delta BHC at 16.89%, 4,4'-DDD at 33.20%, 4,4'-DDT at 18.77%, methoxychlor at 28.37%, and endosulfan sulfate at 15.85%. This closing continuing calibration displayed percent differences greater than the control limit with a positive bias on column two for 4,4'-DDD at 17.38% and methoxychlor at 20.16%. The associated field sample results were non-detect on one or both columns while the continuing calibration displayed a positive bias. No data qualifying action was taken based on these anomalies.

The opening continuing calibration analyzed on 10/31/03 at 0958 displayed percent differences greater than the control limit with a positive bias on column one for endrin at 25.43% and 4,4'-DDD at 19.19%. This opening continuing calibration displayed percent differences greater than the control limit with a negative bias on column two for heptachlor at 15.75% and endosulfan II at 15.25%. The closing continuing calibration analyzed on 10/31/03 at 1342 displayed percent differences greater than the control limit with a positive bias on column one for endrin at 26.81% and 4,4'-DDD at 23.02%. This closing continuing calibration displayed a percent difference greater than the control limit with a negative bias on column two for endosulfan II at 21.50%. Only one column is required to pass to report valid non-detects. Since the associated field sample results were non-detects, no data qualifying action was taken based on these anomalies.

For the PCB analyses, the closing continuing calibration displayed a percent difference greater than the control limit (i.e., 15%) with a positive bias for arochlor 1016 at 16.70%. The associated field sample results were non-detect while the continuing calibration displayed a positive bias; thus, no data qualifying action was required.

For the herbicide analyses, the opening continuing calibration analyzed on 10/27/03 at 2225 displayed percent differences greater than the control limit (i.e., 15%) with a positive bias on column one for 2,4-D at 49.0% and with a negative bias for 2,4,5-T at 17.17% and silvex at 22.6%. This opening continuing calibration displayed percent differences greater than the control limit with a negative bias on column two for dicamba at 21.0% and 2,4-D at 19.9%. The closing continuing calibration analyzed on 10/28/03 at 0339 displayed acceptable percent differences on column one. This closing continuing calibration displayed a percent difference greater than the control limit with a negative bias on column two for 2,4-D at 16.8% and with a positive bias for dalapon at 15.1%. Only one column is required to pass to report valid non-detects. Since the associated field sample results were non-detects, no data qualifying action was taken based on these anomalies.

The laboratory control spikes displayed several recoveries greater than the laboratory generated upper control limits. The associated field samples were non-detect while the laboratory control spike displayed a positive bias. No data qualifying action was taken.

All samples displayed surrogate percent recoveries greater than the laboratory generated upper control limits. Since the associated field samples results were non-detect, no data qualifying action was required.

For the metal analyses by 6020, the method blank for batch 89969-115 contained total chromium at 0.69 ug/L and total lead at 0.43 ug/L. The associated positive field sample results less than five times the blank concentration were flagged "B,p". The method blank for batch 89970-113 contained lead at 0.098 mg/Kg. The associated field sample results for lead were

greater than five times the blank concentration and no data qualifying action was required. The equipment blank EQB5 contained chromium at 4.5 ug/L and thallium at 0.5 ug/L. The equipment blank EQB6 contained chromium at 0.9 ug/L and thallium at 0.4 ug/L. The chromium detection in EQB6 was previously flagged due to a method blank detection and no further data qualifying action was required. The associated positive field sample results less than five times the equipment blank concentrations were flagged "B,x".

The field duplicate pair (ASB2B and SBD10) displayed relative percent differences greater than the control limit (i.e., 35%) for lead at 38.5% and nickel at 52.6%. The results for lead and nickel were positive in these two field samples and were flagged "J,f".

For the metal analyses by 6010B, the method blank for batch 89968-115 contained total beryllium at 0.31 ug/L, total iron at 6.2 ug/L, and total sodium at 200 ug/L. Positive results less than five times the blank concentrations were flagged "B,p" in the associated field samples. The method blank for batch 90177-120 contained total cobalt at 0.374 mg/Kg. The associated field sample results were greater than five times the blank concentration and no data qualifying action was required. The equipment blank EQB5 contained beryllium at 0.3 ug/L, iron at 7.6 ug/L, and sodium at 280 ug/L. The equipment blank EQB6 contained iron at 4.8 ug/L, sodium at 180 ug/L, and zinc at 4.6 ug/L. The equipment blank results for beryllium, iron, and sodium were previously qualified due to method blank detections. The associated field sample results were greater than five times the blank concentration for zinc. No data qualifying action was required.

The serial dilution performed on sample 13SW2 displayed a percent difference greater than the control limit (i.e., 10%) for total sodium at 15.7%. All associated field surface water sample results were positive and were flagged "J,s".

The matrix spike performed on sample 13SD2 displayed percent recoveries greater than the laboratory generated upper control limits for calcium at 134% and magnesium at 121%. All associated positive field sediment sample results were flagged "K,m". The serial dilution performed on sample 13SD2 displayed a percent difference greater than the control limit for calcium at 12.6%. All associated field sediment sample results were previously qualified for matrix spike recovery anomalies and no further data qualifying action was taken.

The matrix spike pair performed on sample ASB2C displayed percent recoveries outside the laboratory generated control limits for chromium (61%/114%) and a recovery less than the lower control limit (i.e., 64%) for vanadium at 60%. All associated field soil boring sample results were positive for chromium and were flagged "J,m". All associated field sample results were positive for vanadium and were flagged "L,m". The serial dilution performed on sample ASB2C displayed a percent difference greater than the control limit for cobalt at 30.0%. All associated field soil boring sample results were positive and were flagged "J,s".

The field duplicate pair (ASB2B and SBD10) displayed relative percent differences greater than the control limit (i.e., 35%) for cobalt at 44.4%, magnesium at 60.3%, and potassium at 55.2%. The associated field sample results for cobalt were previously flagged for a matrix spike anomaly and no further data qualifying action was taken. The results for magnesium and potassium were positive in these two field samples and were flagged "J,f".

Several samples displayed internal standard recoveries greater than the laboratory upper control limit (i.e., 120%) for yttrium. This internal standard is used to quantitate beryllium. The affected samples were reanalyzed at a dilution factor of five and displayed acceptable

internal standard responses. The affected sample results were reported from the diluted analyses and the method detection limits were elevated by a factor of five. The reporting limit was not raised because the project specified reporting limit was still greater than three times the elevated method detection limit.

Correctable Anomalies: For the sample receipt at the laboratory on 10/14/2003, two unlabelled jars were assigned to ASB1C and two unlabelled 250ml jars were assigned to ASB3A based on a logical deduction of required number of sample container types.

Comments: All samples from Area A were collected on a Saturday and could not be shipped until the following Monday. Samples were received at laboratory that Tuesday. The encore aliquots could not be used since the holding time to preservation had expired. All sample aliquots for VOC analyses were taken from bulk. Cooler TM0436 was received at the laboratory with internal temperatures greater than the upper control limit (i.e., 6°C) at 9.8 °C. This cooler contained the sample aliquots for field sample EQB5. Based on professional judgement no data qualifying action was required since this temperature did not exceed 10°C.

It should be noted that TIC results were flagged "NJ,t" in the associated samples. TIC results that were identified as unknown were manually lined out by the reviewer. Due to the abundance of target compounds, most of the samples were analyzed at dilutions for the metals analyses. Therefore, the reporting limits for these constituents were elevated.

No anomalies were encountered if a given fraction was not mentioned. Except for data flagged "R", all data are usable, as qualified, for their intended purpose based on the data reviewed.

Signed: Andrea Sansom

Andrea Sansom

Radford SSP

Submittal No.	Lab Sample ID	Field Sample ID	Matrix (Code)	Sample Date
36440-6	346012	37SB1B	SO	10/10/03
36440-6	346013	EQB5	WQ	10/10/03
36440-6	346014	Trip Blank	WQ	10/10/03
36440-6	346015	EQB6	WQ	10/10/03
36440-6	346016	Trip Blank	WQ	10/10/03
36440-6	346017	13SD3	SO	10/10/03
36440-6	346018	SDD1	SO	10/10/03
36440-6	346019	13SD2	SO	10/10/03
36440-6	346020	13SW3	WS	10/10/03
36440-6	346021	SWD1	WS	10/10/03
36440-6	346022	13SW2	WS	10/10/03
36440-6	346082	Trip Blank	WQ	10/10/03
36440-6	346248	ASB1A	SO	10/11/03
36440-6	346249	ASB1B	SO	10/11/03
36440-6	346250	ASB1C	SO	10/11/03
36440-6	346251	ASB3A	SO	10/11/03
36440-6	346252	ASB3B	SO	10/11/03
36440-6	346253	ASB3C	SO	10/11/03
36440-6	346254	ASB2A	SO	10/11/03
36440-6	346255	ASB2B	SO	10/11/03
36440-6	346256	SBD-10	SO	10/11/03
36440-6	346257	ASB2C	SO	10/11/03

Radford SSP
Duplicate Statistics
ASB2B and SBD10

	Units	RL	5xRL	Sample Conc		Duplicate Conc		%RPD	Delta	4xRL	Pass/ Fail
Volatiles											
acetone	ug/Kg	26	130	23	B	24	B	4.3%	1	104	N/A
methylene chloride	ug/Kg	26	130	7.7	J	7.0	J	9.5%	0.7	104	N/A
Semi-Volatiles											
bis(2-ethylhexyl)phthalate	ug/Kg	220	1100	22	J	16	J	31.6%	6	880	N/A
diethylphthalate	ug/Kg	220	1100	10	J	220	U	182.6%	210	880	N/A
di-n-butylphthalate	ug/Kg	220	1100	590		640		8.1%	50	880	Pass
Polyaromatic Hydrocarbons											
BDL											
Explosives											
BDL											
Metals											
aluminum	mg/Kg	250	1250	32300		34800		7.5%	2500	1000	Pass
antimony	mg/Kg	0.5	2.5	0.50	U	0.068	J	152.1%	0.432	2	N/A
arsenic	mg/Kg	0.40	2.0	3.4		4.7		32.1%	1.3	1.6	Pass
barium	mg/Kg	5.0	25	77		98		24.0%	21	20	Pass
beryllium	mg/Kg	1.0	5.0	1.3		0.86	J	40.7%	0.44	4	N/A
cadmium	mg/Kg	1.0	5.0	0.36	J	1.0	U	94.1%	0.64	4	N/A
calcium	mg/Kg	250	1250	867		380		78.1%	487	1000	Pass
chromium	mg/Kg	5.0	25	39		41		5.0%	2	20	Pass
cobalt	mg/Kg	1.0	5.0	14		22		**44.4%**	8	4	**Fail**
copper	mg/Kg	2.0	10	19		23		19.0%	4	8	Pass
iron	mg/Kg	1000	5000	40300		38000		5.9%	2300	4000	Pass
lead	mg/Kg	1.0	5.0	8.8		13		**38.5%**	4.2	4	**Fail**
magnesium	mg/Kg	250	1250	5220		2800		**60.3%**	2420	1000	**Fail**
manganese	mg/Kg	5.0	25	648		859		28.0%	211	20	Pass
mercury	mg/Kg	0.10	0.50	0.014	J	0.022	J	44.4%	0.008	0.4	N/A
nickel	mg/Kg	0.50	2.5	36		21		**52.6%**	15	2	**Fail**
potassium	mg/Kg	100	500	2750		1560		**55.2%**	1190	400	**Fail**
selenium	mg/Kg	1.0	5.0	0.60	J	0.50	J	18.2%	0.1	4	N/A
silver	mg/Kg	3.0	15	0.093	J	0.094	J	1.1%	0.001	12	N/A
sodium	mg/Kg	100	500	77	J	50	J	42.5%	27	400	N/A
thallium	mg/Kg	0.50	2.5	0.23	J	0.22	J	4.4%	0.01	2	N/A
vanadium	mg/Kg	1.0	5.0	55		49		11.5%	6	4	Pass
zinc	mg/Kg	4.0	20	45		37		19.5%	8	16	Pass
Cyanide											
zinc	mg/Kg	0.50	2.5	0.18	J	0.14	J	25.0%	0.04	2.0	N/A

Soil Control Limits

[sample] > 5 x RL, use 35%
[sample] < 5 x RL, use 4 x RL

Radford SSP
Duplicate Statistics

13SD3 and SDD1

	Units	RL	5xRL	Sample Conc		Duplicate Conc		%RPD	Delta	4xRL	Pass/ Fail
Volatiles											
cis-1,2-dichloroethene	ug/Kg	7.4	37	11		8		31.6%	3	30	Pass
methyl ethyl ketone	ug/Kg	29	145	31		30		3.3%	1	116	Pass
acetone	ug/Kg	29	145	80	B	59	B	30.2%	21	116	Pass
methylene chloride	ug/Kg	29	145	29		6.6	J	125.8%	22.4	116	N/A
tetrachloroethene	ug/Kg	7.4	37	5	J	2.1	J	81.7%	2.9	30	N/A
toluene	ug/Kg	7.4	37	1.8	J	1	J	57.1%	0.8	30	N/A
trichloroethene	ug/Kg	7.4	37	64		38		51.0%	26	30	Pass
Semi-Volatiles											
2-methylnaphalene	ug/Kg	270	1350	7.0	J	270	U	189.9%	263	1080	N/A
acenaphthylene	ug/Kg	270	1350	9.0	J	3.0	J	100.0%	6	1080	N/A
anthracene	ug/Kg	270	1350	44	J	12	J	114.3%	32	1080	N/A
benzo(a)anthracene	ug/Kg	270	1350	86	J	30	J	96.6%	56	1080	N/A
benzo(a)pyrene	ug/Kg	270	1350	140	J	53	J	90.2%	87	1080	N/A
benzo(b)fluoranthene	ug/Kg	270	1350	190	J	86	J	75.4%	104	1080	N/A
benzo(g,h,i)perylene	ug/Kg	270	1350	110	J	27	J	121.2%	83	1080	N/A
benzo(k)fluoranthene	ug/Kg	270	1350	92	J	36	J	87.5%	56	1080	N/A
bis(2-ethylhexyl)phthalate	ug/Kg	270	1350	41	J	35	J	15.8%	6	1080	N/A
chrysene	ug/Kg	270	1350	220	J	64	J	109.9%	156	1080	N/A
dibenzo(a,h)anthracene	ug/Kg	270	1350	42.0	J	270	U	146.2%	228	1080	N/A
diethylphthalate	ug/Kg	270	1350	18	J	22	J	20.0%	4	1080	N/A
dimethylphthalate	ug/Kg	270	1350	1400		270	U	135.3%	1130	1080	Fail
di-n-butylphthalate	ug/Kg	270	1350	130	J	110	J	16.7%	20	1080	N/A
fluoranthene	ug/Kg	270	1350	34	J	26	J	26.7%	8	1080	N/A
fluorene	ug/Kg	270	1350	4.0	J	270	U	194.2%	266	1080	N/A
indeno(1,2,3-cd)pyrene	ug/Kg	270	1350	100	J	30	J	107.7%	70	1080	N/A
naphthalene	ug/Kg	270	1350	5.0	J	270	U	192.7%	265	1080	N/A
phenanthrene	ug/Kg	270	1350	29	J	14	J	69.8%	15	1080	N/A
pyrene	ug/Kg	270	1350	37	J	23	J	46.7%	14	1080	N/A
Polyaromatic Hydrocarbons											
anthracene	ug/Kg	33	165	9	J	33	U	111.3%	23.6	132	N/A
benzo(a)anthracene	ug/Kg	33	165	30	J	33	U	9.5%	3	132	N/A
benzo(a)pyrene	ug/Kg	33	165	49		33	U	39.0%	16	132	N/A
benzo(b)fluoranthene	ug/Kg	33	165	36		33	U	8.7%	3	132	N/A
benzo(g,h,i)perylene	ug/Kg	33	165	88		33	U	90.9%	55	132	N/A
benzo(k)fluoranthene	ug/Kg	33	165	24	J	33	U	31.6%	9	132	N/A
chrysene	ug/Kg	33	165	84		2.6	J	188.0%	81.4	132	N/A
dibenzo(a,h)anthracene	ug/Kg	33	165	6.2	J	33	U	136.7%	26.8	132	N/A
fluoranthene	ug/Kg	33	165	19	J	33	U	53.8%	14	132	N/A
indeno(1,2,3-cd)pyrene	ug/Kg	33	165	45		33	U	30.8%	12	132	N/A
phenanthrene	ug/Kg	33	165	5	J	33	U	145.5%	27.8	132	N/A
pyrene	ug/Kg	33	165	14	J	33	U	80.9%	19	132	N/A
Explosives											
BDL											
Metals											
aluminum	mg/Kg	500	2500	23400		19600		17.7%	3800	2000	Pass
antimony	mg/Kg	0.5	2.5	3.5		1.9		59.3%	1.6	2.0	Pass
arsenic	mg/Kg	0.4	2.0	3.4		3.7		8.5%	0.3	1.6	Pass
barium	mg/Kg	5	25	169		131		25.3%	38	20	Pass
beryllium	mg/Kg	1	5	1.3		1.3		0.0%	0.0	4.0	Pass
cadmium	mg/Kg	1	5	1.0		0.94	J	6.2%	0.06	4.0	N/A
calcium	mg/Kg	250	1250	2080		1620		24.9%	460	1000	Pass
chromium	mg/Kg	5	25	40		31		25.4%	9.0	20	Pass
cobalt	mg/Kg	1	5	13		12		8.0%	1.0	4.0	Pass
copper	mg/Kg	2	10	36		31		14.9%	5.0	8.0	Pass
iron	mg/Kg	1000	5000	37100		32000		14.8%	5100	4000	Pass
lead	mg/Kg	50	250	247		271		9.3%	24	200	Pass
magnesium	mg/Kg	250	1250	3870		3030		24.3%	840	1000	Pass
manganese	mg/Kg	5	25	544		644		16.8%	100	20	Pass
mercury	mg/Kg	0.1	0.50	0.13		0.11		16.7%	0.02	0.40	Pass
nickel	mg/Kg	0.5	2.5	19		18		5.4%	1.0	2.0	Pass
potassium	mg/Kg	100	500	1950		1520		24.8%	430	400	Pass
selenium	mg/Kg	1	5	1.2		1.2		0.0%	0.0	4.0	Pass
silver	mg/Kg	3	15	0.12	J	0.14	J	15.4%	0.02	12	N/A
sodium	mg/Kg	100	500	52	J	38	J	31.1%	14	400	N/A
thallium	mg/Kg	0.5	2.5	0.52		0.49	J	5.9%	0.03	2.0	N/A
vanadium	mg/Kg	1	5	44		32		31.6%	12	4.0	Pass
zinc	mg/Kg	40	200	541		541		0.0%	0.0	160	Pass
Cyanide											
total cyanide	mg/Kg	0.10	0.50	0.20	J	0.39	J	64.4%	0.19	0.40	N/A

Soil Control Limits

[sample] > 5 x RL, use 35%
[sample] < 5 x RL, use 4 x RL

URS
Measurement Systems DV Service

Radford SSP
Duplicate Statistics
13SW3 and SWD1

	Units	RL	5xRL	Sample Conc		Duplicate Conc		%RPD	Delta	4xRL	Pass/ Fail
Volatiles											
BDL											
Semi-Volatiles											
bis(2-ethylhexyl)phthalate	ug/L	5.0	25	0.31	J	0.33	J	6.3%	0.02	20	N/A
butyl benzyl phthalate	ug/L	5.0	25	0.11	J	0.11	J	0.0%	0.0	20	N/A
Polyaromatic Hydrocarbons											
BDL											
Explosives											
BDL											
Metals											
total aluminum	ug/L	100	500	66	J	53	J	21.8%	13	400	N/A
total antimony	ug/L	1.0	5	0.7	J	1.0	U	35.3%	0.3	4.0	N/A
dissolved antimony	ug/L	2.0	10	0.8	J	2.0	U	85.7%	1.2	8.0	N/A
total barium	ug/L	10	50	21		21		0.0%	0.0	40.0	Pass
dissolved barium	ug/L	10	50	18		17		5.7%	1.0	40	Pass
total calcium	ug/L	2500	12500	13000		13000		0.0%	0.0	10000	Pass
dissolved calcium	ug/L	2500	12500	13000		13000		0.0%	0.0	10000	Pass
total chromium	ug/L	1.0	5	0.8	J	0.6	J	28.6%	0.2	4	N/A
dissolved chromium	ug/L	2.0	10	0.6	J	0.8	J	28.6%	0.2	8	N/A
total iron	ug/L	100	500	180		170		5.7%	10.0	400.0	Pass
dissolved iron	ug/L	100	500	38	J	36	J	5.4%	2.0	400.0	N/A
total lead	ug/L	1.0	5	0.9	J	0.9	J	0.0%	0	4	N/A
total magnesium	ug/L	500	2500	5400		5300		1.9%	100	2000	Pass
dissloved magnesium	ug/L	500	2500	5500		5400		1.8%	100	2000	Pass
total manganese	ug/L	10	50	30		24		22.2%	6	40	Pass
dissolved manganese	ug/L	10	50	7.9	J	4.3	J	59.0%	3.6	40.00	N/A
total nickel	ug/L	1.0	5.0	0.8	J	0.8	J	0.0%	0.0	4.0	N/A
dissolved nickel	ug/L	2.0	10	1.0	J	0.8	J	22.2%	0.2	8	N/A
total potassium	ug/L	200	1000	1900		1800		5.4%	100.0	800.0	Pass
dissolved potassium	ug/L	200	1000	1600		1700		6.1%	100	800	Pass
total sodium	ug/L	500	2500	5100		5000		2.0%	100	2000	Pass
dissolved sodium	ug/L	500	2500	5100		5000		2.0%	100	2000.0	Pass
total thallium	ug/L	1.0	5	0.30	J	0.24	J	22.2%	0.06	4.0	N/A
Cyanide											
BDL											

Aqueous Control Limits

[sample] > 5 x RL, use 25%
[sample] < 5 x RL, use 2 x RL

URS
Measurement Systems DV Service

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 09:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**37SB1B**	QC Batch:	90257 -121
Sample #:	**346012**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	83
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.0 U		6.0	0.511
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.0 U		6.0	0.911
79-34-5	1,1,2,2-Tetrachloroethane	6.0 U		6.0	0.784
79-00-5	1,1,2-Trichloroethane	6.0 U		6.0	0.712
75-34-3	1,1-Dichloroethane	6.0 U		6.0	0.869
75-35-4	1,1-Dichloroethylene	6.0 U		6.0	0.880
106-93-4	1,2-Dibromoethane	6.0 U		6.0	0.822
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.50
95-50-1	1,2-Dichlorobenzene	6.0 U		6.0	0.581
107-06-2	1,2-Dichloroethane	6.0 U		6.0	0.517
156-59-2	cis-1,2-Dichloroethene	6.0 U		6.0	0.852
156-60-5	trans-1,2-Dichloroethene	6.0 U		6.0	0.844
78-87-5	1,2-Dichloropropane	6.0 U		6.0	0.703
87-61-6	1,2,3-Trichlorobenzene	6.0 U		6.0	0.653
120-82-1	1,2,4-Trichlorobenzene	6.0 U		6.0	0.492
541-73-1	1,3-Dichlorobenzene	6.0 U		6.0	0.322
106-46-7	1,4-Dichlorobenzene	6.0 U		6.0	0.852
78-93-3	**Methyl Ethyl Ketone**	**24**		24	6.00
591-78-6	2-Hexanone	12 U		12	2.71
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.75
67-64-1	**Acetone**	**48**	B,Z	24	6.00
71-43-2	Benzene	6.0 U		6.0	0.632
74-97-5	Bromochloromethane	6.0 U		6.0	0.913
75-27-4	Dichlorobromomethane	6.0 U		6.0	0.601
75-25-2	Bromoform	6.0 U		6.0	0.694
74-83-9	Bromomethane	6.0 U		6.0	1.80
75-15-0	Carbon Disulfide	6.0 U		6.0	1.74
56-23-5	Carbon Tetrachloride	6.0 U		6.0	0.559
108-90-7	Chlorobenzene	6.0 U		6.0	0.793
75-00-3	Chloroethane	6.0 U	UJ,C	6.0	1.62
67-66-3	Chloroform	6.0 U		6.0	0.535

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**
Project:	Richmond, VA
	RAAP
Submittal #:	**36440-6**
Submittal:	Delivery Order 0046
	RAAP
Sample ID:	**37SB1B**
Sample #:	**346012**
Matrix:	Soil
Unit:	ug/kg dry

Sampled:	10/10/03 @ 09:15
Sampler:	B.F. & J.S.
Received:	10/11/03 @ 08:45
Prepared:	n/a
Prep. Method:	n/a
Analyzed:	10/21/03 by JDM
Anal. Method:	USEPA-8260B
QC Batch:	90257 -121
Anal. Batch:	208351
Percent Solids:	83
Dilution Factor:	1.2

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	6.0 U	6.0	1.00
110-82-7	Cyclohexane	12 U	12	0.379
10061-01-5	cis-1,3-Dichloropropene	6.0 U	6.0	0.589
10061-02-6	trans-1,3-Dichloropropene	6.0 U	6.0	0.625
75-71-8	Dichlorodifluoromethane	6.0 U	6.0	0.802
124-48-1	Chlorodibromomethane	6.0 U	6.0	0.620
100-41-4	Ethylbenzene	6.0 U	6.0	0.508
98-82-8	Isopropylbenzene	6.0 U	6.0	0.655
79-20-9	Methyl Acetate	24 U	24	4.16
108-87-2	Methylcyclohexane	12 U	12	1.01
1634-04-4	Methyl(tert)butyl Ether	6.0 U	6.0	0.769
75-09-2	**Methylene Chloride**	**4.6 J**	24	3.37
100-42-5	Styrene	6.0 U	6.0	0.530
127-18-4	Tetrachloroethene	6.0 U	6.0	0.736
108-88-3	Toluene	6.0 U	6.0	0.557
79-01-6	Trichloroethene	6.0 U	6.0	0.812
75-69-4	Trichlorofluoromethane	6.0 U	6.0	0.892
75-01-4	Vinyl Chloride	6.0 U	6.0	0.444
1330-20-7	Xylene (Total)	6.0 U	6.0	0.505

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 09:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**37SB1B**	QC Batch:	90257 -121
Sample #:	**346012**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	83
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 by DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**EQB5**	QC Batch:	89888 -122
Sample #:	**346013**	Anal. Batch:	208078
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Volatile Organics OLM4.2+ TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	1.0 U		1.0	0.142
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1.0 U		1.0	0.179
79-34-5	1,1,2,2-Tetrachloroethane	1.0 U		1.0	0.148
79-00-5	1,1,2-Trichloroethane	1.0 U		1.0	0.142
75-34-3	1,1-Dichloroethane	1.0 U		1.0	0.057
75-35-4	1,1-Dichloroethylene	1.0 U		1.0	0.133
106-93-4	1,2-Dibromoethane	1.0 U		1.0	0.171
96-12-8	1,2-Dibromo-3-chloropropane	5.0 U		5.0	0.270
95-50-1	1,2-Dichlorobenzene	1.0 U		1.0	0.164
107-06-2	1,2-Dichloroethane	1.0 U		1.0	0.111
156-59-2	cis-1,2-Dichloroethene	1.0 U		1.0	0.139
156-60-5	trans-1,2-Dichloroethene	1.0 U		1.0	0.143
78-87-5	1,2-Dichloropropane	1.0 U		1.0	0.255
87-61-6	1,2,3-Trichlorobenzene	1.0 U		1.0	0.228
120-82-1	1,2,4-Trichlorobenzene	1.0 U		1.0	0.189
541-73-1	1,3-Dichlorobenzene	1.0 U		1.0	0.160
106-46-7	1,4-Dichlorobenzene	1.0 U		1.0	0.124
78-93-3	Methyl Ethyl Ketone	20 U		20	0.417
591-78-6	2-Hexanone	20 U	UJ,c	20	0.455
108-10-1	4-Methyl-2-Pentanone	20 U	UJ,c	20	0.364
67-64-1	**Acetone**	**1.6 J**	J,c	20	1.07
71-43-2	Benzene	1.0 U		1.0	0.022
74-97-5	Bromochloromethane	1.0 U		1.0	0.076
75-27-4	Dichlorobromomethane	2.0 U		2.0	0.431
75-25-2	Bromoform	1.0 U		1.0	0.110
74-83-9	Bromomethane	1.0 U		1.0	0.267
75-15-0	Carbon Disulfide	5.0 U		5.0	0.059
56-23-5	Carbon Tetrachloride	1.0 U		1.0	0.115
108-90-7	Chlorobenzene	1.0 U		1.0	0.157
75-00-3	Chloroethane	1.0 U		1.0	0.180
67-66-3	Chloroform	1.0 U		1.0	0.101

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 by DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**EQB5**	QC Batch:	89888 -122
Sample #:	**346013**	Anal. Batch:	208078
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Volatile Organics OLM4.2+ TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	1.0 U		1.0	0.103
110-82-7	Cyclohexane	5.0 U		5.0	0.215
10061-01-5	cis-1,3-Dichloropropene	1.0 U		1.0	0.189
10061-02-6	trans-1,3-Dichloropropene	1.0 U		1.0	0.117
75-71-8	Dichlorodifluoromethane	1.0 U		1.0	0.120
124-48-1	Chlorodibromomethane	1.0 U		1.0	0.108
100-41-4	Ethylbenzene	1.0 U		1.0	0.195
98-82-8	Isopropylbenzene	1.0 U		1.0	0.090
79-20-9	Methyl Acetate	10 U		10	0.231
108-87-2	Methylcyclohexane	5.0 U		5.0	0.168
1634-04-4	Methyl(tert)butyl Ether	1.0 U		1.0	0.077
75-09-2	**Methylene Chloride**	**0.60 J**	B,Z	4.0	0.117
100-42-5	Styrene	1.0 U		1.0	0.137
127-18-4	Tetrachloroethene	1.0 U		1.0	0.193
108-88-3	Toluene	1.0 U		1.0	0.214
79-01-6	Trichloroethene	1.0 U		1.0	0.211
75-69-4	Trichlorofluoromethane	1.0 U		1.0	0.051
75-01-4	Vinyl Chloride	1.0 U		1.0	0.119
1330-20-7	Xylene (Total)	3.0 U		3.0	0.160

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Individual sample results relate only to the sample tested.
5560 Corporate Exchange Court SE • Grand Rapids, MI 49512 • (616) 975-4500 • Fax (616) 942-7463

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**EQB5**	QC Batch:	89888 -122
Sample #:	**346013**	Anal. Batch:	208078
Matrix:	QC Water	Percent Solids:	n/a
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/L)**	**Qualifier**

No compound was detected.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 09:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/22/03 by DLVV
		Anal. Method:	USEPA-8260B
Sample ID:	**Trip Blank**	QC Batch:	89888 -122
Sample #:	**346014**	Anal. Batch:	208078
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Volatile Organics OLM4.2+ TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	1.0 U		1.0	0.142
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1.0 U		1.0	0.179
79-34-5	1,1,2,2-Tetrachloroethane	1.0 U		1.0	0.148
79-00-5	1,1,2-Trichloroethane	1.0 U		1.0	0.142
75-34-3	1,1-Dichloroethane	1.0 U		1.0	0.057
75-35-4	1,1-Dichloroethylene	1.0 U		1.0	0.133
106-93-4	1,2-Dibromoethane	1.0 U		1.0	0.171
96-12-8	1,2-Dibromo-3-chloropropane	5.0 U		5.0	0.270
95-50-1	1,2-Dichlorobenzene	1.0 U		1.0	0.164
107-06-2	1,2-Dichloroethane	1.0 U		1.0	0.111
156-59-2	cis-1,2-Dichloroethene	1.0 U		1.0	0.139
156-60-5	trans-1,2-Dichloroethene	1.0 U		1.0	0.143
78-87-5	1,2-Dichloropropane	1.0 U		1.0	0.255
87-61-6	1,2,3-Trichlorobenzene	1.0 U		1.0	0.228
120-82-1	1,2,4-Trichlorobenzene	1.0 U		1.0	0.189
541-73-1	1,3-Dichlorobenzene	1.0 U		1.0	0.160
106-46-7	1,4-Dichlorobenzene	1.0 U		1.0	0.124
78-93-3	Methyl Ethyl Ketone	20 U		20	0.417
591-78-6	2-Hexanone	20 U	UJ,C	20	0.455
108-10-1	4-Methyl-2-Pentanone	20 U	UJ,C	20	0.364
67-64-1	Acetone	20 U	UJ,C	20	1.07
71-43-2	Benzene	1.0 U		1.0	0.022
74-97-5	Bromochloromethane	1.0 U		1.0	0.076
75-27-4	Dichlorobromomethane	2.0 U		2.0	0.431
75-25-2	Bromoform	1.0 U		1.0	0.110
74-83-9	Bromomethane	1.0 U		1.0	0.267
75-15-0	Carbon Disulfide	5.0 U		5.0	0.059
56-23-5	Carbon Tetrachloride	1.0 U		1.0	0.115
108-90-7	Chlorobenzene	1.0 U		1.0	0.157
75-00-3	Chloroethane	1.0 U		1.0	0.180
67-66-3	Chloroform	1.0 U		1.0	0.101

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 09:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/22/03 by DLVV
		Anal. Method:	USEPA-8260B
Sample ID:	**Trip Blank**	QC Batch:	89888 -122
Sample #:	**346014**	Anal. Batch:	208078
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Volatile Organics OLM4.2+ TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	1.0 U		1.0	0.103
110-82-7	Cyclohexane	5.0 U		5.0	0.215
10061-01-5	cis-1,3-Dichloropropene	1.0 U		1.0	0.189
10061-02-6	trans-1,3-Dichloropropene	1.0 U		1.0	0.117
75-71-8	Dichlorodifluoromethane	1.0 U		1.0	0.120
124-48-1	Chlorodibromomethane	1.0 U		1.0	0.108
100-41-4	Ethylbenzene	1.0 U		1.0	0.195
98-82-8	Isopropylbenzene	1.0 U		1.0	0.090
79-20-9	Methyl Acetate	10 U		10	0.231
108-87-2	Methylcyclohexane	5.0 U		5.0	0.168
1634-04-4	Methyl(tert)butyl Ether	1.0 U		1.0	0.077
75-09-2	**Methylene Chloride**	**1.2 J**	B,Z	4.0	0.117
100-42-5	Styrene	1.0 U		1.0	0.137
127-18-4	Tetrachloroethene	1.0 U		1.0	0.193
108-88-3	**Toluene**	**0.24 J**		1.0	0.214
79-01-6	Trichloroethene	1.0 U		1.0	0.211
75-69-4	Trichlorofluoromethane	1.0 U		1.0	0.051
75-01-4	Vinyl Chloride	1.0 U		1.0	0.119
1330-20-7	Xylene (Total)	3.0 U		3.0	0.160

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
Submittal #:	**36440-6**	Prepared:	n/a
Submittal:	Delivery Order 0046	Prep. Method:	n/a
	RAAP	Analyzed:	10/22/03 DLVV
Sample ID:	**Trip Blank**	Anal. Method:	USEPA-8260B
Sample #:	**346014**	QC Batch:	89888 -122
Matrix:	QC Water	Anal. Batch:	208078
		Percent Solids:	n/a
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/L)**	**Qualifier**

No compound was detected.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 11:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/22/03 by DLVV
		Anal. Method:	USEPA-8260B
Sample ID:	**EQB6**	QC Batch:	89888 -122
Sample #:	**346015**	Anal. Batch:	208078
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Volatile Organics OLM4.2+ TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	1.0 U		1.0	0.142
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1.0 U		1.0	0.179
79-34-5	1,1,2,2-Tetrachloroethane	1.0 U		1.0	0.148
79-00-5	1,1,2-Trichloroethane	1.0 U		1.0	0.142
75-34-3	1,1-Dichloroethane	1.0 U		1.0	0.057
75-35-4	1,1-Dichloroethylene	1.0 U		1.0	0.133
106-93-4	1,2-Dibromoethane	1.0 U		1.0	0.171
96-12-8	1,2-Dibromo-3-chloropropane	5.0 U		5.0	0.270
95-50-1	1,2-Dichlorobenzene	1.0 U		1.0	0.164
107-06-2	1,2-Dichloroethane	1.0 U		1.0	0.111
156-59-2	cis-1,2-Dichloroethene	1.0 U		1.0	0.139
156-60-5	trans-1,2-Dichloroethene	1.0 U		1.0	0.143
78-87-5	1,2-Dichloropropane	1.0 U		1.0	0.255
87-61-6	1,2,3-Trichlorobenzene	1.0 U		1.0	0.228
120-82-1	1,2,4-Trichlorobenzene	1.0 U		1.0	0.189
541-73-1	1,3-Dichlorobenzene	1.0 U		1.0	0.160
106-46-7	1,4-Dichlorobenzene	1.0 U		1.0	0.124
78-93-3	Methyl Ethyl Ketone	20 U		20	0.417
591-78-6	2-Hexanone	20 U	UJ,C	20	0.455
108-10-1	4-Methyl-2-Pentanone	20 U	UJ,C	20	0.364
67-64-1	**Acetone**	**1.4 J**	J,C	20	1.07
71-43-2	Benzene	1.0 U		1.0	0.022
74-97-5	Bromochloromethane	1.0 U		1.0	0.076
75-27-4	Dichlorobromomethane	2.0 U		2.0	0.431
75-25-2	Bromoform	1.0 U		1.0	0.110
74-83-9	Bromomethane	1.0 U		1.0	0.267
75-15-0	Carbon Disulfide	5.0 U		5.0	0.059
56-23-5	Carbon Tetrachloride	1.0 U		1.0	0.115
108-90-7	Chlorobenzene	1.0 U		1.0	0.157
75-00-3	Chloroethane	1.0 U		1.0	0.180
67-66-3	Chloroform	1.0 U		1.0	0.101

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 by DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**EQB6**	QC Batch:	89888 -122
Sample #:	**346015**	Anal. Batch:	208078
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Volatile Organics OLM4.2+ TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	1.0 U		1.0	0.103
110-82-7	Cyclohexane	5.0 U		5.0	0.215
10061-01-5	cis-1,3-Dichloropropene	1.0 U		1.0	0.189
10061-02-6	trans-1,3-Dichloropropene	1.0 U		1.0	0.117
75-71-8	Dichlorodifluoromethane	1.0 U		1.0	0.120
124-48-1	Chlorodibromomethane	1.0 U		1.0	0.108
100-41-4	Ethylbenzene	1.0 U		1.0	0.195
98-82-8	Isopropylbenzene	1.0 U		1.0	0.090
79-20-9	Methyl Acetate	10 U		10	0.231
108-87-2	Methylcyclohexane	5.0 U		5.0	0.168
1634-04-4	Methyl(tert)butyl Ether	1.0 U		1.0	0.077
75-09-2	**Methylene Chloride**	**0.68 J**	B,Z	4.0	0.117
100-42-5	Styrene	1.0 U		1.0	0.137
127-18-4	Tetrachloroethene	1.0 U		1.0	0.193
108-88-3	Toluene	1.0 U		1.0	0.214
79-01-6	Trichloroethene	1.0 U		1.0	0.211
75-69-4	Trichlorofluoromethane	1.0 U		1.0	0.051
75-01-4	Vinyl Chloride	1.0 U		1.0	0.119
1330-20-7	Xylene (Total)	3.0 U		3.0	0.160

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**EQB6**	QC Batch:	89888 -122
Sample #:	**346015**	Anal. Batch:	208078
Matrix:	QC Water	Percent Solids:	n/a
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/L)**	**Qualifier**

No compound was detected.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 by DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**Trip Blank**	QC Batch:	89888 -122
Sample #:	**346016**	Anal. Batch:	208078
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Volatile Organics OLM4.2+ TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	1.0 U		1.0	0.142
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1.0 U		1.0	0.179
79-34-5	1,1,2,2-Tetrachloroethane	1.0 U		1.0	0.148
79-00-5	1,1,2-Trichloroethane	1.0 U		1.0	0.142
75-34-3	1,1-Dichloroethane	1.0 U		1.0	0.057
75-35-4	1,1-Dichloroethylene	1.0 U		1.0	0.133
106-93-4	1,2-Dibromoethane	1.0 U		1.0	0.171
96-12-8	1,2-Dibromo-3-chloropropane	5.0 U		5.0	0.270
95-50-1	1,2-Dichlorobenzene	1.0 U		1.0	0.164
107-06-2	1,2-Dichloroethane	1.0 U		1.0	0.111
156-59-2	cis-1,2-Dichloroethene	1.0 U		1.0	0.139
156-60-5	trans-1,2-Dichloroethene	1.0 U		1.0	0.143
78-87-5	1,2-Dichloropropane	1.0 U		1.0	0.255
87-61-6	1,2,3-Trichlorobenzene	1.0 U		1.0	0.228
120-82-1	1,2,4-Trichlorobenzene	1.0 U		1.0	0.189
541-73-1	1,3-Dichlorobenzene	1.0 U		1.0	0.160
106-46-7	1,4-Dichlorobenzene	1.0 U		1.0	0.124
78-93-3	Methyl Ethyl Ketone	20 U		20	0.417
591-78-6	2-Hexanone	20 U	UJ,C	20	0.455
108-10-1	4-Methyl-2-Pentanone	20 U	UJ,C	20	0.364
67-64-1	Acetone	20 U	UJ,C	20	1.07
71-43-2	Benzene	1.0 U		1.0	0.022
74-97-5	Bromochloromethane	1.0 U		1.0	0.076
75-27-4	Dichlorobromomethane	2.0 U		2.0	0.431
75-25-2	Bromoform	1.0 U		1.0	0.110
74-83-9	Bromomethane	1.0 U		1.0	0.267
75-15-0	Carbon Disulfide	5.0 U		5.0	0.059
56-23-5	Carbon Tetrachloride	1.0 U		1.0	0.115
108-90-7	Chlorobenzene	1.0 U		1.0	0.157
75-00-3	Chloroethane	1.0 U		1.0	0.180
67-66-3	Chloroform	1.0 U		1.0	0.101

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 by DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**Trip Blank**	QC Batch:	89888 -122
Sample #:	**346016**	Anal. Batch:	208078
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Volatile Organics OLM4.2+ TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	1.0 U		1.0	0.103
110-82-7	Cyclohexane	5.0 U		5.0	0.215
10061-01-5	cis-1,3-Dichloropropene	1.0 U		1.0	0.189
10061-02-6	trans-1,3-Dichloropropene	1.0 U		1.0	0.117
75-71-8	Dichlorodifluoromethane	1.0 U		1.0	0.120
124-48-1	Chlorodibromomethane	1.0 U		1.0	0.108
100-41-4	Ethylbenzene	1.0 U		1.0	0.195
98-82-8	Isopropylbenzene	1.0 U		1.0	0.090
79-20-9	Methyl Acetate	10 U		10	0.231
108-87-2	Methylcyclohexane	5.0 U		5.0	0.168
1634-04-4	Methyl(tert)butyl Ether	1.0 U		1.0	0.077
75-09-2	**Methylene Chloride**	**1.1 J**	B,Z	4.0	0.117
100-42-5	Styrene	1.0 U		1.0	0.137
127-18-4	Tetrachloroethene	1.0 U		1.0	0.193
108-88-3	Toluene	1.0 U		1.0	0.214
79-01-6	Trichloroethene	1.0 U		1.0	0.211
75-69-4	Trichlorofluoromethane	1.0 U		1.0	0.051
75-01-4	Vinyl Chloride	1.0 U		1.0	0.119
1330-20-7	Xylene (Total)	3.0 U		3.0	0.160

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**Trip Blank**	QC Batch:	89888 -122
Sample #:	**346016**	Anal. Batch:	208078
Matrix:	QC Water	Percent Solids:	n/a
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/L)**	**Qualifier**

No compound was detected.

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 13:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/21/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**13SD3**	QC Batch:	90257 -121
Sample #:	**346017**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	68
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	7.4 U		7.4	0.639
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	7.4 U		7.4	1.14
79-34-5	1,1,2,2-Tetrachloroethane	7.4 U		7.4	0.980
79-00-5	1,1,2-Trichloroethane	7.4 U		7.4	0.890
75-34-3	1,1-Dichloroethane	7.4 U		7.4	1.09
75-35-4	1,1-Dichloroethylene	7.4 U		7.4	1.10
106-93-4	1,2-Dibromoethane	7.4 U		7.4	1.03
96-12-8	1,2-Dibromo-3-chloropropane	15 U		15	3.12
95-50-1	1,2-Dichlorobenzene	7.4 U		7.4	0.726
107-06-2	1,2-Dichloroethane	7.4 U		7.4	0.647
156-59-2	**cis-1,2-Dichloroethene**	**11**		7.4	1.07
156-60-5	trans-1,2-Dichloroethene	7.4 U		7.4	1.05
78-87-5	1,2-Dichloropropane	7.4 U		7.4	0.879
87-61-6	1,2,3-Trichlorobenzene	7.4 U		7.4	0.816
120-82-1	1,2,4-Trichlorobenzene	7.4 U		7.4	0.615
541-73-1	1,3-Dichlorobenzene	7.4 U		7.4	0.402
106-46-7	1,4-Dichlorobenzene	7.4 U		7.4	1.07
78-93-3	**Methyl Ethyl Ketone**	**31**		29	7.50
591-78-6	2-Hexanone	15 U		15	3.39
108-10-1	4-Methyl-2-Pentanone	15 U		15	2.19
67-64-1	**Acetone**	**80**	B,Z	29	7.50
71-43-2	Benzene	7.4 U		7.4	0.791
74-97-5	Bromochloromethane	7.4 U		7.4	1.14
75-27-4	Dichlorobromomethane	7.4 U		7.4	0.752
75-25-2	Bromoform	7.4 U		7.4	0.867
74-83-9	Bromomethane	7.4 U		7.4	2.25
75-15-0	Carbon Disulfide	7.4 U		7.4	2.18
56-23-5	Carbon Tetrachloride	7.4 U		7.4	0.699
108-90-7	Chlorobenzene	7.4 U		7.4	0.992
75-00-3	Chloroethane	7.4 U	UJ,C	7.4	2.03
67-66-3	Chloroform	7.4 U		7.4	0.669

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SD3**	QC Batch:	90257 -121
Sample #:	**346017**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	68
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	7.4 U	7.4	1.25
110-82-7	Cyclohexane	15 U	15	0.474
10061-01-5	cis-1,3-Dichloropropene	7.4 U	7.4	0.737
10061-02-6	trans-1,3-Dichloropropene	7.4 U	7.4	0.782
75-71-8	Dichlorodifluoromethane	7.4 U	7.4	1.00
124-48-1	Chlorodibromomethane	7.4 U	7.4	0.776
100-41-4	Ethylbenzene	7.4 U	7.4	0.635
98-82-8	Isopropylbenzene	7.4 U	7.4	0.819
79-20-9	Methyl Acetate	29 U	29	5.21
108-87-2	Methylcyclohexane	15 U	15	1.27
1634-04-4	Methyl(tert)butyl Ether	7.4 U	7.4	0.962
75-09-2	Methylene Chloride	29 U	29	4.22
100-42-5	Styrene	7.4 U	7.4	0.663
127-18-4	**Tetrachloroethene**	**5.0 J**	7.4	0.920
108-88-3	**Toluene**	**1.8 J**	7.4	0.696
79-01-6	**Trichloroethene**	**64**	7.4	1.02
75-69-4	Trichlorofluoromethane	7.4 U	7.4	1.11
75-01-4	Vinyl Chloride	7.4 U	7.4	0.555
1330-20-7	Xylene (Total)	7.4 U	7.4	0.632

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**
Project:	Richmond, VA
	RAAP
Submittal #:	**36440-6**
Submittal:	Delivery Order 0046
	RAAP
Sample ID:	**13SD3**
Sample #:	**346017**
Matrix:	Soil

Sampled:	10/10/03 @ 13:00
Sampler:	B.F. & J.S.
Received:	10/11/03 @ 08:45
Prepared:	n/a
Prep. Method:	n/a
Analyzed:	10/21/03 JDM
Anal. Method:	USEPA-8260B
QC Batch:	90257 -121
Anal. Batch:	208351
Percent Solids:	68
Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 00:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/21/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**SDD1**	QC Batch:	90257 -121
Sample #:	**346018**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	63
Unit:	ug/kg dry	Dilution Factor:	1.6

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	7.9 U		7.9	0.682
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	7.9 U		7.9	1.21
79-34-5	1,1,2,2-Tetrachloroethane	7.9 U		7.9	1.04
79-00-5	1,1,2-Trichloroethane	7.9 U		7.9	0.949
75-34-3	1,1-Dichloroethane	7.9 U		7.9	1.16
75-35-4	1,1-Dichloroethylene	7.9 U		7.9	1.17
106-93-4	1,2-Dibromoethane	7.9 U		7.9	1.10
96-12-8	1,2-Dibromo-3-chloropropane	16 U		16	3.33
95-50-1	1,2-Dichlorobenzene	7.9 U		7.9	0.774
107-06-2	1,2-Dichloroethane	7.9 U		7.9	0.690
156-59-2	**cis-1,2-Dichloroethene**	**8.0**		7.9	1.14
156-60-5	trans-1,2-Dichloroethene	7.9 U		7.9	1.12
78-87-5	1,2-Dichloropropane	7.9 U		7.9	0.938
87-61-6	1,2,3-Trichlorobenzene	7.9 U		7.9	0.870
120-82-1	1,2,4-Trichlorobenzene	7.9 U		7.9	0.656
541-73-1	1,3-Dichlorobenzene	7.9 U		7.9	0.429
106-46-7	1,4-Dichlorobenzene	7.9 U		7.9	1.14
78-93-3	**Methyl Ethyl Ketone**	**30 J**		32	8.00
591-78-6	2-Hexanone	16 U		16	3.62
108-10-1	4-Methyl-2-Pentanone	16 U		16	2.34
67-64-1	**Acetone**	**59**	B,Z	32	8.00
71-43-2	Benzene	7.9 U		7.9	0.843
74-97-5	Bromochloromethane	7.9 U		7.9	1.22
75-27-4	Dichlorobromomethane	7.9 U		7.9	0.802
75-25-2	Bromoform	7.9 U		7.9	0.925
74-83-9	Bromomethane	7.9 U		7.9	2.40
75-15-0	Carbon Disulfide	7.9 U		7.9	2.32
56-23-5	Carbon Tetrachloride	7.9 U		7.9	0.746
108-90-7	Chlorobenzene	7.9 U		7.9	1.06
75-00-3	Chloroethane	7.9 U	UJ,C	7.9	2.16
67-66-3	Chloroform	7.9 U		7.9	0.714

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SDD1**	QC Batch:	90257 -121
Sample #:	**346018**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	63
Unit:	ug/kg dry	Dilution Factor:	1.6

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	7.9 U	7.9	1.33
110-82-7	Cyclohexane	16 U	16	0.506
10061-01-5	cis-1,3-Dichloropropene	7.9 U	7.9	0.786
10061-02-6	trans-1,3-Dichloropropene	7.9 U	7.9	0.834
75-71-8	Dichlorodifluoromethane	7.9 U	7.9	1.07
124-48-1	Chlorodibromomethane	7.9 U	7.9	0.827
100-41-4	Ethylbenzene	7.9 U	7.9	0.677
98-82-8	Isopropylbenzene	7.9 U	7.9	0.874
79-20-9	Methyl Acetate	32 U	32	5.55
108-87-2	Methylcyclohexane	16 U	16	1.35
1634-04-4	Methyl(tert)butyl Ether	7.9 U	7.9	1.03
75-09-2	**Methylene Chloride**	**6.6 J**	32	4.50
100-42-5	Styrene	7.9 U	7.9	0.707
127-18-4	**Tetrachloroethene**	**2.1 J**	7.9	0.981
108-88-3	**Toluene**	**1.0 J**	7.9	0.742
79-01-6	**Trichloroethene**	**38**	7.9	1.08
75-69-4	Trichlorofluoromethane	7.9 U	7.9	1.19
75-01-4	Vinyl Chloride	7.9 U	7.9	0.592
1330-20-7	Xylene (Total)	7.9 U	7.9	0.674

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SDD1**	QC Batch:	90257 -121
Sample #:	**346018**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	63
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SD2**	QC Batch:	90257 -121
Sample #:	**346019**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	65
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	*1,1,1-Trichloroethane	7.7 U	UJ,M	7.7	0.639
76-13-1	*1,1,2-Trichloro-1,2,2-trifluoroethane	7.7 U	↓	7.7	1.14
79-34-5	1,1,2,2-Tetrachloroethane	7.7 U		7.7	0.980
79-00-5	*1,1,2-Trichloroethane	7.7 U	UJ,M	7.7	0.890
75-34-3	*1,1-Dichloroethane	7.7 U		7.7	1.09
75-35-4	*1,1-Dichloroethylene	7.7 U		7.7	1.10
106-93-4	*1,2-Dibromoethane	7.7 U		7.7	1.03
96-12-8	*1,2-Dibromo-3-chloropropane	15 U		15	3.12
95-50-1	*1,2-Dichlorobenzene	7.7 U		7.7	0.726
107-06-2	*1,2-Dichloroethane	7.7 U		7.7	0.647
156-59-2	*cis-1,2-Dichloroethene	7.7 U		7.7	1.07
156-60-5	*trans-1,2-Dichloroethene	7.7 U		7.7	1.05
78-87-5	*1,2-Dichloropropane	7.7 U		7.7	0.879
87-61-6	*1,2,3-Trichlorobenzene	7.7 U		7.7	0.816
120-82-1	*1,2,4-Trichlorobenzene	7.7 U		7.7	0.615
541-73-1	*1,3-Dichlorobenzene	7.7 U		7.7	0.402
106-46-7	*1,4-Dichlorobenzene	7.7 U	↓	7.7	1.07
78-93-3	**Methyl Ethyl Ketone**	**42**		31	7.50
591-78-6	2-Hexanone	15 U		15	3.39
108-10-1	4-Methyl-2-Pentanone	15 U		15	2.19
67-64-1	***Acetone**	**180**	J,M	31	7.50
71-43-2	*Benzene	7.7 U	UJ,M	7.7	0.791
74-97-5	*Bromochloromethane	7.7 U		7.7	1.14
75-27-4	*Dichlorobromomethane	7.7 U		7.7	0.752
75-25-2	*Bromoform	7.7 U		7.7	0.867
74-83-9	Bromomethane	7.7 U		7.7	2.25
75-15-0	*Carbon Disulfide	7.7 U		7.7	2.18
56-23-5	*Carbon Tetrachloride	7.7 U		7.7	0.699
108-90-7	*Chlorobenzene	7.7 U		7.7	0.992
75-00-3	*Chloroethane	7.7 U	UJ,C	7.7	2.03
67-66-3	*Chloroform	7.7 U	UJ,M	7.7	0.669

* See attached Statement of Data Qualifications.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SD2**	QC Batch:	90257 -121
Sample #:	**346019**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	65
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	*Chloromethane	7.7 U	UJ,M	7.7	1.25
110-82-7	*Cyclohexane	15 U		15	0.474
10061-01-5	*cis-1,3-Dichloropropene	7.7 U		7.7	0.737
10061-02-6	*trans-1,3-Dichloropropene	7.7 U		7.7	0.782
75-71-8	*Dichlorodifluoromethane	7.7 U		7.7	1.00
124-48-1	*Chlorodibromomethane	7.7 U		7.7	0.776
100-41-4	*Ethylbenzene	7.7 U		7.7	0.635
98-82-8	*Isopropylbenzene	7.7 U		7.7	0.819
79-20-9	Methyl Acetate	31 U		31	5.21
108-87-2	Methylcyclohexane	15 U		15	1.27
1634-04-4	*Methyl(tert)butyl Ether	7.7 U	UJ,M	7.7	0.962
75-09-2	*Methylene Chloride	31 U		31	4.22
100-42-5	*Styrene	7.7 U		7.7	0.663
127-18-4	*Tetrachloroethene	7.7 U		7.7	0.920
108-88-3	***Toluene**	**1.1 J**	J,M	7.7	0.696
79-01-6	*Trichloroethene	7.7 U	UJ,M	7.7	1.02
75-69-4	*Trichlorofluoromethane	7.7 U		7.7	1.11
75-01-4	*Vinyl Chloride	7.7 U		7.7	0.555
1330-20-7	*Xylene (Total)	7.7 U		7.7	0.632

* See attached Statement of Data Qualifications.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SD2**	QC Batch:	90257 -121
Sample #:	**346019**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	65
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 13:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/15/03 by DLVV
		Anal. Method:	USEPA-8260B
Sample ID:	**13SW3**	QC Batch:	89888 -115
Sample #:	**346020**	Anal. Batch:	207752
Matrix:	Surface Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Volatile Organics OLM4.2+ TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	1.0 U		1.0	0.142
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1.0 U		1.0	0.179
79-34-5	1,1,2,2-Tetrachloroethane	1.0 U		1.0	0.148
79-00-5	1,1,2-Trichloroethane	1.0 U		1.0	0.142
75-34-3	1,1-Dichloroethane	1.0 U		1.0	0.057
75-35-4	1,1-Dichloroethylene	1.0 U		1.0	0.133
106-93-4	1,2-Dibromoethane	1.0 U		1.0	0.171
96-12-8	1,2-Dibromo-3-chloropropane	5.0 U		5.0	0.270
95-50-1	1,2-Dichlorobenzene	1.0 U		1.0	0.164
107-06-2	1,2-Dichloroethane	1.0 U		1.0	0.111
156-59-2	cis-1,2-Dichloroethene	1.0 U		1.0	0.139
156-60-5	trans-1,2-Dichloroethene	1.0 U		1.0	0.143
78-87-5	1,2-Dichloropropane	1.0 U		1.0	0.255
87-61-6	1,2,3-Trichlorobenzene	1.0 U		1.0	0.228
120-82-1	1,2,4-Trichlorobenzene	1.0 U		1.0	0.189
541-73-1	1,3-Dichlorobenzene	1.0 U		1.0	0.160
106-46-7	1,4-Dichlorobenzene	1.0 U		1.0	0.124
78-93-3	Methyl Ethyl Ketone	20 U		20	0.417
591-78-6	2-Hexanone	20 U		20	0.455
108-10-1	4-Methyl-2-Pentanone	20 U		20	0.364
67-64-1	Acetone	20 U		20	1.07
71-43-2	Benzene	1.0 U		1.0	0.022
74-97-5	Bromochloromethane	1.0 U		1.0	0.076
75-27-4	Dichlorobromomethane	2.0 U		2.0	0.431
75-25-2	Bromoform	1.0 U		1.0	0.110
74-83-9	Bromomethane	1.0 U		1.0	0.267
75-15-0	Carbon Disulfide	5.0 U	UJ,C	5.0	0.059
56-23-5	Carbon Tetrachloride	1.0 U		1.0	0.115
108-90-7	Chlorobenzene	1.0 U		1.0	0.157
75-00-3	Chloroethane	1.0 U		1.0	0.180
67-66-3	Chloroform	1.0 U		1.0	0.101

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SW3**	QC Batch:	89888 -115
Sample #:	**346020**	Anal. Batch:	207752
Matrix:	Surface Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Volatile Organics OLM4.2+ TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	1.0 U	1.0	0.103
110-82-7	Cyclohexane	5.0 U	5.0	0.215
10061-01-5	cis-1,3-Dichloropropene	1.0 U	1.0	0.189
10061-02-6	trans-1,3-Dichloropropene	1.0 U	1.0	0.117
75-71-8	Dichlorodifluoromethane	1.0 U	1.0	0.120
124-48-1	Chlorodibromomethane	1.0 U	1.0	0.108
100-41-4	Ethylbenzene	1.0 U	1.0	0.195
98-82-8	Isopropylbenzene	1.0 U	1.0	0.090
79-20-9	Methyl Acetate	10 U	10	0.231
108-87-2	Methylcyclohexane	5.0 U	5.0	0.168
1634-04-4	Methyl(tert)butyl Ether	1.0 U	1.0	0.077
75-09-2	Methylene Chloride	4.0 U	4.0	0.117
100-42-5	Styrene	1.0 U	1.0	0.137
127-18-4	Tetrachloroethene	1.0 U	1.0	0.193
108-88-3	Toluene	1.0 U	1.0	0.214
79-01-6	Trichloroethene	1.0 U	1.0	0.211
75-69-4	Trichlorofluoromethane	1.0 U	1.0	0.051
75-01-4	Vinyl Chloride	1.0 U	1.0	0.119
1330-20-7	Xylene (Total)	3.0 U	3.0	0.160

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SW3**	QC Batch:	89888 -115
Sample #:	**346020**	Anal. Batch:	207752
Matrix:	Surface Water	Percent Solids:	n/a
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/L)**	**Qualifier**

No compound was detected.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 00:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/15/03 by DLVV
		Anal. Method:	USEPA-8260B
Sample ID:	**SWD1**	QC Batch:	89888 -115
Sample #:	**346021**	Anal. Batch:	207752
Matrix:	Surface Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Volatile Organics OLM4.2+ TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	1.0 U		1.0	0.142
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1.0 U		1.0	0.179
79-34-5	1,1,2,2-Tetrachloroethane	1.0 U		1.0	0.148
79-00-5	1,1,2-Trichloroethane	1.0 U		1.0	0.142
75-34-3	1,1-Dichloroethane	1.0 U		1.0	0.057
75-35-4	1,1-Dichloroethylene	1.0 U		1.0	0.133
106-93-4	1,2-Dibromoethane	1.0 U		1.0	0.171
96-12-8	1,2-Dibromo-3-chloropropane	5.0 U		5.0	0.270
95-50-1	1,2-Dichlorobenzene	1.0 U		1.0	0.164
107-06-2	1,2-Dichloroethane	1.0 U		1.0	0.111
156-59-2	cis-1,2-Dichloroethene	1.0 U		1.0	0.139
156-60-5	trans-1,2-Dichloroethene	1.0 U		1.0	0.143
78-87-5	1,2-Dichloropropane	1.0 U		1.0	0.255
87-61-6	1,2,3-Trichlorobenzene	1.0 U		1.0	0.228
120-82-1	1,2,4-Trichlorobenzene	1.0 U		1.0	0.189
541-73-1	1,3-Dichlorobenzene	1.0 U		1.0	0.160
106-46-7	1,4-Dichlorobenzene	1.0 U		1.0	0.124
78-93-3	Methyl Ethyl Ketone	20 U		20	0.417
591-78-6	2-Hexanone	20 U		20	0.455
108-10-1	4-Methyl-2-Pentanone	20 U		20	0.364
67-64-1	Acetone	20 U		20	1.07
71-43-2	Benzene	1.0 U		1.0	0.022
74-97-5	Bromochloromethane	1.0 U		1.0	0.076
75-27-4	Dichlorobromomethane	2.0 U		2.0	0.431
75-25-2	Bromoform	1.0 U		1.0	0.110
74-83-9	Bromomethane	1.0 U		1.0	0.267
75-15-0	Carbon Disulfide	5.0 U	UJ,C	5.0	0.059
56-23-5	Carbon Tetrachloride	1.0 U		1.0	0.115
108-90-7	Chlorobenzene	1.0 U		1.0	0.157
75-00-3	Chloroethane	1.0 U		1.0	0.180
67-66-3	Chloroform	1.0 U		1.0	0.101

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 00:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/15/03 by DLVV
		Anal. Method:	USEPA-8260B
Sample ID:	**SWD1**	QC Batch:	89888 -115
Sample #:	**346021**	Anal. Batch:	207752
Matrix:	Surface Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Volatile Organics OLM4.2+ TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	1.0 U	1.0	0.103
110-82-7	Cyclohexane	5.0 U	5.0	0.215
10061-01-5	cis-1,3-Dichloropropene	1.0 U	1.0	0.189
10061-02-6	trans-1,3-Dichloropropene	1.0 U	1.0	0.117
75-71-8	Dichlorodifluoromethane	1.0 U	1.0	0.120
124-48-1	Chlorodibromomethane	1.0 U	1.0	0.108
100-41-4	Ethylbenzene	1.0 U	1.0	0.195
98-82-8	Isopropylbenzene	1.0 U	1.0	0.090
79-20-9	Methyl Acetate	10 U	10	0.231
108-87-2	Methylcyclohexane	5.0 U	5.0	0.168
1634-04-4	Methyl(tert)butyl Ether	1.0 U	1.0	0.077
75-09-2	Methylene Chloride	4.0 U	4.0	0.117
100-42-5	Styrene	1.0 U	1.0	0.137
127-18-4	Tetrachloroethene	1.0 U	1.0	0.193
108-88-3	Toluene	1.0 U	1.0	0.214
79-01-6	Trichloroethene	1.0 U	1.0	0.211
75-69-4	Trichlorofluoromethane	1.0 U	1.0	0.051
75-01-4	Vinyl Chloride	1.0 U	1.0	0.119
1330-20-7	Xylene (Total)	3.0 U	3.0	0.160

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SWD1**	QC Batch:	89888 -115
Sample #:	**346021**	Anal. Batch:	207752
Matrix:	Surface Water	Percent Solids:	n/a
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/L)**	**Qualifier**

No compound was detected.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 14:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/15/03 by DLVV
		Anal. Method:	USEPA-8260B
Sample ID:	**13SW2**	QC Batch:	89888 -115
Sample #:	**346022**	Anal. Batch:	207752
Matrix:	Surface Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Volatile Organics OLM4.2+ TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	1.0 U		1.0	0.142
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1.0 U		1.0	0.179
79-34-5	1,1,2,2-Tetrachloroethane	1.0 U		1.0	0.148
79-00-5	1,1,2-Trichloroethane	1.0 U		1.0	0.142
75-34-3	1,1-Dichloroethane	1.0 U		1.0	0.057
75-35-4	1,1-Dichloroethylene	1.0 U		1.0	0.133
106-93-4	1,2-Dibromoethane	1.0 U		1.0	0.171
96-12-8	1,2-Dibromo-3-chloropropane	5.0 U		5.0	0.270
95-50-1	1,2-Dichlorobenzene	1.0 U		1.0	0.164
107-06-2	1,2-Dichloroethane	1.0 U		1.0	0.111
156-59-2	cis-1,2-Dichloroethene	1.0 U		1.0	0.139
156-60-5	trans-1,2-Dichloroethene	1.0 U		1.0	0.143
78-87-5	1,2-Dichloropropane	1.0 U		1.0	0.255
87-61-6	1,2,3-Trichlorobenzene	1.0 U		1.0	0.228
120-82-1	1,2,4-Trichlorobenzene	1.0 U		1.0	0.189
541-73-1	1,3-Dichlorobenzene	1.0 U		1.0	0.160
106-46-7	1,4-Dichlorobenzene	1.0 U		1.0	0.124
78-93-3	Methyl Ethyl Ketone	20 U		20	0.417
591-78-6	2-Hexanone	20 U		20	0.455
108-10-1	4-Methyl-2-Pentanone	20 U		20	0.364
67-64-1	Acetone	20 U		20	1.07
71-43-2	Benzene	1.0 U		1.0	0.022
74-97-5	Bromochloromethane	1.0 U		1.0	0.076
75-27-4	Dichlorobromomethane	2.0 U		2.0	0.431
75-25-2	Bromoform	1.0 U		1.0	0.110
74-83-9	Bromomethane	1.0 U		1.0	0.267
75-15-0	Carbon Disulfide	5.0 U	VJ,c	5.0	0.059
56-23-5	Carbon Tetrachloride	1.0 U		1.0	0.115
108-90-7	Chlorobenzene	1.0 U		1.0	0.157
75-00-3	Chloroethane	1.0 U		1.0	0.180
67-66-3	Chloroform	1.0 U		1.0	0.101

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SW2**	QC Batch:	89888 -115
Sample #:	**346022**	Anal. Batch:	207752
Matrix:	Surface Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Volatile Organics OLM4.2+ TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	1.0 U	1.0	0.103
110-82-7	Cyclohexane	5.0 U	5.0	0.215
10061-01-5	cis-1,3-Dichloropropene	1.0 U	1.0	0.189
10061-02-6	trans-1,3-Dichloropropene	1.0 U	1.0	0.117
75-71-8	Dichlorodifluoromethane	1.0 U	1.0	0.120
124-48-1	Chlorodibromomethane	1.0 U	1.0	0.108
100-41-4	Ethylbenzene	1.0 U	1.0	0.195
98-82-8	Isopropylbenzene	1.0 U	1.0	0.090
79-20-9	Methyl Acetate	10 U	10	0.231
108-87-2	Methylcyclohexane	5.0 U	5.0	0.168
1634-04-4	Methyl(tert)butyl Ether	1.0 U	1.0	0.077
75-09-2	Methylene Chloride	4.0 U	4.0	0.117
100-42-5	Styrene	1.0 U	1.0	0.137
127-18-4	Tetrachloroethene	1.0 U	1.0	0.193
108-88-3	Toluene	1.0 U	1.0	0.214
79-01-6	Trichloroethene	1.0 U	1.0	0.211
75-69-4	Trichlorofluoromethane	1.0 U	1.0	0.051
75-01-4	Vinyl Chloride	1.0 U	1.0	0.119
1330-20-7	Xylene (Total)	3.0 U	3.0	0.160

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SW2**	QC Batch:	89888 -115
Sample #:	**346022**	Anal. Batch:	207752
Matrix:	Surface Water	Percent Solids:	n/a
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/L)**	**Qualifier**
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 14:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/15/03 by DLVV
		Anal. Method:	USEPA-8260B
Sample ID:	**Trip Blank**	QC Batch:	89888 -115
Sample #:	**346082**	Anal. Batch:	207752
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Volatile Organics OLM4.2+ TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	1.0 U		1.0	0.142
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1.0 U		1.0	0.179
79-34-5	1,1,2,2-Tetrachloroethane	1.0 U		1.0	0.148
79-00-5	1,1,2-Trichloroethane	1.0 U		1.0	0.142
75-34-3	1,1-Dichloroethane	1.0 U		1.0	0.057
75-35-4	1,1-Dichloroethylene	1.0 U		1.0	0.133
106-93-4	1,2-Dibromoethane	1.0 U		1.0	0.171
96-12-8	1,2-Dibromo-3-chloropropane	5.0 U		5.0	0.270
95-50-1	1,2-Dichlorobenzene	1.0 U		1.0	0.164
107-06-2	1,2-Dichloroethane	1.0 U		1.0	0.111
156-59-2	cis-1,2-Dichloroethene	1.0 U		1.0	0.139
156-60-5	trans-1,2-Dichloroethene	1.0 U		1.0	0.143
78-87-5	1,2-Dichloropropane	1.0 U		1.0	0.255
87-61-6	1,2,3-Trichlorobenzene	1.0 U		1.0	0.228
120-82-1	1,2,4-Trichlorobenzene	1.0 U		1.0	0.189
541-73-1	1,3-Dichlorobenzene	1.0 U		1.0	0.160
106-46-7	1,4-Dichlorobenzene	1.0 U		1.0	0.124
78-93-3	Methyl Ethyl Ketone	20 U		20	0.417
591-78-6	2-Hexanone	20 U		20	0.455
108-10-1	4-Methyl-2-Pentanone	20 U		20	0.364
67-64-1	Acetone	20 U		20	1.07
71-43-2	Benzene	1.0 U		1.0	0.022
74-97-5	Bromochloromethane	1.0 U		1.0	0.076
75-27-4	Dichlorobromomethane	2.0 U		2.0	0.431
75-25-2	Bromoform	1.0 U		1.0	0.110
74-83-9	Bromomethane	1.0 U		1.0	0.267
75-15-0	Carbon Disulfide	5.0 U	UJ,C	5.0	0.059
56-23-5	Carbon Tetrachloride	1.0 U		1.0	0.115
108-90-7	Chlorobenzene	1.0 U		1.0	0.157
75-00-3	Chloroethane	1.0 U		1.0	0.180
67-66-3	Chloroform	1.0 U		1.0	0.101

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 14:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/15/03 by DLVV
		Anal. Method:	USEPA-8260B
Sample ID:	**Trip Blank**	QC Batch:	89888 -115
Sample #:	**346082**	Anal. Batch:	207752
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Volatile Organics OLM4.2+ TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	1.0 U		1.0	0.103
110-82-7	Cyclohexane	5.0 U		5.0	0.215
10061-01-5	cis-1,3-Dichloropropene	1.0 U		1.0	0.189
10061-02-6	trans-1,3-Dichloropropene	1.0 U		1.0	0.117
75-71-8	Dichlorodifluoromethane	1.0 U		1.0	0.120
124-48-1	Chlorodibromomethane	1.0 U		1.0	0.108
100-41-4	Ethylbenzene	1.0 U		1.0	0.195
98-82-8	Isopropylbenzene	1.0 U		1.0	0.090
79-20-9	Methyl Acetate	10 U		10	0.231
108-87-2	Methylcyclohexane	5.0 U		5.0	0.168
1634-04-4	Methyl(tert)butyl Ether	1.0 U		1.0	0.077
75-09-2	**Methylene Chloride**	**0.96 J**	B,Z	4.0	0.117
100-42-5	Styrene	1.0 U		1.0	0.137
127-18-4	Tetrachloroethene	1.0 U		1.0	0.193
108-88-3	Toluene	1.0 U		1.0	0.214
79-01-6	Trichloroethene	1.0 U		1.0	0.211
75-69-4	Trichlorofluoromethane	1.0 U		1.0	0.051
75-01-4	Vinyl Chloride	1.0 U		1.0	0.119
1330-20-7	Xylene (Total)	3.0 U		3.0	0.160

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**Trip Blank**	QC Batch:	89888 -115
Sample #:	**346082**	Anal. Batch:	207752
Matrix:	QC Water	Percent Solids:	n/a
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/L)**	**Qualifier**

No compound was detected.

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 08:45
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/22/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**ASB1A**	QC Batch:	90601 -122
Sample #:	**346248**	Anal. Batch:	208854
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.1 U		6.1	1.93
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.1 U		6.1	0.775
79-34-5	1,1,2,2-Tetrachloroethane	6.1 U		6.1	1.80
79-00-5	1,1,2-Trichloroethane	6.1 U		6.1	1.54
75-34-3	1,1-Dichloroethane	6.1 U		6.1	1.62
75-35-4	1,1-Dichloroethylene	6.1 U		6.1	3.47
106-93-4	1,2-Dibromoethane	6.1 U		6.1	2.24
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	3.28
95-50-1	1,2-Dichlorobenzene	6.1 U		6.1	1.72
107-06-2	1,2-Dichloroethane	6.1 U		6.1	1.56
156-59-2	cis-1,2-Dichloroethene	6.1 U		6.1	2.05
156-60-5	trans-1,2-Dichloroethene	6.1 U		6.1	2.12
78-87-5	1,2-Dichloropropane	6.1 U		6.1	1.90
87-61-6	1,2,3-Trichlorobenzene	6.1 U		6.1	1.13
120-82-1	1,2,4-Trichlorobenzene	6.1 U		6.1	2.11
541-73-1	1,3-Dichlorobenzene	6.1 U		6.1	2.16
106-46-7	1,4-Dichlorobenzene	6.1 U		6.1	0.833
78-93-3	Methyl Ethyl Ketone	24 U		24	5.40
591-78-6	2-Hexanone	12 U		12	2.27
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.22
67-64-1	**Acetone**	**15 J**	B,Z	24	11.2
71-43-2	Benzene	6.1 U		6.1	0.805
74-97-5	Bromochloromethane	6.1 U		6.1	1.48
75-27-4	Dichlorobromomethane	6.1 U		6.1	0.569
75-25-2	Bromoform	6.1 U		6.1	1.63
74-83-9	Bromomethane	6.1 U		6.1	5.50
75-15-0	Carbon Disulfide	6.1 U		6.1	1.84
56-23-5	Carbon Tetrachloride	6.1 U		6.1	1.70
108-90-7	Chlorobenzene	6.1 U		6.1	0.545
75-00-3	Chloroethane	6.1 U	UJ,C	6.1	2.92
67-66-3	Chloroform	6.1 U		6.1	0.869

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 08:45
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**ASB1A**	QC Batch:	90601 -122
Sample #:	**346248**	Anal. Batch:	208854
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	6.1 U	6.1	0.679
110-82-7	Cyclohexane	12 U	12	1.58
10061-01-5	cis-1,3-Dichloropropene	6.1 U	6.1	1.30
10061-02-6	trans-1,3-Dichloropropene	6.1 U	6.1	1.94
75-71-8	Dichlorodifluoromethane	6.1 U	6.1	0.840
124-48-1	Chlorodibromomethane	6.1 U	6.1	0.673
100-41-4	Ethylbenzene	6.1 U	6.1	1.92
98-82-8	Isopropylbenzene	6.1 U	6.1	1.44
79-20-9	Methyl Acetate	24 U	24	4.50
108-87-2	Methylcyclohexane	12 U	12	1.94
1634-04-4	Methyl(tert)butyl Ether	6.1 U	6.1	1.55
75-09-2	**Methylene Chloride**	**4.9 J**	24	1.44
100-42-5	Styrene	6.1 U	6.1	1.49
127-18-4	Tetrachloroethene	6.1 U	6.1	1.54
108-88-3	Toluene	6.1 U	6.1	1.38
79-01-6	Trichloroethene	6.1 U	6.1	2.23
75-69-4	Trichlorofluoromethane	6.1 U	6.1	0.841
75-01-4	Vinyl Chloride	6.1 U	6.1	1.49
1330-20-7	Xylene (Total)	6.1 U	6.1	1.82

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 08:45
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**ASB1A**	QC Batch:	90601 -122
Sample #:	**346248**	Anal. Batch:	208854
Matrix:	Soil	Percent Solids:	82
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 09:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**ASB1B**	QC Batch:	90601 -122
Sample #:	**346249**	Anal. Batch:	208854
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.4 U		6.4	2.09
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.4 U		6.4	0.840
79-34-5	1,1,2,2-Tetrachloroethane	6.4 U		6.4	1.95
79-00-5	1,1,2-Trichloroethane	6.4 U		6.4	1.66
75-34-3	1,1-Dichloroethane	6.4 U		6.4	1.76
75-35-4	1,1-Dichloroethylene	6.4 U		6.4	3.76
106-93-4	1,2-Dibromoethane	6.4 U		6.4	2.43
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	3.55
95-50-1	1,2-Dichlorobenzene	6.4 U		6.4	1.86
107-06-2	1,2-Dichloroethane	6.4 U		6.4	1.69
156-59-2	cis-1,2-Dichloroethene	6.4 U		6.4	2.22
156-60-5	trans-1,2-Dichloroethene	6.4 U		6.4	2.30
78-87-5	1,2-Dichloropropane	6.4 U		6.4	2.05
87-61-6	1,2,3-Trichlorobenzene	6.4 U		6.4	1.23
120-82-1	1,2,4-Trichlorobenzene	6.4 U		6.4	2.29
541-73-1	1,3-Dichlorobenzene	6.4 U		6.4	2.34
106-46-7	1,4-Dichlorobenzene	6.4 U		6.4	0.902
78-93-3	Methyl Ethyl Ketone	26 U		26	5.85
591-78-6	2-Hexanone	13 U		13	2.46
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.33
67-64-1	**Acetone**	**19 J**	B,Z	26	12.1
71-43-2	Benzene	6.4 U		6.4	0.872
74-97-5	Bromochloromethane	6.4 U		6.4	1.60
75-27-4	Dichlorobromomethane	6.4 U		6.4	0.616
75-25-2	Bromoform	6.4 U		6.4	1.77
74-83-9	Bromomethane	6.4 U		6.4	5.95
75-15-0	Carbon Disulfide	6.4 U		6.4	1.99
56-23-5	Carbon Tetrachloride	6.4 U		6.4	1.85
108-90-7	Chlorobenzene	6.4 U		6.4	0.590
75-00-3	Chloroethane	6.4 U	UJ,C	6.4	3.16
67-66-3	Chloroform	6.4 U		6.4	0.941

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 09:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**ASB1B**	QC Batch:	90601 -122
Sample #:	**346249**	Anal. Batch:	208854
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	6.4 U	6.4	0.736
110-82-7	Cyclohexane	13 U	13	1.72
10061-01-5	cis-1,3-Dichloropropene	6.4 U	6.4	1.40
10061-02-6	trans-1,3-Dichloropropene	6.4 U	6.4	2.11
75-71-8	Dichlorodifluoromethane	6.4 U	6.4	0.910
124-48-1	Chlorodibromomethane	6.4 U	6.4	0.729
100-41-4	Ethylbenzene	6.4 U	6.4	2.08
98-82-8	Isopropylbenzene	6.4 U	6.4	1.56
79-20-9	Methyl Acetate	26 U	26	4.88
108-87-2	Methylcyclohexane	13 U	13	2.11
1634-04-4	Methyl(tert)butyl Ether	6.4 U	6.4	1.68
75-09-2	**Methylene Chloride**	**5.9 J**	26	1.56
100-42-5	Styrene	6.4 U	6.4	1.61
127-18-4	Tetrachloroethene	6.4 U	6.4	1.66
108-88-3	Toluene	6.4 U	6.4	1.50
79-01-6	Trichloroethene	6.4 U	6.4	2.42
75-69-4	Trichlorofluoromethane	6.4 U	6.4	0.911
75-01-4	Vinyl Chloride	6.4 U	6.4	1.61
1330-20-7	Xylene (Total)	6.4 U	6.4	1.98

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 09:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**ASB1B**	QC Batch:	90601 -122
Sample #:	**346249**	Anal. Batch:	208854
Matrix:	Soil	Percent Solids:	78
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 09:15
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/22/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**ASB1C**	QC Batch:	90601 -122
Sample #:	**346250**	Anal. Batch:	208508
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.5 U		6.5	2.09
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.5 U		6.5	0.840
79-34-5	1,1,2,2-Tetrachloroethane	6.5 U		6.5	1.95
79-00-5	1,1,2-Trichloroethane	6.5 U		6.5	1.66
75-34-3	1,1-Dichloroethane	6.5 U		6.5	1.76
75-35-4	1,1-Dichloroethylene	6.5 U		6.5	3.76
106-93-4	1,2-Dibromoethane	6.5 U		6.5	2.43
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	3.55
95-50-1	1,2-Dichlorobenzene	6.5 U		6.5	1.86
107-06-2	1,2-Dichloroethane	6.5 U		6.5	1.69
156-59-2	cis-1,2-Dichloroethene	6.5 U		6.5	2.22
156-60-5	trans-1,2-Dichloroethene	6.5 U		6.5	2.30
78-87-5	1,2-Dichloropropane	6.5 U		6.5	2.05
87-61-6	1,2,3-Trichlorobenzene	6.5 U		6.5	1.23
120-82-1	1,2,4-Trichlorobenzene	6.5 U		6.5	2.29
541-73-1	1,3-Dichlorobenzene	6.5 U		6.5	2.34
106-46-7	1,4-Dichlorobenzene	6.5 U		6.5	0.902
78-93-3	Methyl Ethyl Ketone	26 U		26	5.85
591-78-6	2-Hexanone	13 U		13	2.46
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.33
67-64-1	**Acetone**	**29**	B,Z	26	12.1
71-43-2	Benzene	6.5 U		6.5	0.872
74-97-5	Bromochloromethane	6.5 U		6.5	1.60
75-27-4	Dichlorobromomethane	6.5 U		6.5	0.616
75-25-2	Bromoform	6.5 U		6.5	1.77
74-83-9	Bromomethane	6.5 U		6.5	5.95
75-15-0	Carbon Disulfide	6.5 U	UJ,C	6.5	1.99
56-23-5	Carbon Tetrachloride	6.5 U		6.5	1.85
108-90-7	Chlorobenzene	6.5 U		6.5	0.590
75-00-3	Chloroethane	6.5 U		6.5	3.16
67-66-3	Chloroform	6.5 U		6.5	0.941

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 09:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**ASB1C**	QC Batch:	90601 -122
Sample #:	**346250**	Anal. Batch:	208508
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.5 U		6.5	0.736
110-82-7	Cyclohexane	13 U		13	1.72
10061-01-5	cis-1,3-Dichloropropene	6.5 U		6.5	1.40
10061-02-6	trans-1,3-Dichloropropene	6.5 U		6.5	2.11
75-71-8	Dichlorodifluoromethane	6.5 U		6.5	0.910
124-48-1	Chlorodibromomethane	6.5 U		6.5	0.729
100-41-4	Ethylbenzene	6.5 U		6.5	2.08
98-82-8	Isopropylbenzene	6.5 U		6.5	1.56
79-20-9	Methyl Acetate	26 U	UJ,c	26	4.88
108-87-2	Methylcyclohexane	13 U		13	2.11
1634-04-4	Methyl(tert)butyl Ether	6.5 U		6.5	1.68
75-09-2	**Methylene Chloride**	**6.6 J**	B,2	26	1.56
100-42-5	Styrene	6.5 U		6.5	1.61
127-18-4	Tetrachloroethene	6.5 U		6.5	1.66
108-88-3	Toluene	6.5 U		6.5	1.50
79-01-6	Trichloroethene	6.5 U		6.5	2.42
75-69-4	Trichlorofluoromethane	6.5 U		6.5	0.911
75-01-4	Vinyl Chloride	6.5 U		6.5	1.61
1330-20-7	Xylene (Total)	6.5 U		6.5	1.98

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ANALYTICAL REPORT

Client:	**URS Corporation**
Project:	Richmond, VA
	RAAP
Submittal #:	**36440-6**
Submittal:	Delivery Order 0046
	RAAP
Sample ID:	**ASB1C**
Sample #:	**346250**
Matrix:	Soil

Sampled:	10/11/03 @ 09:15
Sampler:	B.F.& J.S.
Received:	10/14/03 @ 09:30
Prepared:	n/a
Prep. Method:	n/a
Analyzed:	10/22/03 JDM
Anal. Method:	USEPA-8260B
QC Batch:	90601 -122
Anal. Batch:	208854
Percent Solids:	77
Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

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Individual sample results relate only to the sample tested.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 12:00
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/22/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**ASB3A**	QC Batch:	90601 -122
Sample #:	**346251**	Anal. Batch:	208854
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.2 U		6.2	1.93
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.2 U		6.2	0.775
79-34-5	1,1,2,2-Tetrachloroethane	6.2 U		6.2	1.80
79-00-5	1,1,2-Trichloroethane	6.2 U		6.2	1.54
75-34-3	1,1-Dichloroethane	6.2 U		6.2	1.62
75-35-4	1,1-Dichloroethylene	6.2 U		6.2	3.47
106-93-4	1,2-Dibromoethane	6.2 U		6.2	2.24
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	3.28
95-50-1	1,2-Dichlorobenzene	6.2 U		6.2	1.72
107-06-2	1,2-Dichloroethane	6.2 U		6.2	1.56
156-59-2	cis-1,2-Dichloroethene	6.2 U		6.2	2.05
156-60-5	trans-1,2-Dichloroethene	6.2 U		6.2	2.12
78-87-5	1,2-Dichloropropane	6.2 U		6.2	1.90
87-61-6	1,2,3-Trichlorobenzene	6.2 U		6.2	1.13
120-82-1	1,2,4-Trichlorobenzene	6.2 U		6.2	2.11
541-73-1	1,3-Dichlorobenzene	6.2 U		6.2	2.16
106-46-7	1,4-Dichlorobenzene	6.2 U		6.2	0.833
78-93-3	Methyl Ethyl Ketone	25 U		25	5.40
591-78-6	2-Hexanone	12 U		12	2.27
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.22
67-64-1	**Acetone**	**12 J**	B,Z	25	11.2
71-43-2	Benzene	6.2 U		6.2	0.805
74-97-5	Bromochloromethane	6.2 U		6.2	1.48
75-27-4	Dichlorobromomethane	6.2 U		6.2	0.569
75-25-2	Bromoform	6.2 U		6.2	1.63
74-83-9	Bromomethane	6.2 U		6.2	5.50
75-15-0	Carbon Disulfide	6.2 U		6.2	1.84
56-23-5	Carbon Tetrachloride	6.2 U		6.2	1.70
108-90-7	Chlorobenzene	6.2 U		6.2	0.545
75-00-3	Chloroethane	6.2 U	UJ,C	6.2	2.92
67-66-3	Chloroform	6.2 U		6.2	0.869

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 12:00
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/22/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**ASB3A**	QC Batch:	90601 -122
Sample #:	**346251**	Anal. Batch:	208854
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	6.2 U	6.2	0.679
110-82-7	Cyclohexane	12 U	12	1.58
10061-01-5	cis-1,3-Dichloropropene	6.2 U	6.2	1.30
10061-02-6	trans-1,3-Dichloropropene	6.2 U	6.2	1.94
75-71-8	Dichlorodifluoromethane	6.2 U	6.2	0.840
124-48-1	Chlorodibromomethane	6.2 U	6.2	0.673
100-41-4	Ethylbenzene	6.2 U	6.2	1.92
98-82-8	Isopropylbenzene	6.2 U	6.2	1.44
79-20-9	Methyl Acetate	25 U	25	4.50
108-87-2	Methylcyclohexane	12 U	12	1.94
1634-04-4	Methyl(tert)butyl Ether	6.2 U	6.2	1.55
75-09-2	**Methylene Chloride**	**5.3 J**	25	1.44
100-42-5	Styrene	6.2 U	6.2	1.49
127-18-4	Tetrachloroethene	6.2 U	6.2	1.54
108-88-3	Toluene	6.2 U	6.2	1.38
79-01-6	Trichloroethene	6.2 U	6.2	2.23
75-69-4	Trichlorofluoromethane	6.2 U	6.2	0.841
75-01-4	Vinyl Chloride	6.2 U	6.2	1.49
1330-20-7	Xylene (Total)	6.2 U	6.2	1.82

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 12:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**ASB3A**	QC Batch:	90601 -122
Sample #:	**346251**	Anal. Batch:	208854
Matrix:	Soil	Percent Solids:	80
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 12:15
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/22/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**ASB3B**	QC Batch:	90601 -122
Sample #:	**346252**	Anal. Batch:	208854
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.2 U		6.2	1.93
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.2 U		6.2	0.775
79-34-5	1,1,2,2-Tetrachloroethane	6.2 U		6.2	1.80
79-00-5	1,1,2-Trichloroethane	6.2 U		6.2	1.54
75-34-3	1,1-Dichloroethane	6.2 U		6.2	1.62
75-35-4	1,1-Dichloroethylene	6.2 U		6.2	3.47
106-93-4	1,2-Dibromoethane	6.2 U		6.2	2.24
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	3.28
95-50-1	1,2-Dichlorobenzene	6.2 U		6.2	1.72
107-06-2	1,2-Dichloroethane	6.2 U		6.2	1.56
156-59-2	cis-1,2-Dichloroethene	6.2 U		6.2	2.05
156-60-5	trans-1,2-Dichloroethene	6.2 U		6.2	2.12
78-87-5	1,2-Dichloropropane	6.2 U		6.2	1.90
87-61-6	1,2,3-Trichlorobenzene	6.2 U		6.2	1.13
120-82-1	1,2,4-Trichlorobenzene	6.2 U		6.2	2.11
541-73-1	1,3-Dichlorobenzene	6.2 U		6.2	2.16
106-46-7	1,4-Dichlorobenzene	6.2 U		6.2	0.833
78-93-3	Methyl Ethyl Ketone	25 U		25	5.40
591-78-6	2-Hexanone	12 U		12	2.27
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.22
67-64-1	**Acetone**	**19 J**	B,z	25	11.2
71-43-2	Benzene	6.2 U		6.2	0.805
74-97-5	Bromochloromethane	6.2 U		6.2	1.48
75-27-4	Dichlorobromomethane	6.2 U		6.2	0.569
75-25-2	Bromoform	6.2 U		6.2	1.63
74-83-9	Bromomethane	6.2 U		6.2	5.50
75-15-0	Carbon Disulfide	6.2 U		6.2	1.84
56-23-5	Carbon Tetrachloride	6.2 U		6.2	1.70
108-90-7	Chlorobenzene	6.2 U		6.2	0.545
75-00-3	Chloroethane	6.2 U	UJ,c	6.2	2.92
67-66-3	Chloroform	6.2 U		6.2	0.869

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 12:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**ASB3B**	QC Batch:	90601 -122
Sample #:	**346252**	Anal. Batch:	208854
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	6.2 U	6.2	0.679
110-82-7	Cyclohexane	12 U	12	1.58
10061-01-5	cis-1,3-Dichloropropene	6.2 U	6.2	1.30
10061-02-6	trans-1,3-Dichloropropene	6.2 U	6.2	1.94
75-71-8	Dichlorodifluoromethane	6.2 U	6.2	0.840
124-48-1	Chlorodibromomethane	6.2 U	6.2	0.673
100-41-4	Ethylbenzene	6.2 U	6.2	1.92
98-82-8	Isopropylbenzene	6.2 U	6.2	1.44
79-20-9	Methyl Acetate	25 U	25	4.50
108-87-2	Methylcyclohexane	12 U	12	1.94
1634-04-4	Methyl(tert)butyl Ether	6.2 U	6.2	1.55
75-09-2	**Methylene Chloride**	**6.6 J**	25	1.44
100-42-5	Styrene	6.2 U	6.2	1.49
127-18-4	Tetrachloroethene	6.2 U	6.2	1.54
108-88-3	Toluene	6.2 U	6.2	1.38
79-01-6	Trichloroethene	6.2 U	6.2	2.23
75-69-4	Trichlorofluoromethane	6.2 U	6.2	0.841
75-01-4	Vinyl Chloride	6.2 U	6.2	1.49
1330-20-7	Xylene (Total)	6.2 U	6.2	1.82

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 12:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**ASB3B**	QC Batch:	90601 -122
Sample #:	**346252**	Anal. Batch:	208854
Matrix:	Soil	Percent Solids:	80
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 12:30
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/22/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**ASB3C**	QC Batch:	90601 -122
Sample #:	**346253**	Anal. Batch:	208854
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.0 U		6.0	1.93
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.0 U		6.0	0.775
79-34-5	1,1,2,2-Tetrachloroethane	6.0 U		6.0	1.80
79-00-5	1,1,2-Trichloroethane	6.0 U		6.0	1.54
75-34-3	1,1-Dichloroethane	6.0 U		6.0	1.62
75-35-4	1,1-Dichloroethylene	6.0 U		6.0	3.47
106-93-4	1,2-Dibromoethane	6.0 U		6.0	2.24
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	3.28
95-50-1	1,2-Dichlorobenzene	6.0 U		6.0	1.72
107-06-2	1,2-Dichloroethane	6.0 U		6.0	1.56
156-59-2	cis-1,2-Dichloroethene	6.0 U		6.0	2.05
156-60-5	trans-1,2-Dichloroethene	6.0 U		6.0	2.12
78-87-5	1,2-Dichloropropane	6.0 U		6.0	1.90
87-61-6	1,2,3-Trichlorobenzene	6.0 U		6.0	1.13
120-82-1	1,2,4-Trichlorobenzene	6.0 U		6.0	2.11
541-73-1	1,3-Dichlorobenzene	6.0 U		6.0	2.16
106-46-7	1,4-Dichlorobenzene	6.0 U		6.0	0.833
78-93-3	Methyl Ethyl Ketone	24 U		24	5.40
591-78-6	2-Hexanone	12 U		12	2.27
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.22
67-64-1	**Acetone**	**18 J**	B,Z	24	11.2
71-43-2	Benzene	6.0 U		6.0	0.805
74-97-5	Bromochloromethane	6.0 U		6.0	1.48
75-27-4	Dichlorobromomethane	6.0 U		6.0	0.569
75-25-2	Bromoform	6.0 U		6.0	1.63
74-83-9	Bromomethane	6.0 U		6.0	5.50
75-15-0	Carbon Disulfide	6.0 U		6.0	1.84
56-23-5	Carbon Tetrachloride	6.0 U		6.0	1.70
108-90-7	Chlorobenzene	6.0 U		6.0	0.545
75-00-3	Chloroethane	6.0 U	UJ,C	6.0	2.92
67-66-3	Chloroform	6.0 U		6.0	0.869

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 12:30
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**ASB3C**	QC Batch:	90601 -122
Sample #:	**346253**	Anal. Batch:	208854
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	6.0 U	6.0	0.679
110-82-7	Cyclohexane	12 U	12	1.58
10061-01-5	cis-1,3-Dichloropropene	6.0 U	6.0	1.30
10061-02-6	trans-1,3-Dichloropropene	6.0 U	6.0	1.94
75-71-8	Dichlorodifluoromethane	6.0 U	6.0	0.840
124-48-1	Chlorodibromomethane	6.0 U	6.0	0.673
100-41-4	Ethylbenzene	6.0 U	6.0	1.92
98-82-8	Isopropylbenzene	6.0 U	6.0	1.44
79-20-9	Methyl Acetate	24 U	24	4.50
108-87-2	Methylcyclohexane	12 U	12	1.94
1634-04-4	Methyl(tert)butyl Ether	6.0 U	6.0	1.55
75-09-2	**Methylene Chloride**	**3.7 J**	24	1.44
100-42-5	Styrene	6.0 U	6.0	1.49
127-18-4	Tetrachloroethene	6.0 U	6.0	1.54
108-88-3	Toluene	6.0 U	6.0	1.38
79-01-6	Trichloroethene	6.0 U	6.0	2.23
75-69-4	Trichlorofluoromethane	6.0 U	6.0	0.841
75-01-4	Vinyl Chloride	6.0 U	6.0	1.49
1330-20-7	Xylene (Total)	6.0 U	6.0	1.82

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 12:30
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**ASB3C**	QC Batch:	90601 -122
Sample #:	**346253**	Anal. Batch:	208854
Matrix:	Soil	Percent Solids:	84
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 10:15
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/22/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**ASB2A**	QC Batch:	90601 -122
Sample #:	**346254**	Anal. Batch:	208854
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.2 U		6.2	1.93
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.2 U		6.2	0.775
79-34-5	1,1,2,2-Tetrachloroethane	6.2 U		6.2	1.80
79-00-5	1,1,2-Trichloroethane	6.2 U		6.2	1.54
75-34-3	1,1-Dichloroethane	6.2 U		6.2	1.62
75-35-4	1,1-Dichloroethylene	6.2 U		6.2	3.47
106-93-4	1,2-Dibromoethane	6.2 U		6.2	2.24
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	3.28
95-50-1	1,2-Dichlorobenzene	6.2 U		6.2	1.72
107-06-2	1,2-Dichloroethane	6.2 U		6.2	1.56
156-59-2	cis-1,2-Dichloroethene	6.2 U		6.2	2.05
156-60-5	trans-1,2-Dichloroethene	6.2 U		6.2	2.12
78-87-5	1,2-Dichloropropane	6.2 U		6.2	1.90
87-61-6	1,2,3-Trichlorobenzene	6.2 U		6.2	1.13
120-82-1	1,2,4-Trichlorobenzene	6.2 U		6.2	2.11
541-73-1	1,3-Dichlorobenzene	6.2 U		6.2	2.16
106-46-7	1,4-Dichlorobenzene	6.2 U		6.2	0.833
78-93-3	Methyl Ethyl Ketone	25 U		25	5.40
591-78-6	2-Hexanone	12 U		12	2.27
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.22
67-64-1	**Acetone**	**16 J**	B,Z	25	11.2
71-43-2	Benzene	6.2 U		6.2	0.805
74-97-5	Bromochloromethane	6.2 U		6.2	1.48
75-27-4	Dichlorobromomethane	6.2 U		6.2	0.569
75-25-2	Bromoform	6.2 U		6.2	1.63
74-83-9	Bromomethane	6.2 U		6.2	5.50
75-15-0	Carbon Disulfide	6.2 U		6.2	1.84
56-23-5	Carbon Tetrachloride	6.2 U		6.2	1.70
108-90-7	Chlorobenzene	6.2 U		6.2	0.545
75-00-3	Chloroethane	6.2 U	VJ,C	6.2	2.92
67-66-3	Chloroform	6.2 U		6.2	0.869

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 10:15
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/22/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**ASB2A**	QC Batch:	90601 -122
Sample #:	**346254**	Anal. Batch:	208854
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	6.2 U	6.2	0.679
110-82-7	Cyclohexane	12 U	12	1.58
10061-01-5	cis-1,3-Dichloropropene	6.2 U	6.2	1.30
10061-02-6	trans-1,3-Dichloropropene	6.2 U	6.2	1.94
75-71-8	Dichlorodifluoromethane	6.2 U	6.2	0.840
124-48-1	Chlorodibromomethane	6.2 U	6.2	0.673
100-41-4	Ethylbenzene	6.2 U	6.2	1.92
98-82-8	Isopropylbenzene	6.2 U	6.2	1.44
79-20-9	Methyl Acetate	25 U	25	4.50
108-87-2	Methylcyclohexane	12 U	12	1.94
1634-04-4	Methyl(tert)butyl Ether	6.2 U	6.2	1.55
75-09-2	**Methylene Chloride**	**4.5 J**	25	1.44
100-42-5	Styrene	6.2 U	6.2	1.49
127-18-4	Tetrachloroethene	6.2 U	6.2	1.54
108-88-3	Toluene	6.2 U	6.2	1.38
79-01-6	Trichloroethene	6.2 U	6.2	2.23
75-69-4	Trichlorofluoromethane	6.2 U	6.2	0.841
75-01-4	Vinyl Chloride	6.2 U	6.2	1.49
1330-20-7	Xylene (Total)	6.2 U	6.2	1.82

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**ASB2A**	QC Batch:	90601 -122
Sample #:	**346254**	Anal. Batch:	208854
Matrix:	Soil	Percent Solids:	80
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 10:10
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
Submittal #:	**36440-6**	Prepared:	n/a
Submittal:	Delivery Order 0046 RAAP	Prep. Method:	n/a
		Analyzed:	10/22/03 by JDM
Sample ID:	**ASB2B**	Anal. Method:	USEPA-8260B
Sample #:	**346255**	QC Batch:	90601 -122
Matrix:	Soil	Anal. Batch:	208854
Unit:	ug/kg dry	Percent Solids:	76
		Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.6 U		6.6	2.09
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.6 U		6.6	0.840
79-34-5	1,1,2,2-Tetrachloroethane	6.6 U		6.6	1.95
79-00-5	1,1,2-Trichloroethane	6.6 U		6.6	1.66
75-34-3	1,1-Dichloroethane	6.6 U		6.6	1.76
75-35-4	1,1-Dichloroethylene	6.6 U		6.6	3.76
106-93-4	1,2-Dibromoethane	6.6 U		6.6	2.43
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	3.55
95-50-1	1,2-Dichlorobenzene	6.6 U		6.6	1.86
107-06-2	1,2-Dichloroethane	6.6 U		6.6	1.69
156-59-2	cis-1,2-Dichloroethene	6.6 U		6.6	2.22
156-60-5	trans-1,2-Dichloroethene	6.6 U		6.6	2.30
78-87-5	1,2-Dichloropropane	6.6 U		6.6	2.05
87-61-6	1,2,3-Trichlorobenzene	6.6 U		6.6	1.23
120-82-1	1,2,4-Trichlorobenzene	6.6 U		6.6	2.29
541-73-1	1,3-Dichlorobenzene	6.6 U		6.6	2.34
106-46-7	1,4-Dichlorobenzene	6.6 U		6.6	0.902
78-93-3	Methyl Ethyl Ketone	26 U		26	5.85
591-78-6	2-Hexanone	13 U		13	2.46
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.33
67-64-1	**Acetone**	**23 J**	B,Z	26	12.1
71-43-2	Benzene	6.6 U		6.6	0.872
74-97-5	Bromochloromethane	6.6 U		6.6	1.60
75-27-4	Dichlorobromomethane	6.6 U		6.6	0.616
75-25-2	Bromoform	6.6 U		6.6	1.77
74-83-9	Bromomethane	6.6 U		6.6	5.95
75-15-0	Carbon Disulfide	6.6 U		6.6	1.99
56-23-5	Carbon Tetrachloride	6.6 U		6.6	1.85
108-90-7	Chlorobenzene	6.6 U		6.6	0.590
75-00-3	Chloroethane	6.6 U	UJ,C	6.6	3.16
67-66-3	Chloroform	6.6 U		6.6	0.941

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 10:10
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**ASB2B**	QC Batch:	90601 -122
Sample #:	**346255**	Anal. Batch:	208854
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	6.6 U	6.6	0.736
110-82-7	Cyclohexane	13 U	13	1.72
10061-01-5	cis-1,3-Dichloropropene	6.6 U	6.6	1.40
10061-02-6	trans-1,3-Dichloropropene	6.6 U	6.6	2.11
75-71-8	Dichlorodifluoromethane	6.6 U	6.6	0.910
124-48-1	Chlorodibromomethane	6.6 U	6.6	0.729
100-41-4	Ethylbenzene	6.6 U	6.6	2.08
98-82-8	Isopropylbenzene	6.6 U	6.6	1.56
79-20-9	Methyl Acetate	26 U	26	4.88
108-87-2	Methylcyclohexane	13 U	13	2.11
1634-04-4	Methyl(tert)butyl Ether	6.6 U	6.6	1.68
75-09-2	**Methylene Chloride**	**7.7 J**	26	1.56
100-42-5	Styrene	6.6 U	6.6	1.61
127-18-4	Tetrachloroethene	6.6 U	6.6	1.66
108-88-3	Toluene	6.6 U	6.6	1.50
79-01-6	Trichloroethene	6.6 U	6.6	2.42
75-69-4	Trichlorofluoromethane	6.6 U	6.6	0.911
75-01-4	Vinyl Chloride	6.6 U	6.6	1.61
1330-20-7	Xylene (Total)	6.6 U	6.6	1.98

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 10:10
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**ASB2B**	QC Batch:	90601 -122
Sample #:	**346255**	Anal. Batch:	208854
Matrix:	Soil	Percent Solids:	76
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 00:00
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/22/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**SBD-10**	QC Batch:	90601 -122
Sample #:	**346256**	Anal. Batch:	208854
Matrix:	Soil	Percent Solids:	72
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.9 U		6.9	2.25
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.9 U		6.9	0.904
79-34-5	1,1,2,2-Tetrachloroethane	6.9 U		6.9	2.10
79-00-5	1,1,2-Trichloroethane	6.9 U		6.9	1.79
75-34-3	1,1-Dichloroethane	6.9 U		6.9	1.89
75-35-4	1,1-Dichloroethylene	6.9 U		6.9	4.05
106-93-4	1,2-Dibromoethane	6.9 U		6.9	2.62
96-12-8	1,2-Dibromo-3-chloropropane	14 U		14	3.82
95-50-1	1,2-Dichlorobenzene	6.9 U		6.9	2.00
107-06-2	1,2-Dichloroethane	6.9 U		6.9	1.82
156-59-2	cis-1,2-Dichloroethene	6.9 U		6.9	2.39
156-60-5	trans-1,2-Dichloroethene	6.9 U		6.9	2.48
78-87-5	1,2-Dichloropropane	6.9 U		6.9	2.21
87-61-6	1,2,3-Trichlorobenzene	6.9 U		6.9	1.32
120-82-1	1,2,4-Trichlorobenzene	6.9 U		6.9	2.46
541-73-1	1,3-Dichlorobenzene	6.9 U		6.9	2.52
106-46-7	1,4-Dichlorobenzene	6.9 U		6.9	0.972
78-93-3	Methyl Ethyl Ketone	28 U		28	6.30
591-78-6	2-Hexanone	14 U		14	2.65
108-10-1	4-Methyl-2-Pentanone	14 U		14	1.43
67-64-1	**Acetone**	**24 J**	B,Z	28	13.1
71-43-2	Benzene	6.9 U		6.9	0.939
74-97-5	Bromochloromethane	6.9 U		6.9	1.72
75-27-4	Dichlorobromomethane	6.9 U		6.9	0.664
75-25-2	Bromoform	6.9 U		6.9	1.90
74-83-9	Bromomethane	6.9 U		6.9	6.41
75-15-0	Carbon Disulfide	6.9 U		6.9	2.14
56-23-5	Carbon Tetrachloride	6.9 U		6.9	1.99
108-90-7	Chlorobenzene	6.9 U		6.9	0.636
75-00-3	Chloroethane	6.9 U	UJ,C	6.9	3.40
67-66-3	Chloroform	6.9 U		6.9	1.01

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 00:00
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/22/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**SBD-10**	QC Batch:	90601 -122
Sample #:	**346256**	Anal. Batch:	208854
Matrix:	Soil	Percent Solids:	72
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	6.9 U	6.9	0.792
110-82-7	Cyclohexane	14 U	14	1.85
10061-01-5	cis-1,3-Dichloropropene	6.9 U	6.9	1.51
10061-02-6	trans-1,3-Dichloropropene	6.9 U	6.9	2.27
75-71-8	Dichlorodifluoromethane	6.9 U	6.9	0.980
124-48-1	Chlorodibromomethane	6.9 U	6.9	0.785
100-41-4	Ethylbenzene	6.9 U	6.9	2.24
98-82-8	Isopropylbenzene	6.9 U	6.9	1.68
79-20-9	Methyl Acetate	28 U	28	5.25
108-87-2	Methylcyclohexane	14 U	14	2.27
1634-04-4	Methyl(tert)butyl Ether	6.9 U	6.9	1.81
75-09-2	**Methylene Chloride**	**7.0 J**	28	1.68
100-42-5	Styrene	6.9 U	6.9	1.74
127-18-4	Tetrachloroethene	6.9 U	6.9	1.79
108-88-3	Toluene	6.9 U	6.9	1.61
79-01-6	Trichloroethene	6.9 U	6.9	2.60
75-69-4	Trichlorofluoromethane	6.9 U	6.9	0.981
75-01-4	Vinyl Chloride	6.9 U	6.9	1.74
1330-20-7	Xylene (Total)	6.9 U	6.9	2.13

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD-10**	QC Batch:	90601 -122
Sample #:	**346256**	Anal. Batch:	208854
Matrix:	Soil	Percent Solids:	72
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 11:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**ASB2C**	QC Batch:	90601 -122
Sample #:	**346257**	Anal. Batch:	208854
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.8 U		6.8	2.25
76-13-1	*1,1,2-Trichloro-1,2,2-trifluoroethane	6.8 U		6.8	0.904
79-34-5	1,1,2,2-Tetrachloroethane	6.8 U		6.8	2.10
79-00-5	1,1,2-Trichloroethane	6.8 U		6.8	1.79
75-34-3	1,1-Dichloroethane	6.8 U		6.8	1.89
75-35-4	1,1-Dichloroethylene	6.8 U		6.8	4.05
106-93-4	1,2-Dibromoethane	6.8 U		6.8	2.62
96-12-8	1,2-Dibromo-3-chloropropane	14 U		14	3.82
95-50-1	1,2-Dichlorobenzene	6.8 U		6.8	2.00
107-06-2	1,2-Dichloroethane	6.8 U		6.8	1.82
156-59-2	cis-1,2-Dichloroethene	6.8 U		6.8	2.39
156-60-5	*trans-1,2-Dichloroethene	6.8 U		6.8	2.48
78-87-5	1,2-Dichloropropane	6.8 U		6.8	2.21
87-61-6	1,2,3-Trichlorobenzene	6.8 U		6.8	1.32
120-82-1	1,2,4-Trichlorobenzene	6.8 U		6.8	2.46
541-73-1	1,3-Dichlorobenzene	6.8 U		6.8	2.52
106-46-7	1,4-Dichlorobenzene	6.8 U		6.8	0.972
78-93-3	Methyl Ethyl Ketone	27 U		27	6.30
591-78-6	2-Hexanone	14 U		14	2.65
108-10-1	4-Methyl-2-Pentanone	14 U		14	1.43
67-64-1	***Acetone**	**23 J**	B,Z	27	13.1
71-43-2	Benzene	6.8 U		6.8	0.939
74-97-5	Bromochloromethane	6.8 U		6.8	1.72
75-27-4	Dichlorobromomethane	6.8 U		6.8	0.664
75-25-2	Bromoform	6.8 U		6.8	1.90
74-83-9	Bromomethane	6.8 U		6.8	6.41
75-15-0	Carbon Disulfide	6.8 U		6.8	2.14
56-23-5	*Carbon Tetrachloride	6.8 U		6.8	1.99
108-90-7	Chlorobenzene	6.8 U		6.8	0.636
75-00-3	Chloroethane	6.8 U	UJ,C	6.8	3.40
67-66-3	Chloroform	6.8 U		6.8	1.01

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 11:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**ASB2C**	QC Batch:	90601 -122
Sample #:	**346257**	Anal. Batch:	208854
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	6.8 U	6.8	0.792
110-82-7	Cyclohexane	14 U	14	1.85
10061-01-5	cis-1,3-Dichloropropene	6.8 U	6.8	1.51
10061-02-6	trans-1,3-Dichloropropene	6.8 U	6.8	2.27
75-71-8	Dichlorodifluoromethane	6.8 U	6.8	0.980
124-48-1	Chlorodibromomethane	6.8 U	6.8	0.785
100-41-4	Ethylbenzene	6.8 U	6.8	2.24
98-82-8	Isopropylbenzene	6.8 U	6.8	1.68
79-20-9	Methyl Acetate	27 U	27	5.25
108-87-2	*Methylcyclohexane	14 U	14	2.27
1634-04-4	Methyl(tert)butyl Ether	6.8 U	6.8	1.81
75-09-2	**Methylene Chloride**	**11 J**	27	1.68
100-42-5	Styrene	6.8 U	6.8	1.74
127-18-4	Tetrachloroethene	6.8 U	6.8	1.79
108-88-3	Toluene	6.8 U	6.8	1.61
79-01-6	Trichloroethene	6.8 U	6.8	2.60
75-69-4	Trichlorofluoromethane	6.8 U	6.8	0.981
75-01-4	*Vinyl Chloride	6.8 U	6.8	1.74
1330-20-7	Xylene (Total)	6.8 U	6.8	2.13

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 11:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**ASB2C**	QC Batch:	90601 -122
Sample #:	**346257**	Anal. Batch:	208854
Matrix:	Soil	Percent Solids:	73
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 09:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/11/03 @ 08:45
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3510C
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/03/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**EQB5**	QC Batch:	90165 -116
Sample #:	**346013**	Anal. Batch:	209010
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	5.0 U		5.0	0.013
95-94-3	1,2,4,5-Tetrachloro-benzene	5.0 U		5.0	0.775
108-60-1	Bis (2-Chloroisopropyl)-Ether	5.0 U		5.0	0.014
95-95-4	2,4,5-Trichlorophenol	5.0 U		5.0	0.014
88-06-2	2,4,6-Trichlorophenol	5.0 U		5.0	0.015
120-83-2	2,4-Dichlorophenol	5.0 U		5.0	0.018
105-67-9	2,4-Dimethylphenol	5.0 U		5.0	0.198
51-28-5	2,4-Dinitrophenol	10 U	VJ,C	10	1.24
121-14-2	2,4-Dinitrotoluene	5.0 U		5.0	0.007
606-20-2	2,6-Dinitrotoluene	5.0 U		5.0	0.052
91-58-7	2-Chloronaphthalene	5.0 U		5.0	0.005
95-57-8	2-Chlorophenol	5.0 U		5.0	0.011
91-57-6	2-Methylnaphthalene	5.0 U		5.0	0.084
95-48-7	2-Methylphenol	5.0 U		5.0	0.007
88-74-4	2-Nitroaniline	5.0 U		5.0	0.010
88-75-5	2-Nitrophenol	5.0 U		5.0	0.011
91-94-1	3,3'-Dichlorobenzidine	5.0 U		5.0	0.058
99-09-2	3-Nitroaniline	5.0 U		5.0	0.032
534-52-1	4,6-Dinitro-2-Methylphenol	5.0 U		5.0	0.054
101-55-3	4-Bromophenyl Phenylether	5.0 U		5.0	0.019
59-50-7	4-Chloro-3-Methylphenol	5.0 U		5.0	0.018
106-47-8	4-Chloroaniline	5.0 U		5.0	0.011
7005-72-3	4-Chlorophenylphenyl-Ether	5.0 U		5.0	0.015
106-44-5	4-Methylphenol	5.0 U		5.0	0.014
100-01-6	4-Nitroaniline	5.0 U		5.0	0.070
100-02-7	4-Nitrophenol	10 U		10	0.134
83-32-9	Acenaphthene	5.0 U		5.0	0.008
208-96-8	Acenaphthylene	5.0 U		5.0	0.007
98-86-2	Acetophenone	5.0 U		5.0	0.011

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3510C
Submittal:	Delivery Order 0046	Analyzed:	11/03/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**EQB5**	QC Batch:	90165 -116
Sample #:	**346013**	Anal. Batch:	209010
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	5.0 U		5.0	0.014
1912-24-9	Atrazine	5.0 U		5.0	0.018
100-52-7	Benzaldehyde	5.0 U		5.0	0.616
56-55-3	Benzo (a) Anthracene	5.0 U		5.0	0.022
50-32-8	Benzo (a) Pyrene	5.0 U		5.0	0.025
205-99-2	Benzo (b) Fluoranthene	5.0 U		5.0	0.019
191-24-2	Benzo (g,h,i,) Perylene	5.0 U		5.0	0.046
207-08-9	Benzo (k) Fluoranthene	5.0 U		5.0	0.064
111-91-1	Bis (2-Chloroethoxy)-Methane	5.0 U		5.0	0.013
111-44-4	Bis (2-Chloroethyl) Ether	5.0 U		5.0	0.012
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**0.35 J**	B,Z	5.0	0.149
85-68-7	**Butyl Benzyl Phthalate**	**0.060 J**	B,Z	5.0	0.015
105-60-2	Caprolactam	5.0 U	UJ,I	5.0	0.024
86-74-8	Carbazole	5.0 U	UJ,C	5.0	0.015
218-01-9	Chrysene	5.0 U		5.0	0.025
53-70-3	Dibenzo (a,h) Anthracene	5.0 U		5.0	0.025
132-64-9	Dibenzofuran	5.0 U		5.0	0.014
84-66-2	Diethylphthalate	5.0 U		5.0	0.074
131-11-3	Dimethylphthalate	5.0 U		5.0	0.013
84-74-2	Di-n-Butylphthalate	5.0 U		5.0	1.60
117-84-0	Di-n-Octylphthalate	5.0 U		5.0	0.162
206-44-0	Fluoranthene	5.0 U		5.0	0.024
86-73-7	Fluorene	5.0 U		5.0	0.012
118-74-1	Hexachlorobenzene	5.0 U		5.0	0.011
87-68-3	Hexachlorobutadiene	5.0 U		5.0	0.019
77-47-4	Hexachlorocyclopentadiene	5.0 U	UJ,I	5.0	0.016
67-72-1	Hexachloroethane	5.0 U		5.0	0.023
193-39-5	Indeno (1,2,3-cd) Pyrene	5.0 U		5.0	0.033
78-59-1	Isophorone	5.0 U		5.0	0.017
91-20-3	Naphthalene	5.0 U		5.0	0.006
98-95-3	Nitrobenzene	5.0 U		5.0	0.012

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Individual sample results relate only to the sample tested.
5560 Corporate Exchange Court SE • Grand Rapids, MI 49512 • (616) 975-4500 • Fax (616) 942-7463

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3510C
Submittal:	Delivery Order 0046	Analyzed:	11/03/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**EQB5**	QC Batch:	90165 -116
Sample #:	**346013**	Anal. Batch:	209010
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	5.0 U	5.0	0.017
86-30-6	N-Nitroso-di-Phenylamine	5.0 U	5.0	0.019
87-86-5	Pentachlorophenol	10 U	10	0.075
85-01-8	Phenanthrene	5.0 U	5.0	0.016
108-95-2	Phenol	5.0 U	5.0	0.006
129-00-0	Pyrene	5.0 U	5.0	0.033

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 09:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/11/03 @ 08:45
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/03/03 JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**EQB5**	QC Batch:	90165 -116
Sample #:	**346013**	Anal. Batch:	209010
Matrix:	QC Water	Percent Solids:	n/a
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/L)**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	0.57	E	NJ,+
1-HEXACOSANOL	506-52-5	0.64	E	NJ,+
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	1.22	E	NJ,+
Erucylamide	112-84-5	9.63	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3510C
Submittal:	Delivery Order 0046	Analyzed:	11/03/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**EQB6**	QC Batch:	90165 -116
Sample #:	**346015**	Anal. Batch:	209010
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	5.0 U		5.0	0.013
95-94-3	1,2,4,5-Tetrachloro-benzene	5.0 U		5.0	0.775
108-60-1	Bis (2-Chloroisopropyl)-Ether	5.0 U		5.0	0.014
95-95-4	2,4,5-Trichlorophenol	5.0 U		5.0	0.014
88-06-2	2,4,6-Trichlorophenol	5.0 U		5.0	0.015
120-83-2	2,4-Dichlorophenol	5.0 U		5.0	0.018
105-67-9	2,4-Dimethylphenol	5.0 U		5.0	0.198
51-28-5	2,4-Dinitrophenol	10 U	UJ,C	10	1.24
121-14-2	2,4-Dinitrotoluene	5.0 U		5.0	0.007
606-20-2	2,6-Dinitrotoluene	5.0 U		5.0	0.052
91-58-7	2-Chloronaphthalene	5.0 U		5.0	0.005
95-57-8	2-Chlorophenol	5.0 U		5.0	0.011
91-57-6	2-Methylnaphthalene	5.0 U		5.0	0.084
95-48-7	2-Methylphenol	5.0 U		5.0	0.007
88-74-4	2-Nitroaniline	5.0 U		5.0	0.010
88-75-5	2-Nitrophenol	5.0 U		5.0	0.011
91-94-1	3,3'-Dichlorobenzidine	5.0 U		5.0	0.058
99-09-2	3-Nitroaniline	5.0 U		5.0	0.032
534-52-1	4,6-Dinitro-2-Methylphenol	5.0 U		5.0	0.054
101-55-3	4-Bromophenyl Phenylether	5.0 U		5.0	0.019
59-50-7	4-Chloro-3-Methylphenol	5.0 U		5.0	0.018
106-47-8	4-Chloroaniline	5.0 U		5.0	0.011
7005-72-3	4-Chlorophenylphenyl-Ether	5.0 U		5.0	0.015
106-44-5	4-Methylphenol	5.0 U		5.0	0.014
100-01-6	4-Nitroaniline	5.0 U		5.0	0.070
100-02-7	4-Nitrophenol	10 U		10	0.134
83-32-9	Acenaphthene	5.0 U		5.0	0.008
208-96-8	Acenaphthylene	5.0 U		5.0	0.007
98-86-2	Acetophenone	5.0 U		5.0	0.011

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Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
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		Prepared:	10/16/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3510C
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/03/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**EQB6**	QC Batch:	90165 -116
Sample #:	**346015**	Anal. Batch:	209010
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	5.0 U		5.0	0.014
1912-24-9	Atrazine	5.0 U		5.0	0.018
100-52-7	Benzaldehyde	5.0 U		5.0	0.616
56-55-3	Benzo (a) Anthracene	5.0 U		5.0	0.022
50-32-8	Benzo (a) Pyrene	5.0 U		5.0	0.025
205-99-2	Benzo (b) Fluoranthene	5.0 U		5.0	0.019
191-24-2	Benzo (g,h,i,) Perylene	5.0 U		5.0	0.046
207-08-9	Benzo (k) Fluoranthene	5.0 U		5.0	0.064
111-91-1	Bis (2-Chloroethoxy)-Methane	5.0 U		5.0	0.013
111-44-4	Bis (2-Chloroethyl) Ether	5.0 U		5.0	0.012
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**0.29 J**	B,Z	5.0	0.149
85-68-7	**Butyl Benzyl Phthalate**	**0.050 J**	B,Z	5.0	0.015
105-60-2	Caprolactam	5.0 U	UJ,I	5.0	0.024
86-74-8	Carbazole	5.0 U	UJ,C	5.0	0.015
218-01-9	Chrysene	5.0 U		5.0	0.025
53-70-3	Dibenzo (a,h) Anthracene	5.0 U		5.0	0.025
132-64-9	Dibenzofuran	5.0 U		5.0	0.014
84-66-2	Diethylphthalate	5.0 U		5.0	0.074
131-11-3	Dimethylphthalate	5.0 U		5.0	0.013
84-74-2	Di-n-Butylphthalate	5.0 U		5.0	1.60
117-84-0	Di-n-Octylphthalate	5.0 U		5.0	0.162
206-44-0	Fluoranthene	5.0 U		5.0	0.024
86-73-7	Fluorene	5.0 U		5.0	0.012
118-74-1	Hexachlorobenzene	5.0 U		5.0	0.011
87-68-3	Hexachlorobutadiene	5.0 U		5.0	0.019
77-47-4	Hexachlorocyclopentadiene	5.0 U	UJ,I	5.0	0.016
67-72-1	Hexachloroethane	5.0 U		5.0	0.023
193-39-5	Indeno (1,2,3-cd) Pyrene	5.0 U		5.0	0.033
78-59-1	Isophorone	5.0 U		5.0	0.017
91-20-3	Naphthalene	5.0 U		5.0	0.006
98-95-3	Nitrobenzene	5.0 U		5.0	0.012

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	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3510C
Submittal:	Delivery Order 0046	Analyzed:	11/03/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**EQB6**	QC Batch:	90165 -116
Sample #:	**346015**	Anal. Batch:	209010
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	5.0 U	5.0	0.017
86-30-6	N-Nitroso-di-Phenylamine	5.0 U	5.0	0.019
87-86-5	Pentachlorophenol	10 U	10	0.075
85-01-8	Phenanthrene	5.0 U	5.0	0.016
108-95-2	Phenol	5.0 U	5.0	0.006
129-00-0	Pyrene	5.0 U	5.0	0.033

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Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/03/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**EQB6**	QC Batch:	90165 -116
Sample #:	**346015**	Anal. Batch:	209010
Matrix:	QC Water	Percent Solids:	n/a
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/L)**	**Qualifier**	
1-HEXACOSANOL	506-52-5	0.65	E	NJ,+
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	0.75	E	NJ,+
Erucylamide	112-84-5	6.94	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SD3**	QC Batch:	90572 -114
Sample #:	**346017**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	68
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	250 U		250	3.69
95-94-3	1,2,4,5-Tetrachloro-benzene	250 U		250	43.1
108-60-1	Bis (2-Chloroisopropyl)-Ether	250 U		250	1.98
95-95-4	2,4,5-Trichlorophenol	250 U		250	5.01
88-06-2	2,4,6-Trichlorophenol	250 U		250	3.93
120-83-2	2,4-Dichlorophenol	250 U		250	5.28
105-67-9	2,4-Dimethylphenol	250 U		250	11.9
51-28-5	2,4-Dinitrophenol	480 U	UJ,C	480	4.80
121-14-2	2,4-Dinitrotoluene	250 U		250	4.73
606-20-2	2,6-Dinitrotoluene	250 U		250	41.6
91-58-7	2-Chloronaphthalene	250 U		250	3.45
95-57-8	2-Chlorophenol	250 U		250	3.02
91-57-6	**2-Methylnaphthalene**	**7.0 J**		250	4.11
95-48-7	2-Methylphenol	250 U		250	7.26
88-74-4	2-Nitroaniline	250 U		250	6.90
88-75-5	2-Nitrophenol	250 U		250	2.55
91-94-1	3,3'-Dichlorobenzidine	250 U		250	83.1
99-09-2	3-Nitroaniline	250 U		250	27.5
534-52-1	4,6-Dinitro-2-Methylphenol	250 U		250	6.77
101-55-3	4-Bromophenyl Phenylether	250 U		250	5.07
59-50-7	4-Chloro-3-Methylphenol	250 U		250	7.82
106-47-8	4-Chloroaniline	250 U		250	1.89
7005-72-3	4-Chlorophenylphenyl-Ether	250 U		250	4.91
106-44-5	4-Methylphenol	250 U		250	9.56
100-01-6	4-Nitroaniline	250 U		250	10.9
100-02-7	4-Nitrophenol	480 U		480	4.25
83-32-9	Acenaphthene	250 U		250	2.58
208-96-8	**Acenaphthylene**	**9.0 J**		250	2.25
98-86-2	Acetophenone	250 U		250	2.85

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SD3**	QC Batch:	90572 -114
Sample #:	**346017**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	68
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	**Anthracene**	**44 J**		250	6.93
1912-24-9	Atrazine	250 U		250	10.3
100-52-7	Benzaldehyde	250 U		250	6.08
56-55-3	**Benzo (a) Anthracene**	**86 J**		250	20.0
50-32-8	**Benzo (a) Pyrene**	**140 J**		250	8.57
205-99-2	**Benzo (b) Fluoranthene**	**190 J**		250	14.6
191-24-2	**Benzo (g,h,i,) Perylene**	**110 J**		250	13.1
207-08-9	**Benzo (k) Fluoranthene**	**92 J**		250	20.1
111-91-1	Bis (2-Chloroethoxy)-Methane	250 U		250	4.71
111-44-4	Bis (2-Chloroethyl) Ether	250 U		250	2.60
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**41 J**		250	3.11
85-68-7	Butyl Benzyl Phthalate	250 U		250	6.72
105-60-2	Caprolactam	480 U		480	9.57
86-74-8	Carbazole	250 U		250	9.15
218-01-9	**Chrysene**	**220 J**		250	15.3
53-70-3	**Dibenzo (a,h) Anthracene**	**42 J**		250	8.85
132-64-9	Dibenzofuran	250 U		250	4.74
84-66-2	**Diethylphthalate**	**18 J**		250	2.85
131-11-3	**Dimethylphthalate**	**1400**	J,f	250	4.97
84-74-2	**Di-n-Butylphthalate**	**130 J**		250	5.73
117-84-0	Di-n-Octylphthalate	250 U		250	4.65
206-44-0	**Fluoranthene**	**34 J**		250	3.53
86-73-7	**Fluorene**	**4.0 J**		250	2.52
118-74-1	Hexachlorobenzene	250 U		250	3.77
87-68-3	Hexachlorobutadiene	250 U		250	5.81
77-47-4	Hexachlorocyclopentadiene	250 U	UJ,c	250	2.97
67-72-1	Hexachloroethane	250 U		250	3.50
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**100 J**		250	5.88
78-59-1	Isophorone	250 U		250	2.60
91-20-3	**Naphthalene**	**5.0 J**		250	4.13
98-95-3	Nitrobenzene	250 U		250	4.80

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SD3**	QC Batch:	90572 -114
Sample #:	**346017**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	68
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	250 U	250	4.94
86-30-6	N-Nitroso-di-Phenylamine	250 U	250	7.13
87-86-5	Pentachlorophenol	480 U	480	6.59
85-01-8	**Phenanthrene**	**29 J**	250	3.45
108-95-2	Phenol	250 U	250	5.94
129-00-0	**Pyrene**	**37 J**	250	2.22

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SD3**	QC Batch:	90572 -114
Sample #:	**346017**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	68
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	300	E	NJ,+
Benzeneamine, 2-nitro-N-phenyl-	119-75-5	350	E	NJ,+
Erucylamide	112-84-5	400	E	NJ,+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~150~~	~~E~~	
Perylene	198-55-0	170	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SDD1**	QC Batch:	90572 -114
Sample #:	**346018**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	63
Unit:	ug/kg dry	Dilution Factor:	1.6

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	270 U		270	3.94
95-94-3	1,2,4,5-Tetrachloro-benzene	270 U		270	45.9
108-60-1	Bis (2-Chloroisopropyl)-Ether	270 U		270	2.11
95-95-4	2,4,5-Trichlorophenol	270 U		270	5.34
88-06-2	2,4,6-Trichlorophenol	270 U		270	4.19
120-83-2	2,4-Dichlorophenol	270 U		270	5.63
105-67-9	2,4-Dimethylphenol	270 U		270	12.7
51-28-5	2,4-Dinitrophenol	520 U	UJ,C	520	5.12
121-14-2	2,4-Dinitrotoluene	270 U		270	5.04
606-20-2	2,6-Dinitrotoluene	270 U		270	44.3
91-58-7	2-Chloronaphthalene	270 U		270	3.68
95-57-8	2-Chlorophenol	270 U		270	3.22
91-57-6	2-Methylnaphthalene	270 U		270	4.38
95-48-7	2-Methylphenol	270 U		270	7.74
88-74-4	2-Nitroaniline	270 U		270	7.36
88-75-5	2-Nitrophenol	270 U		270	2.72
91-94-1	3,3'-Dichlorobenzidine	270 U		270	88.6
99-09-2	3-Nitroaniline	270 U		270	29.3
534-52-1	4,6-Dinitro-2-Methylphenol	270 U		270	7.22
101-55-3	4-Bromophenyl Phenylether	270 U		270	5.41
59-50-7	4-Chloro-3-Methylphenol	270 U		270	8.34
106-47-8	4-Chloroaniline	270 U		270	2.02
7005-72-3	4-Chlorophenylphenyl-Ether	270 U		270	5.23
106-44-5	4-Methylphenol	270 U		270	10.2
100-01-6	4-Nitroaniline	270 U		270	11.6
100-02-7	4-Nitrophenol	520 U		520	4.53
83-32-9	Acenaphthene	270 U		270	2.75
208-96-8	**Acenaphthylene**	**3.0 J**		270	2.40
98-86-2	Acetophenone	270 U		270	3.04

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SDD1**	QC Batch:	90572 -114
Sample #:	**346018**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	63
Unit:	ug/kg dry	Dilution Factor:	1.6

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	**Anthracene**	**12 J**		270	7.39
1912-24-9	Atrazine	270 U		270	11.0
100-52-7	Benzaldehyde	270 U		270	6.48
56-55-3	**Benzo (a) Anthracene**	**30 J**		270	21.3
50-32-8	**Benzo (a) Pyrene**	**53 J**		270	9.14
205-99-2	**Benzo (b) Fluoranthene**	**86 J**		270	15.6
191-24-2	**Benzo (g,h,i,) Perylene**	**27 J**		270	14.0
207-08-9	**Benzo (k) Fluoranthene**	**36 J**		270	21.4
111-91-1	Bis (2-Chloroethoxy)-Methane	270 U		270	5.02
111-44-4	Bis (2-Chloroethyl) Ether	270 U		270	2.77
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**35 J**		270	3.31
85-68-7	Butyl Benzyl Phthalate	270 U		270	7.17
105-60-2	Caprolactam	520 U		520	10.2
86-74-8	Carbazole	270 U		270	9.76
218-01-9	**Chrysene**	**64 J**		270	16.3
53-70-3	Dibenzo (a,h) Anthracene	270 U		270	9.44
132-64-9	Dibenzofuran	270 U		270	5.06
84-66-2	**Diethylphthalate**	**22 J**		270	3.04
131-11-3	Dimethylphthalate	270 U	UJ,f	270	5.30
84-74-2	**Di-n-Butylphthalate**	**110 J**		270	6.11
117-84-0	Di-n-Octylphthalate	270 U		270	4.96
206-44-0	**Fluoranthene**	**26 J**		270	3.76
86-73-7	Fluorene	270 U		270	2.69
118-74-1	Hexachlorobenzene	270 U		270	4.02
87-68-3	Hexachlorobutadiene	270 U		270	6.19
77-47-4	Hexachlorocyclopentadiene	270 U	UJ,c	270	3.17
67-72-1	Hexachloroethane	270 U		270	3.73
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**30 J**		270	6.27
78-59-1	Isophorone	270 U		270	2.77
91-20-3	Naphthalene	270 U		270	4.40
98-95-3	Nitrobenzene	270 U		270	5.12

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SDD1**	QC Batch:	90572 -114
Sample #:	**346018**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	63
Unit:	ug/kg dry	Dilution Factor:	1.6

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	270 U	270	5.26
86-30-6	N-Nitroso-di-Phenylamine	270 U	270	7.60
87-86-5	Pentachlorophenol	520 U	520	7.02
85-01-8	**Phenanthrene**	**14 J**	270	3.68
108-95-2	Phenol	270 U	270	6.34
129-00-0	**Pyrene**	**23 J**	270	2.37

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SDD1**	QC Batch:	90572 -114
Sample #:	**346018**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	63
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	170	E	NJ,+
Benzeneamine, 2-nitro-N-phenyl-	119-75-5	60	E	NJ,+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~680~~	~~E~~	~~4~~ 1/20/2004
Perylene	198-55-0	57	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 14:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/11/03 @ 08:45
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/03/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SD2**	QC Batch:	90572 -114
Sample #:	**346019**	Anal. Batch:	209010
Matrix:	Soil	Percent Solids:	65
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	260 U		260	3.69
95-94-3	1,2,4,5-Tetrachloro-benzene	260 U		260	43.1
108-60-1	Bis (2-Chloroisopropyl)-Ether	260 U		260	1.98
95-95-4	2,4,5-Trichlorophenol	260 U		260	5.01
88-06-2	2,4,6-Trichlorophenol	260 U		260	3.93
120-83-2	2,4-Dichlorophenol	260 U		260	5.28
105-67-9	2,4-Dimethylphenol	260 U		260	11.9
51-28-5	2,4-Dinitrophenol	510 U	UJ,C	510	4.80
121-14-2	2,4-Dinitrotoluene	260 U		260	4.73
606-20-2	2,6-Dinitrotoluene	260 U		260	41.6
91-58-7	2-Chloronaphthalene	260 U		260	3.45
95-57-8	2-Chlorophenol	260 U		260	3.02
91-57-6	**2-Methylnaphthalene**	**12 J**		260	4.11
95-48-7	2-Methylphenol	260 U		260	7.26
88-74-4	2-Nitroaniline	260 U		260	6.90
88-75-5	2-Nitrophenol	260 U		260	2.55
91-94-1	3,3'-Dichlorobenzidine	260 U		260	83.1
99-09-2	3-Nitroaniline	260 U		260	27.5
534-52-1	4,6-Dinitro-2-Methylphenol	260 U		260	6.77
101-55-3	4-Bromophenyl Phenylether	260 U		260	5.07
59-50-7	4-Chloro-3-Methylphenol	260 U		260	7.82
106-47-8	4-Chloroaniline	260 U	UJ,M	260	1.89
7005-72-3	4-Chlorophenylphenyl-Ether	260 U		260	4.91
106-44-5	4-Methylphenol	260 U		260	9.56
100-01-6	4-Nitroaniline	260 U		260	10.9
100-02-7	4-Nitrophenol	510 U		510	4.25
83-32-9	**Acenaphthene**	**5.0 J**		260	2.58
208-96-8	Acenaphthylene	260 U		260	2.25
98-86-2	Acetophenone	260 U		260	2.85

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/03/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SD2**	QC Batch:	90572 -114
Sample #:	**346019**	Anal. Batch:	209010
Matrix:	Soil	Percent Solids:	65
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	260 U	UJ,M	260	6.93
1912-24-9	Atrazine	260 U		260	10.3
100-52-7	Benzaldehyde	260 U		260	6.08
56-55-3	**Benzo (a) Anthracene**	**33 J**		260	20.0
50-32-8	**Benzo (a) Pyrene**	**42 J**		260	8.57
205-99-2	**Benzo (b) Fluoranthene**	**64 J**		260	14.6
191-24-2	**Benzo (g,h,i,) Perylene**	**35 J**		260	13.1
207-08-9	**Benzo (k) Fluoranthene**	**27 J**		260	20.1
111-91-1	Bis (2-Chloroethoxy)-Methane	260 U		260	4.71
111-44-4	Bis (2-Chloroethyl) Ether	260 U		260	2.60
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**28 J**	J,M	260	3.11
85-68-7	Butyl Benzyl Phthalate	260 U		260	6.72
105-60-2	Caprolactam	510 U		510	9.57
86-74-8	Carbazole	260 U	UJ,C	260	9.15
218-01-9	**Chrysene**	**37 J**		260	15.3
53-70-3	**Dibenzo (a,h) Anthracene**	**15 J**		260	8.85
132-64-9	Dibenzofuran	260 U		260	4.74
84-66-2	**Diethylphthalate**	**14 J**	J,d	260	2.85
131-11-3	Dimethylphthalate	260 U		260	4.97
84-74-2	**Di-n-Butylphthalate**	**69 J**		260	5.73
117-84-0	Di-n-Octylphthalate	260 U		260	4.65
206-44-0	**Fluoranthene**	**56 J**	J,M	260	3.53
86-73-7	**Fluorene**	**5.0 J**		260	2.52
118-74-1	Hexachlorobenzene	260 U		260	3.77
87-68-3	Hexachlorobutadiene	260 U		260	5.81
77-47-4	Hexachlorocyclopentadiene	260 U	UJ,M	260	2.97
67-72-1	Hexachloroethane	260 U		260	3.50
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**31 J**		260	5.88
78-59-1	Isophorone	260 U		260	2.60
91-20-3	Naphthalene	260 U		260	4.13
98-95-3	Nitrobenzene	260 U		260	4.80

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/03/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SD2**	QC Batch:	90572 -114
Sample #:	**346019**	Anal. Batch:	209010
Matrix:	Soil	Percent Solids:	65
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	260 U	260	4.94
86-30-6	N-Nitroso-di-Phenylamine	260 U	260	7.13
87-86-5	Pentachlorophenol	510 U	510	6.59
85-01-8	**Phenanthrene**	**34 J**	260	3.45
108-95-2	Phenol	260 U	260	5.94
129-00-0	**Pyrene**	**51 J**	260	2.22

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/03/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SD2**	QC Batch:	90572 -114
Sample #:	**346019**	Anal. Batch:	209010
Matrix:	Soil	Percent Solids:	65
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	66	E	NJ,+
1,2-Benzenedicarboxylic acid, butyl 2-methylpropyl ester	17851-53-5	91	E	NJ,+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~430~~	~~E~~	~~AS~~ 1/20/2004

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3510C
Submittal:	Delivery Order 0046	Analyzed:	11/03/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SW3**	QC Batch:	90165 -116
Sample #:	**346020**	Anal. Batch:	209010
Matrix:	Surface Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	5.0 U		5.0	0.013
95-94-3	1,2,4,5-Tetrachloro-benzene	5.0 U		5.0	0.775
108-60-1	Bis (2-Chloroisopropyl)-Ether	5.0 U		5.0	0.014
95-95-4	2,4,5-Trichlorophenol	5.0 U		5.0	0.014
88-06-2	2,4,6-Trichlorophenol	5.0 U		5.0	0.015
120-83-2	2,4-Dichlorophenol	5.0 U		5.0	0.018
105-67-9	2,4-Dimethylphenol	5.0 U		5.0	0.198
51-28-5	2,4-Dinitrophenol	10 U	UJ,C	10	1.24
121-14-2	2,4-Dinitrotoluene	5.0 U		5.0	0.007
606-20-2	2,6-Dinitrotoluene	5.0 U		5.0	0.052
91-58-7	2-Chloronaphthalene	5.0 U		5.0	0.005
95-57-8	2-Chlorophenol	5.0 U		5.0	0.011
91-57-6	2-Methylnaphthalene	5.0 U		5.0	0.084
95-48-7	2-Methylphenol	5.0 U		5.0	0.007
88-74-4	2-Nitroaniline	5.0 U		5.0	0.010
88-75-5	2-Nitrophenol	5.0 U		5.0	0.011
91-94-1	3,3'-Dichlorobenzidine	5.0 U		5.0	0.058
99-09-2	3-Nitroaniline	5.0 U		5.0	0.032
534-52-1	4,6-Dinitro-2-Methylphenol	5.0 U		5.0	0.054
101-55-3	4-Bromophenyl Phenylether	5.0 U		5.0	0.019
59-50-7	4-Chloro-3-Methylphenol	5.0 U		5.0	0.018
106-47-8	4-Chloroaniline	5.0 U		5.0	0.011
7005-72-3	4-Chlorophenylphenyl-Ether	5.0 U		5.0	0.015
106-44-5	4-Methylphenol	5.0 U		5.0	0.014
100-01-6	4-Nitroaniline	5.0 U		5.0	0.070
100-02-7	4-Nitrophenol	10 U		10	0.134
83-32-9	Acenaphthene	5.0 U		5.0	0.008
208-96-8	Acenaphthylene	5.0 U		5.0	0.007
98-86-2	Acetophenone	5.0 U		5.0	0.011

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3510C
Submittal:	Delivery Order 0046	Analyzed:	11/03/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SW3**	QC Batch:	90165 -116
Sample #:	**346020**	Anal. Batch:	209010
Matrix:	Surface Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	5.0 U		5.0	0.014
1912-24-9	Atrazine	5.0 U		5.0	0.018
100-52-7	Benzaldehyde	5.0 U		5.0	0.616
56-55-3	Benzo (a) Anthracene	5.0 U		5.0	0.022
50-32-8	Benzo (a) Pyrene	5.0 U		5.0	0.025
205-99-2	Benzo (b) Fluoranthene	5.0 U		5.0	0.019
191-24-2	Benzo (g,h,i,) Perylene	5.0 U		5.0	0.046
207-08-9	Benzo (k) Fluoranthene	5.0 U		5.0	0.064
111-91-1	Bis (2-Chloroethoxy)-Methane	5.0 U		5.0	0.013
111-44-4	Bis (2-Chloroethyl) Ether	5.0 U		5.0	0.012
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**0.31 J**	B,Z	5.0	0.149
85-68-7	**Butyl Benzyl Phthalate**	**0.11 J**	B,Z	5.0	0.015
105-60-2	Caprolactam	5.0 U	UJ,I	5.0	0.024
86-74-8	Carbazole	5.0 U	UJ,C	5.0	0.015
218-01-9	Chrysene	5.0 U		5.0	0.025
53-70-3	Dibenzo (a,h) Anthracene	5.0 U		5.0	0.025
132-64-9	Dibenzofuran	5.0 U		5.0	0.014
84-66-2	Diethylphthalate	5.0 U		5.0	0.074
131-11-3	Dimethylphthalate	5.0 U		5.0	0.013
84-74-2	Di-n-Butylphthalate	5.0 U		5.0	1.60
117-84-0	Di-n-Octylphthalate	5.0 U		5.0	0.162
206-44-0	Fluoranthene	5.0 U		5.0	0.024
86-73-7	Fluorene	5.0 U		5.0	0.012
118-74-1	Hexachlorobenzene	5.0 U		5.0	0.011
87-68-3	Hexachlorobutadiene	5.0 U		5.0	0.019
77-47-4	Hexachlorocyclopentadiene	5.0 U	UJ,I	5.0	0.016
67-72-1	Hexachloroethane	5.0 U		5.0	0.023
193-39-5	Indeno (1,2,3-cd) Pyrene	5.0 U		5.0	0.033
78-59-1	Isophorone	5.0 U		5.0	0.017
91-20-3	Naphthalene	5.0 U		5.0	0.006
98-95-3	Nitrobenzene	5.0 U		5.0	0.012

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3510C
Submittal:	Delivery Order 0046	Analyzed:	11/03/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SW3**	QC Batch:	90165 -116
Sample #:	**346020**	Anal. Batch:	209010
Matrix:	Surface Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	5.0 U	5.0	0.017
86-30-6	N-Nitroso-di-Phenylamine	5.0 U	5.0	0.019
87-86-5	Pentachlorophenol	10 U	10	0.075
85-01-8	Phenanthrene	5.0 U	5.0	0.016
108-95-2	Phenol	5.0 U	5.0	0.006
129-00-0	Pyrene	5.0 U	5.0	0.033

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/03/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SW3**	QC Batch:	90165 -116
Sample #:	**346020**	Anal. Batch:	209010
Matrix:	Surface Water	Percent Solids:	n/a
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/L)**	**Qualifier**	
(M) 1-Eicosanol	629-96-9	0.89	E	NJ,+
1,2-Benzenedicarboxylic acid, butyl 2-methylpropyl ester	17851-53-5	0.51	E	NJ,+
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	1.20	E	NJ,+
Docosane, 11-butyl-	13475-76-8	0.49	E	NJ,+
Erucylamide	112-84-5	9.63	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3510C
Submittal:	Delivery Order 0046	Analyzed:	11/03/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SWD1**	QC Batch:	90165 -116
Sample #:	**346021**	Anal. Batch:	209010
Matrix:	Surface Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	5.0 U	5.0	0.013
95-94-3	1,2,4,5-Tetrachloro-benzene	5.0 U	5.0	0.775
108-60-1	Bis (2-Chloroisopropyl)-Ether	5.0 U	5.0	0.014
95-95-4	2,4,5-Trichlorophenol	5.0 U	5.0	0.014
88-06-2	2,4,6-Trichlorophenol	5.0 U	5.0	0.015
120-83-2	2,4-Dichlorophenol	5.0 U	5.0	0.018
105-67-9	2,4-Dimethylphenol	5.0 U	5.0	0.198
51-28-5	2,4-Dinitrophenol	10 U	UJ,c 10	1.24
121-14-2	2,4-Dinitrotoluene	5.0 U	5.0	0.007
606-20-2	2,6-Dinitrotoluene	5.0 U	5.0	0.052
91-58-7	2-Chloronaphthalene	5.0 U	5.0	0.005
95-57-8	2-Chlorophenol	5.0 U	5.0	0.011
91-57-6	2-Methylnaphthalene	5.0 U	5.0	0.084
95-48-7	2-Methylphenol	5.0 U	5.0	0.007
88-74-4	2-Nitroaniline	5.0 U	5.0	0.010
88-75-5	2-Nitrophenol	5.0 U	5.0	0.011
91-94-1	3,3'-Dichlorobenzidine	5.0 U	5.0	0.058
99-09-2	3-Nitroaniline	5.0 U	5.0	0.032
534-52-1	4,6-Dinitro-2-Methylphenol	5.0 U	5.0	0.054
101-55-3	4-Bromophenyl Phenylether	5.0 U	5.0	0.019
59-50-7	4-Chloro-3-Methylphenol	5.0 U	5.0	0.018
106-47-8	4-Chloroaniline	5.0 U	5.0	0.011
7005-72-3	4-Chlorophenylphenyl-Ether	5.0 U	5.0	0.015
106-44-5	4-Methylphenol	5.0 U	5.0	0.014
100-01-6	4-Nitroaniline	5.0 U	5.0	0.070
100-02-7	4-Nitrophenol	10 U	10	0.134
83-32-9	Acenaphthene	5.0 U	5.0	0.008
208-96-8	Acenaphthylene	5.0 U	5.0	0.007
98-86-2	Acetophenone	5.0 U	5.0	0.011

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 00:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/11/03 @ 08:45
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3510C
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/03/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**SWD1**	QC Batch:	90165 -116
Sample #:	**346021**	Anal. Batch:	209010
Matrix:	Surface Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	5.0 U		5.0	0.014
1912-24-9	Atrazine	5.0 U		5.0	0.018
100-52-7	Benzaldehyde	5.0 U		5.0	0.616
56-55-3	Benzo (a) Anthracene	5.0 U		5.0	0.022
50-32-8	Benzo (a) Pyrene	5.0 U		5.0	0.025
205-99-2	Benzo (b) Fluoranthene	5.0 U		5.0	0.019
191-24-2	Benzo (g,h,i,) Perylene	5.0 U		5.0	0.046
207-08-9	Benzo (k) Fluoranthene	5.0 U		5.0	0.064
111-91-1	Bis (2-Chloroethoxy)-Methane	5.0 U		5.0	0.013
111-44-4	Bis (2-Chloroethyl) Ether	5.0 U		5.0	0.012
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**0.33 J**	B,Z	5.0	0.149
85-68-7	**Butyl Benzyl Phthalate**	**0.11 J**	B,Z	5.0	0.015
105-60-2	Caprolactam	5.0 U	UJ,I	5.0	0.024
86-74-8	Carbazole	5.0 U	UJ,C	5.0	0.015
218-01-9	Chrysene	5.0 U		5.0	0.025
53-70-3	Dibenzo (a,h) Anthracene	5.0 U		5.0	0.025
132-64-9	Dibenzofuran	5.0 U		5.0	0.014
84-66-2	Diethylphthalate	5.0 U		5.0	0.074
131-11-3	Dimethylphthalate	5.0 U		5.0	0.013
84-74-2	Di-n-Butylphthalate	5.0 U		5.0	1.60
117-84-0	Di-n-Octylphthalate	5.0 U		5.0	0.162
206-44-0	Fluoranthene	5.0 U		5.0	0.024
86-73-7	Fluorene	5.0 U		5.0	0.012
118-74-1	Hexachlorobenzene	5.0 U		5.0	0.011
87-68-3	Hexachlorobutadiene	5.0 U		5.0	0.019
77-47-4	Hexachlorocyclopentadiene	5.0 U	UJ,I	5.0	0.016
67-72-1	Hexachloroethane	5.0 U		5.0	0.023
193-39-5	Indeno (1,2,3-cd) Pyrene	5.0 U		5.0	0.033
78-59-1	Isophorone	5.0 U		5.0	0.017
91-20-3	Naphthalene	5.0 U		5.0	0.006
98-95-3	Nitrobenzene	5.0 U		5.0	0.012

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3510C
Submittal:	Delivery Order 0046	Analyzed:	11/03/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SWD1**	QC Batch:	90165 -116
Sample #:	**346021**	Anal. Batch:	209010
Matrix:	Surface Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	5.0 U	5.0	0.017
86-30-6	N-Nitroso-di-Phenylamine	5.0 U	5.0	0.019
87-86-5	Pentachlorophenol	10 U	10	0.075
85-01-8	Phenanthrene	5.0 U	5.0	0.016
108-95-2	Phenol	5.0 U	5.0	0.006
129-00-0	Pyrene	5.0 U	5.0	0.033

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/03/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SWD1**	QC Batch:	90165 -116
Sample #:	**346021**	Anal. Batch:	209010
Matrix:	Surface Water	Percent Solids:	n/a
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/L)**	**Qualifier**	
(M) 1-Eicosanol	629-96-9	0.78	E	NJ,+
(Z)-9-Octadecenamide	301-02-0	10.37	E	NJ,+
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	0.52	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 14:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/11/03 @ 08:45
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3510C
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/03/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SW2**	QC Batch:	90165 -116
Sample #:	**346022**	Anal. Batch:	209010
Matrix:	Surface Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	5.0 U		5.0	0.013
95-94-3	1,2,4,5-Tetrachloro-benzene	5.0 U		5.0	0.775
108-60-1	Bis (2-Chloroisopropyl)-Ether	5.0 U		5.0	0.014
95-95-4	2,4,5-Trichlorophenol	5.0 U		5.0	0.014
88-06-2	2,4,6-Trichlorophenol	5.0 U		5.0	0.015
120-83-2	2,4-Dichlorophenol	5.0 U		5.0	0.018
105-67-9	2,4-Dimethylphenol	5.0 U	UJ,M	5.0	0.198
51-28-5	2,4-Dinitrophenol	10 U	UJ,C	10	1.24
121-14-2	2,4-Dinitrotoluene	5.0 U		5.0	0.007
606-20-2	2,6-Dinitrotoluene	5.0 U		5.0	0.052
91-58-7	2-Chloronaphthalene	5.0 U		5.0	0.005
95-57-8	2-Chlorophenol	5.0 U		5.0	0.011
91-57-6	2-Methylnaphthalene	5.0 U		5.0	0.084
95-48-7	2-Methylphenol	5.0 U		5.0	0.007
88-74-4	2-Nitroaniline	5.0 U		5.0	0.010
88-75-5	2-Nitrophenol	5.0 U		5.0	0.011
91-94-1	3,3'-Dichlorobenzidine	5.0 U		5.0	0.058
99-09-2	3-Nitroaniline	5.0 U		5.0	0.032
534-52-1	4,6-Dinitro-2-Methylphenol	5.0 U	UJ,M	5.0	0.054
101-55-3	4-Bromophenyl Phenylether	5.0 U		5.0	0.019
59-50-7	4-Chloro-3-Methylphenol	5.0 U		5.0	0.018
106-47-8	4-Chloroaniline	5.0 U		5.0	0.011
7005-72-3	4-Chlorophenylphenyl-Ether	5.0 U		5.0	0.015
106-44-5	4-Methylphenol	5.0 U		5.0	0.014
100-01-6	4-Nitroaniline	5.0 U		5.0	0.070
100-02-7	4-Nitrophenol	10 U	UJ,M	10	0.134
83-32-9	Acenaphthene	5.0 U		5.0	0.008
208-96-8	Acenaphthylene	5.0 U		5.0	0.007
98-86-2	Acetophenone	5.0 U		5.0	0.011

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 14:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/11/03 @ 08:45
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3510C
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/03/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SW2**	QC Batch:	90165 -116
Sample #:	**346022**	Anal. Batch:	209010
Matrix:	Surface Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	5.0 U		5.0	0.014
1912-24-9	Atrazine	5.0 U		5.0	0.018
100-52-7	Benzaldehyde	5.0 U		5.0	0.616
56-55-3	Benzo (a) Anthracene	5.0 U		5.0	0.022
50-32-8	Benzo (a) Pyrene	5.0 U		5.0	0.025
205-99-2	Benzo (b) Fluoranthene	5.0 U		5.0	0.019
191-24-2	Benzo (g,h,i,) Perylene	5.0 U		5.0	0.046
207-08-9	Benzo (k) Fluoranthene	5.0 U		5.0	0.064
111-91-1	Bis (2-Chloroethoxy)-Methane	5.0 U		5.0	0.013
111-44-4	Bis (2-Chloroethyl) Ether	5.0 U		5.0	0.012
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**0.34 J**	B,Z	5.0	0.149
85-68-7	**Butyl Benzyl Phthalate**	**0.11 J**	B,Z	5.0	0.015
105-60-2	Caprolactam	5.0 U	UJ,I	5.0	0.024
86-74-8	Carbazole	5.0 U	UJ,C	5.0	0.015
218-01-9	Chrysene	5.0 U		5.0	0.025
53-70-3	Dibenzo (a,h) Anthracene	5.0 U		5.0	0.025
132-64-9	Dibenzofuran	5.0 U		5.0	0.014
84-66-2	**Diethylphthalate**	**0.11 J**	B,Z	5.0	0.074
131-11-3	Dimethylphthalate	5.0 U		5.0	0.013
84-74-2	Di-n-Butylphthalate	5.0 U		5.0	1.60
117-84-0	Di-n-Octylphthalate	5.0 U		5.0	0.162
206-44-0	Fluoranthene	5.0 U		5.0	0.024
86-73-7	Fluorene	5.0 U		5.0	0.012
118-74-1	Hexachlorobenzene	5.0 U		5.0	0.011
87-68-3	Hexachlorobutadiene	5.0 U		5.0	0.019
77-47-4	Hexachlorocyclopentadiene	5.0 U	UJ,I	5.0	0.016
67-72-1	Hexachloroethane	5.0 U		5.0	0.023
193-39-5	Indeno (1,2,3-cd) Pyrene	5.0 U		5.0	0.033
78-59-1	Isophorone	5.0 U		5.0	0.017
91-20-3	Naphthalene	5.0 U		5.0	0.006
98-95-3	Nitrobenzene	5.0 U		5.0	0.012

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3510C
Submittal:	Delivery Order 0046	Analyzed:	11/03/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SW2**	QC Batch:	90165 -116
Sample #:	**346022**	Anal. Batch:	209010
Matrix:	Surface Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	5.0 U		5.0	0.017
86-30-6	N-Nitroso-di-Phenylamine	5.0 U		5.0	0.019
87-86-5	Pentachlorophenol	10 U	UJM	10	0.075
85-01-8	Phenanthrene	5.0 U		5.0	0.016
108-95-2	Phenol	5.0 U		5.0	0.006
129-00-0	Pyrene	5.0 U		5.0	0.033

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/03/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SW2**	QC Batch:	90165 -116
Sample #:	**346022**	Anal. Batch:	209010
Matrix:	Surface Water	Percent Solids:	n/a
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/L)**	**Qualifier**	
(M) 1-Eicosanol	629-96-9	0.91	E	NJ,+
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	0.84	E	NJ,+
1-Hexadecanol	36653-82-4	0.51	E	NJ,+
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	1.63	E	NJ,+
Eicosane	112-95-8	0.54	E	NJ,+
Erucylamide	112-84-5	20.79	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 08:45
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/03/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**ASB1A**	QC Batch:	89985 -118
Sample #:	**346248**	Anal. Batch:	209010
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	210 U		210	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	210 U		210	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	210 U		210	1.58
95-95-4	2,4,5-Trichlorophenol	210 U		210	4.01
88-06-2	2,4,6-Trichlorophenol	210 U		210	3.14
120-83-2	2,4-Dichlorophenol	210 U		210	4.22
105-67-9	2,4-Dimethylphenol	210 U	UJ,I	210	9.53
51-28-5	2,4-Dinitrophenol	400 U	UJ,C	400	3.84
~~121-14-2~~	~~2,4-Dinitrotoluene~~	~~1200 E~~	~~J,V~~	~~210~~	~~3.78~~
606-20-2	**2,6-Dinitrotoluene**	**82 J**		210	33.2
91-58-7	2-Chloronaphthalene	210 U		210	2.76
95-57-8	2-Chlorophenol	210 U		210	2.41
91-57-6	2-Methylnaphthalene	210 U		210	3.29
95-48-7	2-Methylphenol	210 U		210	5.81
88-74-4	2-Nitroaniline	210 U		210	5.52
88-75-5	2-Nitrophenol	210 U		210	2.04
91-94-1	3,3'-Dichlorobenzidine	210 U		210	66.5
99-09-2	3-Nitroaniline	210 U		210	22.0
534-52-1	4,6-Dinitro-2-Methylphenol	210 U		210	5.41
101-55-3	4-Bromophenyl Phenylether	210 U		210	4.06
59-50-7	4-Chloro-3-Methylphenol	210 U		210	6.25
106-47-8	4-Chloroaniline	210 U	UJ,I	210	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	210 U		210	3.92
106-44-5	4-Methylphenol	210 U		210	7.64
100-01-6	4-Nitroaniline	210 U		210	8.70
100-02-7	4-Nitrophenol	400 U		400	3.40
83-32-9	Acenaphthene	210 U		210	2.06
208-96-8	Acenaphthylene	210 U		210	1.80
98-86-2	Acetophenone	210 U		210	2.28

~~J,V~~ 1/20/2004

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 08:45
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/03/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**ASB1A**	QC Batch:	89985 -118
Sample #:	**346248**	Anal. Batch:	209010
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	210 U		210	5.54
1912-24-9	Atrazine	210 U		210	8.26
100-52-7	Benzaldehyde	210 U		210	4.86
56-55-3	Benzo (a) Anthracene	210 U		210	16.0
50-32-8	**Benzo (a) Pyrene**	**9.0 J**		210	6.85
205-99-2	**Benzo (b) Fluoranthene**	**16 J**	J,1	210	11.7
191-24-2	Benzo (g,h,i,) Perylene	210 U		210	10.5
207-08-9	Benzo (k) Fluoranthene	210 U		210	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	210 U		210	3.77
111-44-4	Bis (2-Chloroethyl) Ether	210 U		210	2.08
~~117-81-7~~	~~**Bis (2-ethylhexyl)-Phthalate**~~	~~**1500 E**~~	J,q	210	2.48 KS 1/20/2004
85-68-7	Butyl Benzyl Phthalate	210 U		210	5.38
105-60-2	Caprolactam	400 U		400	7.66
86-74-8	Carbazole	210 U	UJ,c	210	7.32
218-01-9	**Chrysene**	**15 J**		210	12.2
53-70-3	Dibenzo (a,h) Anthracene	210 U		210	7.08
132-64-9	Dibenzofuran	210 U		210	3.79
84-66-2	**Diethylphthalate**	**14 J**		210	2.28
131-11-3	**Dimethylphthalate**	**210**		210	3.97
~~84-74-2~~	~~**Di-n-Butylphthalate**~~	~~**3900 E**~~	J,q	210	4.58 KS 1/20/2004
117-84-0	Di-n-Octylphthalate	210 U		210	3.72
206-44-0	**Fluoranthene**	**30 J**		210	2.82
86-73-7	Fluorene	210 U		210	2.02
118-74-1	Hexachlorobenzene	210 U		210	3.01
87-68-3	Hexachlorobutadiene	210 U		210	4.64
77-47-4	Hexachlorocyclopentadiene	210 U		210	2.38
67-72-1	Hexachloroethane	210 U		210	2.80
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**6.0 J**		210	4.70
78-59-1	Isophorone	210 U		210	2.08
91-20-3	Naphthalene	210 U		210	3.30
98-95-3	Nitrobenzene	210 U		210	3.84

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 08:45
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/03/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**ASB1A**	QC Batch:	89985 -118
Sample #:	**346248**	Anal. Batch:	209010
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	210 U	210	3.95
~~86-30-6~~	~~**N-Nitroso-di-Phenylamine**~~	~~**1200 E**~~ J,Q	210	5.70
87-86-5	Pentachlorophenol	400 U	400	5.27
85-01-8	**Phenanthrene**	**11 J**	210	2.76
108-95-2	Phenol	210 U	210	4.75
129-00-0	**Pyrene**	**26 J**	210	1.78

~~RB 1/20/04~~

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 08:45
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/03/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**ASB1A**	QC Batch:	89985 -118
Sample #:	**346248**	Anal. Batch:	209010
Matrix:	Soil	Percent Solids:	82
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, butyl 2-methylpropyl ester	17851-53-5	60	E	NJ,t
Benzeneamine, 2-nitro-N-phenyl-	119-75-5	140	E	NJ,t
Erucylamide	112-84-5	1500	E	B,X
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~130~~	~~E~~	

AS 1/20/2004

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 08:45
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/04/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**ASB1A**	QC Batch:	89985 -118
Sample #:	**346248DL**	Anal. Batch:	209009
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	6

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	1000 U		1000	14.8
95-94-3	1,2,4,5-Tetrachloro-benzene	1000 U		1000	172
108-60-1	Bis (2-Chloroisopropyl)-Ether	1000 U		1000	7.92
95-95-4	2,4,5-Trichlorophenol	1000 U		1000	20.0
88-06-2	2,4,6-Trichlorophenol	1000 U		1000	15.7
120-83-2	2,4-Dichlorophenol	1000 U		1000	21.1
105-67-9	2,4-Dimethylphenol	1000 U	UJ,I	1000	47.6
51-28-5	2,4-Dinitrophenol	2000 U	UJ,C	2000	19.2
121-14-2	√ **2,4-Dinitrotoluene**	**850 J**		1000	18.9
606-20-2	2,6-Dinitrotoluene	1000 U		1000	166
91-58-7	2-Chloronaphthalene	1000 U		1000	13.8
95-57-8	2-Chlorophenol	1000 U		1000	12.1
91-57-6	2-Methylnaphthalene	1000 U		1000	16.4
95-48-7	2-Methylphenol	1000 U		1000	29.0
88-74-4	2-Nitroaniline	1000 U		1000	27.6
88-75-5	2-Nitrophenol	1000 U		1000	10.2
91-94-1	3,3'-Dichlorobenzidine	1000 U		1000	332
99-09-2	3-Nitroaniline	1000 U	UJ,C	1000	110
534-52-1	4,6-Dinitro-2-Methylphenol	1000 U		1000	27.1
101-55-3	4-Bromophenyl Phenylether	1000 U		1000	20.3
59-50-7	4-Chloro-3-Methylphenol	1000 U		1000	31.3
106-47-8	4-Chloroaniline	1000 U	UJ,C	1000	7.56
7005-72-3	4-Chlorophenylphenyl-Ether	1000 U		1000	19.6
106-44-5	4-Methylphenol	1000 U		1000	38.2
100-01-6	4-Nitroaniline	1000 U		1000	43.5
100-02-7	4-Nitrophenol	2000 U	UJ,C	2000	17.0
83-32-9	Acenaphthene	1000 U		1000	10.3
208-96-8	Acenaphthylene	1000 U		1000	9.00
98-86-2	Acetophenone	1000 U		1000	11.4

Use only 2,4-DNT, see neat analysis - 1/20/2004

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 08:45
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/04/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**ASB1A**	QC Batch:	89985 -118
Sample #:	**346248DL**	Anal. Batch:	209009
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	6

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
120-12-7	Anthracene	1000 U	1000	27.7
1912-24-9	Atrazine	1000 U	1000	41.3
100-52-7	Benzaldehyde	1000 U	1000	24.3
56-55-3	Benzo (a) Anthracene	1000 U	1000	79.8
50-32-8	Benzo (a) Pyrene	1000 U	1000	34.3
205-99-2	Benzo (b) Fluoranthene	1000 U	1000	58.6
191-24-2	Benzo (g,h,i,) Perylene	1000 U	1000	52.3
207-08-9	Benzo (k) Fluoranthene	1000 U	1000	80.4
111-91-1	Bis (2-Chloroethoxy)-Methane	1000 U	1000	18.8
111-44-4	Bis (2-Chloroethyl) Ether	1000 U	1000	10.4
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**1400**	1000	12.4
85-68-7	Butyl Benzyl Phthalate	1000 U	1000	26.9
105-60-2	Caprolactam	2000 U UJ,c	2000	38.3
86-74-8	Carbazole	1000 U UJ,c	1000	36.6
218-01-9	Chrysene	1000 U	1000	61.2
53-70-3	Dibenzo (a,h) Anthracene	1000 U	1000	35.4
132-64-9	Dibenzofuran	1000 U	1000	19.0
84-66-2	Diethylphthalate	1000 U	1000	11.4
131-11-3	**Dimethylphthalate**	**160 J**	1000	19.9
84-74-2	**Di-n-Butylphthalate**	**5100**	1000	22.9
117-84-0	Di-n-Octylphthalate	1000 U	1000	18.6
206-44-0	**Fluoranthene**	**30 J**	1000	14.1
86-73-7	Fluorene	1000 U	1000	10.1
118-74-1	Hexachlorobenzene	1000 U	1000	15.1
87-68-3	Hexachlorobutadiene	1000 U	1000	23.2
77-47-4	Hexachlorocyclopentadiene	1000 U	1000	11.9
67-72-1	Hexachloroethane	1000 U	1000	14.0
193-39-5	Indeno (1,2,3-cd) Pyrene	1000 U	1000	23.5
78-59-1	Isophorone	1000 U	1000	10.4
91-20-3	Naphthalene	1000 U	1000	16.5
98-95-3	Nitrobenzene	1000 U	1000	19.2

Use only bis(2ethylhexyl)phthalate and di-n-butylphthalate, see neat analysis - JS 1/20/2004

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 08:45
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/04/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**ASB1A**	QC Batch:	89985 -118
Sample #:	**346248DL**	Anal. Batch:	209009
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	6

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
~~621-64-7~~	~~N-Nitrosodi-n-Propylamine~~	~~1000 U~~	~~1000~~	~~19.7~~
86-30-6	**N-Nitroso-di-Phenylamine**	**1000**	1000	28.5
87-86-5	Pentachlorophenol	2000 U	~~2000~~	~~26.3~~
85-01-8	Phenanthrene	~~1000 U~~	1000	13.8
108-95-2	Phenol	1000 U	1000	23.8
~~129-00-0~~	**Pyrene**	**20 J**	1000	8.88

Use only n-nitroso-di-Phenylamine, see next analysis - JB 1/20/04

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 09:00
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/03/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**ASB1B**	QC Batch:	89985 -118
Sample #:	**346249**	Anal. Batch:	209010
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U		220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U		220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U		220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U		220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U		220	3.41
120-83-2	2,4-Dichlorophenol	220 U		220	4.58
105-67-9	2,4-Dimethylphenol	220 U	UJ,I	220	10.3
51-28-5	2,4-Dinitrophenol	420 U	UJ,C	420	4.16
121-14-2	2,4-Dinitrotoluene	220 U		220	4.10
606-20-2	2,6-Dinitrotoluene	220 U		220	36.0
91-58-7	2-Chloronaphthalene	220 U		220	2.99
95-57-8	2-Chlorophenol	220 U		220	2.61
91-57-6	2-Methylnaphthalene	220 U		220	3.56
95-48-7	2-Methylphenol	220 U		220	6.29
88-74-4	2-Nitroaniline	220 U		220	5.98
88-75-5	2-Nitrophenol	220 U		220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U		220	72.0
99-09-2	3-Nitroaniline	220 U		220	23.8
534-52-1	4,6-Dinitro-2-Methylphenol	220 U		220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U		220	4.39
59-50-7	4-Chloro-3-Methylphenol	220 U		220	6.77
106-47-8	4-Chloroaniline	220 U	UJ,I	220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U		220	4.25
106-44-5	4-Methylphenol	220 U		220	8.28
100-01-6	4-Nitroaniline	220 U		220	9.43
100-02-7	4-Nitrophenol	420 U		420	3.68
83-32-9	Acenaphthene	220 U		220	2.24
208-96-8	Acenaphthylene	220 U		220	1.95
98-86-2	Acetophenone	220 U		220	2.47

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 09:00
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/03/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**ASB1B**	QC Batch:	89985 -118
Sample #:	**346249**	Anal. Batch:	209010
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	220 U		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U		220	5.27
56-55-3	Benzo (a) Anthracene	220 U		220	17.3
50-32-8	Benzo (a) Pyrene	220 U		220	7.42
205-99-2	Benzo (b) Fluoranthene	220 U		220	12.7
191-24-2	Benzo (g,h,i,) Perylene	220 U		220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**22 J**		220	2.69
85-68-7	Butyl Benzyl Phthalate	220 U		220	5.82
105-60-2	Caprolactam	420 U		420	8.29
86-74-8	Carbazole	220 U	VSIC	220	7.93
218-01-9	Chrysene	220 U		220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U		220	7.67
132-64-9	Dibenzofuran	220 U		220	4.11
84-66-2	**Diethylphthalate**	**8.0 J**		220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**93 J**		220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	Fluoranthene	220 U		220	3.06
86-73-7	Fluorene	220 U		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U		220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	Indeno (1,2,3-cd) Pyrene	220 U		220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	Naphthalene	220 U		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 09:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/03/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**ASB1B**	QC Batch:	89985 -118
Sample #:	**346249**	Anal. Batch:	209010
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	N-Nitroso-di-Phenylamine	220 U	220	6.18
87-86-5	Pentachlorophenol	420 U	420	5.71
85-01-8	Phenanthrene	220 U	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	Pyrene	220 U	220	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 09:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/03/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**ASB1B**	QC Batch:	89985 -118
Sample #:	**346249**	Anal. Batch:	209010
Matrix:	Soil	Percent Solids:	78
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	CAS Number	Result (ug/kg dr	Qualifier	
(Z)-9-Octadecenamide	301-02-0	1600	E	NJ,+
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	110	E	B,X
2-Ethyl-1-Hexanol	104-76-7	33	E	NJ,+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~77~~	~~E~~	~~SS~~ 1/20/2004
Phosphonic acid, dioctadecyl ester	19047-85-9	24	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 09:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/03/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**ASB1C**	QC Batch:	89985 -118
Sample #:	**346250**	Anal. Batch:	209010
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U		220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U		220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U		220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U		220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U		220	3.41
120-83-2	2,4-Dichlorophenol	220 U		220	4.58
105-67-9	2,4-Dimethylphenol	220 U	UJ,I	220	10.3
51-28-5	2,4-Dinitrophenol	430 U	UJ,C	430	4.16
121-14-2	2,4-Dinitrotoluene	220 U		220	4.10
606-20-2	2,6-Dinitrotoluene	220 U		220	36.0
91-58-7	2-Chloronaphthalene	220 U		220	2.99
95-57-8	2-Chlorophenol	220 U		220	2.61
91-57-6	2-Methylnaphthalene	220 U		220	3.56
95-48-7	2-Methylphenol	220 U		220	6.29
88-74-4	2-Nitroaniline	220 U		220	5.98
88-75-5	2-Nitrophenol	220 U		220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U		220	72.0
99-09-2	3-Nitroaniline	220 U		220	23.8
534-52-1	4,6-Dinitro-2-Methylphenol	220 U		220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U		220	4.39
59-50-7	4-Chloro-3-Methylphenol	220 U		220	6.77
106-47-8	4-Chloroaniline	220 U	UJ,I	220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U		220	4.25
106-44-5	4-Methylphenol	220 U		220	8.28
100-01-6	4-Nitroaniline	220 U		220	9.43
100-02-7	4-Nitrophenol	430 U		430	3.68
83-32-9	Acenaphthene	220 U		220	2.24
208-96-8	Acenaphthylene	220 U		220	1.95
98-86-2	Acetophenone	220 U		220	2.47

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 09:15
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/03/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**ASB1C**	QC Batch:	89985 -118
Sample #:	**346250**	Anal. Batch:	209010
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	220 U		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U		220	5.27
56-55-3	Benzo (a) Anthracene	220 U		220	17.3
50-32-8	Benzo (a) Pyrene	220 U		220	7.42
205-99-2	Benzo (b) Fluoranthene	220 U		220	12.7
191-24-2	Benzo (g,h,i,) Perylene	220 U		220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**17 J**		220	2.69
85-68-7	Butyl Benzyl Phthalate	220 U		220	5.82
105-60-2	Caprolactam	430 U		430	8.29
86-74-8	Carbazole	220 U	UJ,c	220	7.93
218-01-9	Chrysene	220 U		220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U		220	7.67
132-64-9	Dibenzofuran	220 U		220	4.11
84-66-2	**Diethylphthalate**	**10 J**		220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**130 J**		220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	Fluoranthene	220 U		220	3.06
86-73-7	Fluorene	220 U		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U		220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	Indeno (1,2,3-cd) Pyrene	220 U		220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	Naphthalene	220 U		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 09:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/03/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**ASB1C**	QC Batch:	89985 -118
Sample #:	**346250**	Anal. Batch:	209010
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	N-Nitroso-di-Phenylamine	220 U	220	6.18
87-86-5	Pentachlorophenol	430 U	430	5.71
85-01-8	Phenanthrene	220 U	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	Pyrene	220 U	220	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 09:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/03/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**ASB1C**	QC Batch:	89985 -118
Sample #:	**346250**	Anal. Batch:	209010
Matrix:	Soil	Percent Solids:	77
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	200	E	NJ,+
2(5H)-Furanone, 5,5-dimethyl-	20019-64-1	49	E	NJ,+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~530~~	~~E~~	AS 1/20/2004

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 12:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/04/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**ASB3A**	QC Batch:	89985 -118
Sample #:	**346251**	Anal. Batch:	209009
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	210 U		210	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	210 U		210	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	210 U		210	1.58
95-95-4	2,4,5-Trichlorophenol	210 U		210	4.01
88-06-2	2,4,6-Trichlorophenol	210 U		210	3.14
120-83-2	2,4-Dichlorophenol	210 U		210	4.22
105-67-9	2,4-Dimethylphenol	210 U	UJ,I	210	9.53
51-28-5	2,4-Dinitrophenol	410 U	UJ,C	410	3.84
~~121-14-2~~	~~2,4-Dinitrotoluene~~	~~32000 E~~	~~J,Q~~	210	3.78 KS 1/15/04
606-20-2	**2,6-Dinitrotoluene**	**3300 E**	J,Q	210	33.2
91-58-7	2-Chloronaphthalene	210 U		210	2.76
95-57-8	2-Chlorophenol	210 U		210	2.41
91-57-6	2-Methylnaphthalene	210 U		210	3.29
95-48-7	2-Methylphenol	210 U		210	5.81
88-74-4	2-Nitroaniline	210 U		210	5.52
88-75-5	2-Nitrophenol	210 U		210	2.04
91-94-1	3,3'-Dichlorobenzidine	210 U		210	66.5
99-09-2	3-Nitroaniline	210 U	UJ,C	210	22.0
534-52-1	4,6-Dinitro-2-Methylphenol	210 U		210	5.41
101-55-3	4-Bromophenyl Phenylether	210 U		210	4.06
59-50-7	4-Chloro-3-Methylphenol	210 U		210	6.25
106-47-8	4-Chloroaniline	210 U	UJ,C	210	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	210 U		210	3.92
106-44-5	4-Methylphenol	210 U		210	7.64
100-01-6	4-Nitroaniline	210 U		210	8.70
100-02-7	4-Nitrophenol	410 U	UJ,C	410	3.40
83-32-9	Acenaphthene	210 U		210	2.06
208-96-8	Acenaphthylene	210 U		210	1.80
98-86-2	Acetophenone	210 U		210	2.28

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 12:00
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/04/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**ASB3A**	QC Batch:	89985 -118
Sample #:	**346251**	Anal. Batch:	209009
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	210 U		210	5.54
1912-24-9	Atrazine	210 U		210	8.26
100-52-7	Benzaldehyde	210 U		210	4.86
56-55-3	Benzo (a) Anthracene	210 U		210	16.0
50-32-8	***Benzo (a) Pyrene**	**10 JJ**	J,i	210	6.85
205-99-2	*Benzo (b) Fluoranthene	210 UJ	UJ,i	210	11.7
191-24-2	*Benzo (g,h,i,) Perylene	210 UJ	UJ,i	210	10.5
207-08-9	*Benzo (k) Fluoranthene	210 UJ	UJ,i	210	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	210 U		210	3.77
111-44-4	Bis (2-Chloroethyl) Ether	210 U		210	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**1200 E**	J,q	210	2.48
85-68-7	**Butyl Benzyl Phthalate**	**240**		210	5.38
105-60-2	Caprolactam	410 U	UJ,c	410	7.66
86-74-8	Carbazole	210 U	UJ,c	210	7.32
218-01-9	Chrysene	210 U		210	12.2
53-70-3	*Dibenzo (a,h) Anthracene	210 UJ	UJ,i	210	7.08
132-64-9	Dibenzofuran	210 U		210	3.79
84-66-2	**Diethylphthalate**	**14 J**		210	2.28
131-11-3	Dimethylphthalate	210 U		210	3.97
~~84-74-2~~	~~**Di-n-Butylphthalate**~~	~~**30000 E**~~	~~J,q~~	~~210~~	~~4.58~~
117-84-0	**Di-n-Octylphthalate**	**38 J**		210	3.72
206-44-0	**Fluoranthene**	**8.8 J**		210	2.82
86-73-7	Fluorene	210 U		210	2.02
118-74-1	Hexachlorobenzene	210 U		210	3.01
87-68-3	Hexachlorobutadiene	210 U		210	4.64
77-47-4	Hexachlorocyclopentadiene	210 U		210	2.38
67-72-1	Hexachloroethane	210 U		210	2.80
193-39-5	*Indeno (1,2,3-cd) Pyrene	210 UJ	UJ,i	210	4.70
78-59-1	Isophorone	210 U		210	2.08
91-20-3	Naphthalene	210 U		210	3.30
98-95-3	Nitrobenzene	210 U		210	3.84

~~4.58~~ R 1/14/04

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 12:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/04/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**ASB3A**	QC Batch:	89985 -118
Sample #:	**346251**	Anal. Batch:	209009
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	210 U	210	3.95
~~86-30-6~~	~~**N-Nitroso-di-Phenylamine**~~	~~**3700 E**~~ J,Q	~~210~~	~~5.70~~ tb 1/15/04
87-86-5	Pentachlorophenol	410 U	410	5.27
85-01-8	**Phenanthrene**	**3.8 J**	210	2.76
108-95-2	Phenol	210 U	210	4.75
129-00-0	**Pyrene**	**6.7 J**	210	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 12:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/04/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**ASB3A**	QC Batch:	89985 -118
Sample #:	**346251**	Anal. Batch:	209009
Matrix:	Soil	Percent Solids:	80
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	170	E	NJ,+
1,2-Benzenedicarboxylic acid, butyl 2-ethylhexyl ester	85-69-8	560	E	NJ,+
Benzenamine, 4-nitro-N-phenyl-	836-30-6	310	E	NJ,+
Benzeneamine, 2-nitro-N-phenyl-	119-75-5	520	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 12:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/05/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**ASB3A**	QC Batch:	89985 -118
Sample #:	**346251DL**	Anal. Batch:	209001
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	310

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	53000 U		53000	763
95-94-3	1,2,4,5-Tetrachloro-benzene	53000 U		53000	8900
108-60-1	Bis (2-Chloroisopropyl)-Ether	53000 U		53000	409
95-95-4	2,4,5-Trichlorophenol	53000 U		53000	1040
88-06-2	2,4,6-Trichlorophenol	53000 U		53000	812
120-83-2	2,4-Dichlorophenol	53000 U		53000	1090
105-67-9	2,4-Dimethylphenol	53000 U	UJ,1	53000	2460
51-28-5	2,4-Dinitrophenol	100000 U		100000	992
121-14-2	✓**2,4-Dinitrotoluene**	**28000 J**		53000	977
606-20-2	2,6-Dinitrotoluene	53000 U		53000	8590
91-58-7	2-Chloronaphthalene	53000 U		53000	713
95-57-8	2-Chlorophenol	53000 U		53000	623
91-57-6	2-Methylnaphthalene	53000 U		53000	849
95-48-7	2-Methylphenol	53000 U		53000	1500
88-74-4	2-Nitroaniline	53000 U		53000	1430
88-75-5	2-Nitrophenol	53000 U		53000	527
91-94-1	3,3'-Dichlorobenzidine	53000 U		53000	17200
99-09-2	3-Nitroaniline	53000 U		53000	5670
534-52-1	4,6-Dinitro-2-Methylphenol	53000 U		53000	1400
101-55-3	4-Bromophenyl Phenylether	53000 U		53000	1050
59-50-7	4-Chloro-3-Methylphenol	53000 U		53000	1620
106-47-8	4-Chloroaniline	53000 U	UJ,1	53000	391
7005-72-3	4-Chlorophenylphenyl-Ether	53000 U		53000	1010
106-44-5	4-Methylphenol	53000 U		53000	1970
100-01-6	4-Nitroaniline	53000 U		53000	2250
100-02-7	4-Nitrophenol	100000 U		100000	877
83-32-9	Acenaphthene	53000 U		53000	533
208-96-8	Acenaphthylene	53000 U		53000	465
98-86-2	Acetophenone	53000 U		53000	589

Use only 2,4 DNT, see neat analysis ~~A~~ 1/19/04

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 12:00
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/05/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**ASB3A**	QC Batch:	89985 -118
Sample #:	**346251DL**	Anal. Batch:	209001
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	310

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
120-12-7	Anthracene	53000 U	53000	1430
1912-24-9	Atrazine	53000 U	53000	2130
100-52-7	Benzaldehyde	53000 U	53000	1260
56-55-3	Benzo (a) Anthracene	53000 U	53000	4120
50-32-8	Benzo (a) Pyrene	53000 U	53000	1770
205-99-2	Benzo (b) Fluoranthene	53000 U	53000	3030
191-24-2	Benzo (g,h,i,) Perylene	53000 U	53000	2700
207-08-9	Benzo (k) Fluoranthene	53000 U	53000	4150
111-91-1	Bis (2-Chloroethoxy)-Methane	53000 U	53000	973
111-44-4	Bis (2-Chloroethyl) Ether	53000 U	53000	536
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**1200 J**	53000	642
85-68-7	Butyl Benzyl Phthalate	53000 U	53000	1390
105-60-2	Caprolactam	100000 U VJ,c	100000	1980
86-74-8	Carbazole	53000 U	53000	1890
218-01-9	Chrysene	53000 U	53000	3160
53-70-3	Dibenzo (a,h) Anthracene	53000 U	53000	1830
132-64-9	Dibenzofuran	53000 U	53000	980
84-66-2	**Diethylphthalate**	**1400 J**	53000	589
131-11-3	Dimethylphthalate	53000 U	53000	1030
84-74-2	√ **Di-n-Butylphthalate**	**130000**	53000	1180
117-84-0	Di-n-Octylphthalate	53000 U	53000	961
206-44-0	Fluoranthene	53000 U	53000	729
86-73-7	Fluorene	53000 U	53000	521
118-74-1	Hexachlorobenzene	53000 U	53000	778
87-68-3	Hexachlorobutadiene	53000 U	53000	1200
77-47-4	Hexachlorocyclopentadiene	53000 U	53000	614
67-72-1	Hexachloroethane	53000 U	53000	724
193-39-5	Indeno (1,2,3-cd) Pyrene	53000 U	53000	1220
78-59-1	Isophorone	53000 U	53000	536
91-20-3	Naphthalene	53000 U	53000	853
98-95-3	Nitrobenzene	53000 U	53000	992

Use only Di-n-butylphthalate, see neat analysis ✱ 1/19/04

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 12:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/05/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**ASB3A**	QC Batch:	89985 -118
Sample #:	**346251DL**	Anal. Batch:	209001
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	310

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
~~621-64-7~~	~~N-Nitrosodi-n-Propylamine~~	~~53000 U~~	~~53000~~	~~1020~~
86-30-6	✓ **N-Nitroso-di-Phenylamine**	**4700 J**	53000	1470
87-86-5	Pentachlorophenol	100000 U	100000	~~1360~~
85-01-8	Phenanthrene	~~53000 U~~	53000	713
108-95-2	Phenol	53000 U	53000	1230
~~129-00-0~~	Pyrene	53000 U	53000	459

Use only n-nitroso-di-phenylamine, see neat run ✱ 1/19/04

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 12:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/04/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**ASB3B**	QC Batch:	89985 -118
Sample #:	**346252**	Anal. Batch:	209009
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	210 U		210	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	210 U		210	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	210 U		210	1.58
95-95-4	2,4,5-Trichlorophenol	210 U		210	4.01
88-06-2	2,4,6-Trichlorophenol	210 U		210	3.14
120-83-2	2,4-Dichlorophenol	210 U		210	4.22
105-67-9	2,4-Dimethylphenol	210 U	UJ,l	210	9.53
51-28-5	2,4-Dinitrophenol	410 U	UJ,c	410	3.84
121-14-2	**2,4-Dinitrotoluene**	**23 J**		210	3.78
606-20-2	2,6-Dinitrotoluene	210 U		210	33.2
91-58-7	2-Chloronaphthalene	210 U		210	2.76
95-57-8	2-Chlorophenol	210 U		210	2.41
91-57-6	2-Methylnaphthalene	210 U		210	3.29
95-48-7	2-Methylphenol	210 U		210	5.81
88-74-4	2-Nitroaniline	210 U		210	5.52
88-75-5	2-Nitrophenol	210 U		210	2.04
91-94-1	3,3'-Dichlorobenzidine	210 U		210	66.5
99-09-2	3-Nitroaniline	210 U	UJ,c	210	22.0
534-52-1	4,6-Dinitro-2-Methylphenol	210 U		210	5.41
101-55-3	4-Bromophenyl Phenylether	210 U		210	4.06
59-50-7	4-Chloro-3-Methylphenol	210 U		210	6.25
106-47-8	4-Chloroaniline	210 U	UJ,c	210	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	210 U		210	3.92
106-44-5	4-Methylphenol	210 U		210	7.64
100-01-6	4-Nitroaniline	210 U		210	8.70
100-02-7	4-Nitrophenol	410 U	UJ,c	410	3.40
83-32-9	Acenaphthene	210 U		210	2.06
208-96-8	Acenaphthylene	210 U		210	1.80
98-86-2	Acetophenone	210 U		210	2.28

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 12:15
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/04/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**ASB3B**	QC Batch:	89985 -118
Sample #:	**346252**	Anal. Batch:	209009
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	210 U		210	5.54
1912-24-9	Atrazine	210 U		210	8.26
100-52-7	Benzaldehyde	210 U		210	4.86
56-55-3	Benzo (a) Anthracene	210 U		210	16.0
50-32-8	Benzo (a) Pyrene	210 U		210	6.85
205-99-2	Benzo (b) Fluoranthene	210 U		210	11.7
191-24-2	Benzo (g,h,i,) Perylene	210 U		210	10.5
207-08-9	Benzo (k) Fluoranthene	210 U		210	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	210 U		210	3.77
111-44-4	Bis (2-Chloroethyl) Ether	210 U		210	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**20 J**		210	2.48
85-68-7	Butyl Benzyl Phthalate	210 U		210	5.38
105-60-2	Caprolactam	410 U	UJ,c	410	7.66
86-74-8	Carbazole	210 U	UJ,c	210	7.32
218-01-9	Chrysene	210 U		210	12.2
53-70-3	Dibenzo (a,h) Anthracene	210 U		210	7.08
132-64-9	Dibenzofuran	210 U		210	3.79
84-66-2	**Diethylphthalate**	**10 J**		210	2.28
131-11-3	Dimethylphthalate	210 U		210	3.97
84-74-2	**Di-n-Butylphthalate**	**320**		210	4.58
117-84-0	Di-n-Octylphthalate	210 U		210	3.72
206-44-0	Fluoranthene	210 U		210	2.82
86-73-7	Fluorene	210 U		210	2.02
118-74-1	Hexachlorobenzene	210 U		210	3.01
87-68-3	Hexachlorobutadiene	210 U		210	4.64
77-47-4	Hexachlorocyclopentadiene	210 U		210	2.38
67-72-1	Hexachloroethane	210 U		210	2.80
193-39-5	Indeno (1,2,3-cd) Pyrene	210 U		210	4.70
78-59-1	Isophorone	210 U		210	2.08
91-20-3	Naphthalene	210 U		210	3.30
98-95-3	Nitrobenzene	210 U		210	3.84

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 12:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/04/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**ASB3B**	QC Batch:	89985 -118
Sample #:	**346252**	Anal. Batch:	209009
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	210 U	210	3.95
86-30-6	**N-Nitroso-di-Phenylamine**	**8.0 J**	210	5.70
87-86-5	Pentachlorophenol	410 U	410	5.27
85-01-8	Phenanthrene	210 U	210	2.76
108-95-2	Phenol	210 U	210	4.75
129-00-0	Pyrene	210 U	210	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 12:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/04/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**ASB3B**	QC Batch:	89985 -118
Sample #:	**346252**	Anal. Batch:	209009
Matrix:	Soil	Percent Solids:	80
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, butyl 2-methylpropyl ester	17851-53-5	420	E	NJ,t
1-Dodecanol	112-53-8	47	E	NJ,t
1-Pentadecanol	629-76-5	40	E	NJ,t
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	94	E	B,X
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~370~~	~~E~~	~~1/20/2004~~

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 12:30
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/04/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**ASB3C**	QC Batch:	89985 -118
Sample #:	**346253**	Anal. Batch:	209009
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	200 U		200	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	200 U		200	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	200 U		200	1.58
95-95-4	2,4,5-Trichlorophenol	200 U		200	4.01
88-06-2	2,4,6-Trichlorophenol	200 U		200	3.14
120-83-2	2,4-Dichlorophenol	200 U		200	4.22
105-67-9	2,4-Dimethylphenol	200 U	UJ,I	200	9.53
51-28-5	2,4-Dinitrophenol	390 U	UJ,C	390	3.84
121-14-2	2,4-Dinitrotoluene	200 U		200	3.78
606-20-2	2,6-Dinitrotoluene	200 U		200	33.2
91-58-7	2-Chloronaphthalene	200 U		200	2.76
95-57-8	2-Chlorophenol	200 U		200	2.41
91-57-6	2-Methylnaphthalene	200 U		200	3.29
95-48-7	2-Methylphenol	200 U		200	5.81
88-74-4	2-Nitroaniline	200 U		200	5.52
88-75-5	2-Nitrophenol	200 U		200	2.04
91-94-1	3,3'-Dichlorobenzidine	200 U		200	66.5
99-09-2	3-Nitroaniline	200 U	UJ,C	200	22.0
534-52-1	4,6-Dinitro-2-Methylphenol	200 U		200	5.41
101-55-3	4-Bromophenyl Phenylether	200 U		200	4.06
59-50-7	4-Chloro-3-Methylphenol	200 U		200	6.25
106-47-8	4-Chloroaniline	200 U	UJ,C	200	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	200 U		200	3.92
106-44-5	4-Methylphenol	200 U		200	7.64
100-01-6	4-Nitroaniline	200 U		200	8.70
100-02-7	4-Nitrophenol	390 U	UJ,C	390	3.40
83-32-9	Acenaphthene	200 U		200	2.06
208-96-8	Acenaphthylene	200 U		200	1.80
98-86-2	Acetophenone	200 U		200	2.28

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 12:30
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/04/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**ASB3C**	QC Batch:	89985 -118
Sample #:	**346253**	Anal. Batch:	209009
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	200 U		200	5.54
1912-24-9	Atrazine	200 U		200	8.26
100-52-7	Benzaldehyde	200 U		200	4.86
56-55-3	Benzo (a) Anthracene	200 U		200	16.0
50-32-8	Benzo (a) Pyrene	200 U		200	6.85
205-99-2	Benzo (b) Fluoranthene	200 U		200	11.7
191-24-2	Benzo (g,h,i,) Perylene	200 U		200	10.5
207-08-9	Benzo (k) Fluoranthene	200 U		200	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	200 U		200	3.77
111-44-4	Bis (2-Chloroethyl) Ether	200 U		200	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**22 J**		200	2.48
85-68-7	Butyl Benzyl Phthalate	200 U		200	5.38
105-60-2	Caprolactam	390 U	UJ,C	390	7.66
86-74-8	Carbazole	200 U	UJ,C	200	7.32
218-01-9	Chrysene	200 U		200	12.2
53-70-3	Dibenzo (a,h) Anthracene	200 U		200	7.08
132-64-9	Dibenzofuran	200 U		200	3.79
84-66-2	**Diethylphthalate**	**8.0 J**		200	2.28
131-11-3	Dimethylphthalate	200 U		200	3.97
84-74-2	**Di-n-Butylphthalate**	**320**		200	4.58
117-84-0	Di-n-Octylphthalate	200 U		200	3.72
206-44-0	Fluoranthene	200 U		200	2.82
86-73-7	Fluorene	200 U		200	2.02
118-74-1	Hexachlorobenzene	200 U		200	3.01
87-68-3	Hexachlorobutadiene	200 U		200	4.64
77-47-4	Hexachlorocyclopentadiene	200 U		200	2.38
67-72-1	Hexachloroethane	200 U		200	2.80
193-39-5	Indeno (1,2,3-cd) Pyrene	200 U		200	4.70
78-59-1	Isophorone	200 U		200	2.08
91-20-3	Naphthalene	200 U		200	3.30
98-95-3	Nitrobenzene	200 U		200	3.84

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 12:30
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/04/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**ASB3C**	QC Batch:	89985 -118
Sample #:	**346253**	Anal. Batch:	209009
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	200 U	200	3.95
86-30-6	N-Nitroso-di-Phenylamine	200 U	200	5.70
87-86-5	Pentachlorophenol	390 U	390	5.27
85-01-8	Phenanthrene	200 U	200	2.76
108-95-2	Phenol	200 U	200	4.75
129-00-0	Pyrene	200 U	200	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 12:30
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/04/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**ASB3C**	QC Batch:	89985 -118
Sample #:	**346253**	Anal. Batch:	209009
Matrix:	Soil	Percent Solids:	84
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, butyl 2-methylpropyl ester	17851-53-5	340	E	NJ,+
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	65	E	B,X
2-Ethyl-1-Hexanol	104-76-7	30	E	NJ,+
Erucylamide	112-84-5	950	E	B,X
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~340~~	~~E~~	~~AB 1/20/2004~~

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/04/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**ASB2A**	QC Batch:	89985 -118
Sample #:	**346254**	Anal. Batch:	209009
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	210 U		210	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	210 U		210	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	210 U		210	1.58
95-95-4	2,4,5-Trichlorophenol	210 U		210	4.01
88-06-2	2,4,6-Trichlorophenol	210 U		210	3.14
120-83-2	2,4-Dichlorophenol	210 U		210	4.22
105-67-9	2,4-Dimethylphenol	210 U	UJ,I	210	9.53
51-28-5	2,4-Dinitrophenol	410 U	UJ,C	410	3.84
121-14-2	**2,4-Dinitrotoluene**	**1000**		210	3.78
606-20-2	**2,6-Dinitrotoluene**	**100 J**		210	33.2
91-58-7	2-Chloronaphthalene	210 U		210	2.76
95-57-8	2-Chlorophenol	210 U		210	2.41
91-57-6	2-Methylnaphthalene	210 U		210	3.29
95-48-7	2-Methylphenol	210 U		210	5.81
88-74-4	2-Nitroaniline	210 U		210	5.52
88-75-5	2-Nitrophenol	210 U		210	2.04
91-94-1	3,3'-Dichlorobenzidine	210 U		210	66.5
99-09-2	3-Nitroaniline	210 U	UJ,C	210	22.0
534-52-1	4,6-Dinitro-2-Methylphenol	210 U		210	5.41
101-55-3	4-Bromophenyl Phenylether	210 U		210	4.06
59-50-7	4-Chloro-3-Methylphenol	210 U		210	6.25
106-47-8	4-Chloroaniline	210 U	UJ,C	210	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	210 U		210	3.92
106-44-5	4-Methylphenol	210 U		210	7.64
100-01-6	4-Nitroaniline	210 U		210	8.70
100-02-7	4-Nitrophenol	410 U	UJ,C	410	3.40
83-32-9	Acenaphthene	210 U		210	2.06
208-96-8	Acenaphthylene	210 U		210	1.80
98-86-2	Acetophenone	210 U		210	2.28

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/04/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**ASB2A**	QC Batch:	89985 -118
Sample #:	**346254**	Anal. Batch:	209009
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	210 U		210	5.54
1912-24-9	Atrazine	210 U		210	8.26
100-52-7	Benzaldehyde	210 U		210	4.86
56-55-3	Benzo (a) Anthracene	210 U		210	16.0
50-32-8	Benzo (a) Pyrene	210 U		210	6.85
205-99-2	Benzo (b) Fluoranthene	210 U		210	11.7
191-24-2	Benzo (g,h,i,) Perylene	210 U		210	10.5
207-08-9	Benzo (k) Fluoranthene	210 U		210	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	210 U		210	3.77
111-44-4	Bis (2-Chloroethyl) Ether	210 U		210	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**110 J**		210	2.48
85-68-7	Butyl Benzyl Phthalate	210 U		210	5.38
105-60-2	Caprolactam	410 U	UJ,C	410	7.66
86-74-8	Carbazole	210 U	UJ,C	210	7.32
218-01-9	Chrysene	210 U		210	12.2
53-70-3	Dibenzo (a,h) Anthracene	210 U		210	7.08
132-64-9	Dibenzofuran	210 U		210	3.79
84-66-2	**Diethylphthalate**	**10 J**		210	2.28
131-11-3	Dimethylphthalate	210 U		210	3.97
~~84-74-2~~	~~**Di-n-Butylphthalate**~~	~~**3000 E**~~	J,Q	210	~~4.58~~ dm 1/15/04
117-84-0	Di-n-Octylphthalate	210 U		210	3.72
206-44-0	**Fluoranthene**	**3.0 J**		210	2.82
86-73-7	Fluorene	210 U		210	2.02
118-74-1	Hexachlorobenzene	210 U		210	3.01
87-68-3	Hexachlorobutadiene	210 U		210	4.64
77-47-4	Hexachlorocyclopentadiene	210 U		210	2.38
67-72-1	Hexachloroethane	210 U		210	2.80
193-39-5	Indeno (1,2,3-cd) Pyrene	210 U		210	4.70
78-59-1	Isophorone	210 U		210	2.08
91-20-3	Naphthalene	210 U		210	3.30
98-95-3	Nitrobenzene	210 U		210	3.84

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/04/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**ASB2A**	QC Batch:	89985 -118
Sample #:	**346254**	Anal. Batch:	209009
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	210 U	210	3.95
86-30-6	**N-Nitroso-di-Phenylamine**	**120 J**	210	5.70
87-86-5	Pentachlorophenol	410 U	410	5.27
85-01-8	Phenanthrene	210 U	210	2.76
108-95-2	Phenol	210 U	210	4.75
129-00-0	**Pyrene**	**3.0 J**	210	1.78

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 10:15
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
Submittal #:	**36440-6**	Prepared:	10/18/03 by DJM
Submittal:	Delivery Order 0046 RAAP	Prep. Method:	
		Analyzed:	11/04/03 JMK1
Sample ID:	**ASB2A**	Anal. Method:	USEPA-8270C
Sample #:	**346254**	QC Batch:	89985 -118
Matrix:	Soil	Anal. Batch:	209009
		Percent Solids:	80
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	190	E	NJ,t
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	490	E	NJ,t
Erucylamide	112-84-5	1100	E	B,x
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~680~~	~~E~~	~~A~~ 1/20/2004

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 10:15
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/04/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**ASB2A**	QC Batch:	89985 -118
Sample #:	**346254DL**	Anal. Batch:	209009
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	6.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	1100 U		1100	15.3
95-94-3	1,2,4,5-Tetrachloro-benzene	1100 U		1100	178
108-60-1	Bis (2-Chloroisopropyl)-Ether	1100 U		1100	8.18
95-95-4	2,4,5-Trichlorophenol	1100 U		1100	20.7
88-06-2	2,4,6-Trichlorophenol	1100 U		1100	16.2
120-83-2	2,4-Dichlorophenol	1100 U		1100	21.8
105-67-9	2,4-Dimethylphenol	1100 U	UJ,I	1100	49.2
51-28-5	2,4-Dinitrophenol	2100 U	UJ,C	2100	19.8
121-14-2	**2,4-Dinitrotoluene**	**710** J		1100	19.5
606-20-2	2,6-Dinitrotoluene	1100 U		1100	172
91-58-7	2-Chloronaphthalene	1100 U		1100	14.3
95-57-8	2-Chlorophenol	1100 U		1100	12.5
91-57-6	2-Methylnaphthalene	1100 U		1100	17.0
95-48-7	2-Methylphenol	1100 U		1100	30.0
88-74-4	2-Nitroaniline	1100 U		1100	28.5
88-75-5	2-Nitrophenol	1100 U		1100	10.5
91-94-1	3,3'-Dichlorobenzidine	1100 U		1100	343
99-09-2	3-Nitroaniline	1100 U	UJ,C	1100	113
534-52-1	4,6-Dinitro-2-Methylphenol	1100 U		1100	28.0
101-55-3	4-Bromophenyl Phenylether	1100 U		1100	21.0
59-50-7	4-Chloro-3-Methylphenol	1100 U		1100	32.3
106-47-8	4-Chloroaniline	1100 U	UJ,C	1100	7.81
7005-72-3	4-Chlorophenylphenyl-Ether	1100 U		1100	20.3
106-44-5	4-Methylphenol	1100 U		1100	39.5
100-01-6	4-Nitroaniline	1100 U		1100	45.0
100-02-7	4-Nitrophenol	2100 U	UJ,C	2100	17.5
83-32-9	Acenaphthene	1100 U		1100	10.7
208-96-8	Acenaphthylene	1100 U		1100	9.30
98-86-2	Acetophenone	1100 U		1100	11.8

Do not use, see neat analysis - AS 1/20/2004

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 10:15
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/04/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**ASB2A**	QC Batch:	89985 -118
Sample #:	**346254DL**	Anal. Batch:	209009
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	6.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	1100 U		1100	28.6
1912-24-9	Atrazine	1100 U		1100	42.7
100-52-7	Benzaldehyde	1100 U		1100	25.1
56-55-3	Benzo (a) Anthracene	1100 U		1100	82.5
50-32-8	Benzo (a) Pyrene	1100 U		1100	35.4
205-99-2	Benzo (b) Fluoranthene	1100 U		1100	60.5
191-24-2	Benzo (g,h,i,) Perylene	1100 U		1100	54.1
207-08-9	Benzo (k) Fluoranthene	1100 U		1100	83.1
111-91-1	Bis (2-Chloroethoxy)-Methane	1100 U		1100	19.5
111-44-4	Bis (2-Chloroethyl) Ether	1100 U		1100	10.7
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**90 J**		1100	12.8
85-68-7	Butyl Benzyl Phthalate	1100 U		1100	27.8
105-60-2	Caprolactam	2100 U	UJ,C	2100	39.6
86-74-8	Carbazole	1100 U	UJ,C	1100	37.8
218-01-9	Chrysene	1100 U		1100	63.2
53-70-3	Dibenzo (a,h) Anthracene	1100 U		1100	36.6
132-64-9	Dibenzofuran	1100 U		1100	19.6
84-66-2	Diethylphthalate	1100 U		1100	11.8
131-11-3	Dimethylphthalate	1100 U		1100	20.5
84-74-2	√**Di-n-Butylphthalate**	**4300**		1100	23.7
117-84-0	Di-n-Octylphthalate	1100 U		1100	19.2
206-44-0	Fluoranthene	1100 U		1100	14.6
86-73-7	Fluorene	1100 U		1100	10.4
118-74-1	Hexachlorobenzene	1100 U		1100	15.6
87-68-3	Hexachlorobutadiene	1100 U		1100	24.0
77-47-4	Hexachlorocyclopentadiene	1100 U		1100	12.3
67-72-1	Hexachloroethane	1100 U		1100	14.5
193-39-5	Indeno (1,2,3-cd) Pyrene	1100 U		1100	24.3
78-59-1	Isophorone	1100 U		1100	10.7
91-20-3	Naphthalene	1100 U		1100	17.1
98-95-3	Nitrobenzene	1100 U		1100	19.8

Use only di-n-Butylphthalate, see neat analysis -AS 1/20/2004

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 10:15
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/04/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**ASB2A**	QC Batch:	89985 -118
Sample #:	**346254DL**	Anal. Batch:	209009
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	6.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	1100 U	1100	20.4
86-30-6	**N-Nitroso-di-Phenylamine**	**80 J**	1100	29.5
87-86-5	Pentachlorophenol	2100 U	2100	27.2
85-01-8	Phenanthrene	1100 U	1100	14.3
108-95-2	Phenol	1100 U	1100	24.6
129-00-0	Pyrene	1100 U	1100	9.18

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 10:10
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/04/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**ASB2B**	QC Batch:	89985 -118
Sample #:	**346255**	Anal. Batch:	209009
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U		220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U		220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U		220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U		220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U		220	3.41
120-83-2	2,4-Dichlorophenol	220 U		220	4.58
105-67-9	2,4-Dimethylphenol	220 U	UJ,l	220	10.3
51-28-5	2,4-Dinitrophenol	430 U	UJ,c	430	4.16
121-14-2	2,4-Dinitrotoluene	220 U		220	4.10
606-20-2	2,6-Dinitrotoluene	220 U		220	36.0
91-58-7	2-Chloronaphthalene	220 U		220	2.99
95-57-8	2-Chlorophenol	220 U		220	2.61
91-57-6	2-Methylnaphthalene	220 U		220	3.56
95-48-7	2-Methylphenol	220 U		220	6.29
88-74-4	2-Nitroaniline	220 U		220	5.98
88-75-5	2-Nitrophenol	220 U		220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U		220	72.0
99-09-2	3-Nitroaniline	220 U	UJ,c	220	23.8
534-52-1	4,6-Dinitro-2-Methylphenol	220 U		220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U		220	4.39
59-50-7	4-Chloro-3-Methylphenol	220 U		220	6.77
106-47-8	4-Chloroaniline	220 U	UJ,c	220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U		220	4.25
106-44-5	4-Methylphenol	220 U		220	8.28
100-01-6	4-Nitroaniline	220 U		220	9.43
100-02-7	4-Nitrophenol	430 U	UJ,c	430	3.68
83-32-9	Acenaphthene	220 U		220	2.24
208-96-8	Acenaphthylene	220 U		220	1.95
98-86-2	Acetophenone	220 U		220	2.47

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 10:10
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/04/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**ASB2B**	QC Batch:	89985 -118
Sample #:	**346255**	Anal. Batch:	209009
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	220 U		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U		220	5.27
56-55-3	Benzo (a) Anthracene	220 U		220	17.3
50-32-8	Benzo (a) Pyrene	220 U		220	7.42
205-99-2	Benzo (b) Fluoranthene	220 U		220	12.7
191-24-2	Benzo (g,h,i,) Perylene	220 U		220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**22 J**		220	2.69
85-68-7	Butyl Benzyl Phthalate	220 U		220	5.82
105-60-2	Caprolactam	430 U	UJ,C	430	8.29
86-74-8	Carbazole	220 U	UJ,C	220	7.93
218-01-9	Chrysene	220 U		220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U		220	7.67
132-64-9	Dibenzofuran	220 U		220	4.11
84-66-2	**Diethylphthalate**	**10 J**		220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**590**		220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	Fluoranthene	220 U		220	3.06
86-73-7	Fluorene	220 U		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U		220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	Indeno (1,2,3-cd) Pyrene	220 U		220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	Naphthalene	220 U		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 10:10
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/04/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**ASB2B**	QC Batch:	89985 -118
Sample #:	**346255**	Anal. Batch:	209009
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	N-Nitroso-di-Phenylamine	220 U	220	6.18
87-86-5	Pentachlorophenol	430 U	430	5.71
85-01-8	Phenanthrene	220 U	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	Pyrene	220 U	220	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 10:10
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
Submittal #:	**36440-6**	Prepared:	10/18/03 by DJM
Submittal:	Delivery Order 0046 RAAP	Prep. Method:	
		Analyzed:	11/04/03 JMK1
Sample ID:	**ASB2B**	Anal. Method:	USEPA-8270C
Sample #:	**346255**	QC Batch:	89985 -118
Matrix:	Soil	Anal. Batch:	209009
		Percent Solids:	76
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	230	E	NJ,+
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	510	E	NJ,+
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	87	E	B, X
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~1200~~	~~E~~	~~AS~~ 1/20/2004

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 00:00
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/04/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**SBD-10**	QC Batch:	89985 -118
Sample #:	**346256**	Anal. Batch:	209009
Matrix:	Soil	Percent Solids:	72
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U		220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U		220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U		220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U		220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U		220	3.41
120-83-2	2,4-Dichlorophenol	220 U		220	4.58
105-67-9	2,4-Dimethylphenol	220 U	UJ,I	220	10.3
51-28-5	2,4-Dinitrophenol	430 U	UJ,c	430	4.16
121-14-2	2,4-Dinitrotoluene	220 U		220	4.10
606-20-2	2,6-Dinitrotoluene	220 U		220	36.0
91-58-7	2-Chloronaphthalene	220 U		220	2.99
95-57-8	2-Chlorophenol	220 U		220	2.61
91-57-6	2-Methylnaphthalene	220 U		220	3.56
95-48-7	2-Methylphenol	220 U		220	6.29
88-74-4	2-Nitroaniline	220 U		220	5.98
88-75-5	2-Nitrophenol	220 U		220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U		220	72.0
99-09-2	3-Nitroaniline	220 U	UJ,c	220	23.8
534-52-1	4,6-Dinitro-2-Methylphenol	220 U		220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U		220	4.39
59-50-7	4-Chloro-3-Methylphenol	220 U		220	6.77
106-47-8	4-Chloroaniline	220 U	UJ,c	220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U		220	4.25
106-44-5	4-Methylphenol	220 U		220	8.28
100-01-6	4-Nitroaniline	220 U		220	9.43
100-02-7	4-Nitrophenol	430 U	UJ,c	430	3.68
83-32-9	Acenaphthene	220 U		220	2.24
208-96-8	Acenaphthylene	220 U		220	1.95
98-86-2	Acetophenone	220 U		220	2.47

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ANALYTICAL REPORT

Client:	**URS Corporation**
Project:	Richmond, VA
	RAAP
Submittal #:	**36440-6**
Submittal:	Delivery Order 0046
	RAAP
Sample ID:	**SBD-10**
Sample #:	**346256**
Matrix:	Soil
Unit:	ug/kg dry

Sampled:	10/11/03 @ 00:00
Sampler:	B.F.& J.S.
Received:	10/14/03 @ 09:30
Prepared:	10/18/03 by DJM
Prep. Method:	USEPA-3550B
Analyzed:	11/04/03 by JMK1
Anal. Method:	USEPA-8270C
QC Batch:	89985 -118
Anal. Batch:	209009
Percent Solids:	72
Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	220 U		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U		220	5.27
56-55-3	Benzo (a) Anthracene	220 U		220	17.3
50-32-8	Benzo (a) Pyrene	220 U		220	7.42
205-99-2	Benzo (b) Fluoranthene	220 U		220	12.7
191-24-2	Benzo (g,h,i,) Perylene	220 U		220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**16 J**		220	2.69
85-68-7	Butyl Benzyl Phthalate	220 U		220	5.82
105-60-2	Caprolactam	430 U	UJ,C	430	8.29
86-74-8	Carbazole	220 U	UJ,C	220	7.93
218-01-9	Chrysene	220 U		220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U		220	7.67
132-64-9	Dibenzofuran	220 U		220	4.11
84-66-2	Diethylphthalate	220 U		220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**640**		220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	Fluoranthene	220 U		220	3.06
86-73-7	Fluorene	220 U		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U		220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	Indeno (1,2,3-cd) Pyrene	220 U		220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	Naphthalene	220 U		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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ANALYTICAL REPORT

Client:	**URS Corporation**
Project:	Richmond, VA
	RAAP
Submittal #:	**36440-6**
Submittal:	Delivery Order 0046
	RAAP
Sample ID:	**SBD-10**
Sample #:	**346256**
Matrix:	Soil
Unit:	ug/kg dry

Sampled:	10/11/03 @ 00:00
Sampler:	B.F.& J.S.
Received:	10/14/03 @ 09:30
Prepared:	10/18/03 by DJM
Prep. Method:	USEPA-3550B
Analyzed:	11/04/03 by JMK1
Anal. Method:	USEPA-8270C
QC Batch:	89985 -118
Anal. Batch:	209009
Percent Solids:	72
Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	N-Nitroso-di-Phenylamine	220 U	220	6.18
87-86-5	Pentachlorophenol	430 U	430	5.71
85-01-8	Phenanthrene	220 U	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	Pyrene	220 U	220	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/04/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD-10**	QC Batch:	89985 -118
Sample #:	**346256**	Anal. Batch:	209009
Matrix:	Soil	Percent Solids:	72
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	94	E	NJ,+
1,2-Benzenedicarboxylic acid, butyl 2-methylpropyl ester	17851-53-5	510	E	NJ,+
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	69	E	B,x
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~2000~~	~~E~~	~~AS~~ 1/20/2004

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 11:15
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/04/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**ASB2C**	QC Batch:	89985 -118
Sample #:	**346257**	Anal. Batch:	209009
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	230 U		230	3.44
95-94-3	1,2,4,5-Tetrachloro-benzene	230 U		230	40.2
108-60-1	Bis (2-Chloroisopropyl)-Ether	230 U		230	1.85
95-95-4	2,4,5-Trichlorophenol	230 U		230	4.68
88-06-2	2,4,6-Trichlorophenol	230 U		230	3.67
120-83-2	2,4-Dichlorophenol	230 U		230	4.93
105-67-9	2,4-Dimethylphenol	230 U	UJ,I	230	11.1
51-28-5	2,4-Dinitrophenol	450 U	UJ,C	450	4.48
121-14-2	2,4-Dinitrotoluene	230 U		230	4.41
606-20-2	2,6-Dinitrotoluene	230 U		230	38.8
91-58-7	2-Chloronaphthalene	230 U		230	3.22
95-57-8	2-Chlorophenol	230 U		230	2.81
91-57-6	2-Methylnaphthalene	230 U		230	3.84
95-48-7	2-Methylphenol	230 U		230	6.78
88-74-4	2-Nitroaniline	230 U		230	6.44
88-75-5	2-Nitrophenol	230 U		230	2.38
91-94-1	3,3'-Dichlorobenzidine	230 U	UJ,M	230	77.6
99-09-2	3-Nitroaniline	230 U	UJ,C	230	25.6
534-52-1	4,6-Dinitro-2-Methylphenol	230 U		230	6.31
101-55-3	4-Bromophenyl Phenylether	230 U		230	4.73
59-50-7	4-Chloro-3-Methylphenol	230 U		230	7.29
106-47-8	4-Chloroaniline	230 U	UJ,C	230	1.76
7005-72-3	4-Chlorophenylphenyl-Ether	230 U		230	4.58
106-44-5	4-Methylphenol	230 U		230	8.92
100-01-6	4-Nitroaniline	230 U	UJ,M	230	10.2
100-02-7	4-Nitrophenol	450 U	UJ,C	450	3.96
83-32-9	Acenaphthene	230 U		230	2.41
208-96-8	Acenaphthylene	230 U		230	2.10
98-86-2	Acetophenone	230 U		230	2.66

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 11:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/04/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**ASB2C**	QC Batch:	89985 -118
Sample #:	**346257**	Anal. Batch:	209009
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	230 U		230	6.47
1912-24-9	Atrazine	230 U		230	9.63
100-52-7	Benzaldehyde	230 U		230	5.67
56-55-3	Benzo (a) Anthracene	230 U		230	18.6
50-32-8	Benzo (a) Pyrene	230 U		230	7.99
205-99-2	Benzo (b) Fluoranthene	230 U		230	13.7
191-24-2	Benzo (g,h,i,) Perylene	230 U		230	12.2
207-08-9	Benzo (k) Fluoranthene	230 U		230	18.8
111-91-1	Bis (2-Chloroethoxy)-Methane	230 U		230	4.40
111-44-4	Bis (2-Chloroethyl) Ether	230 U		230	2.42
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**34 J**		230	2.90
85-68-7	**Butyl Benzyl Phthalate**	**9.0 J**		230	6.27
105-60-2	Caprolactam	450 U	UJ,C	450	8.93
86-74-8	Carbazole	230 U	UJ,C	230	8.54
218-01-9	Chrysene	230 U		230	14.3
53-70-3	Dibenzo (a,h) Anthracene	230 U		230	8.26
132-64-9	Dibenzofuran	230 U		230	4.42
84-66-2	**Diethylphthalate**	**8.0 J**		230	2.66
131-11-3	Dimethylphthalate	230 U		230	4.63
84-74-2	**Di-n-Butylphthalate**	**600**		230	5.35
117-84-0	Di-n-Octylphthalate	230 U		230	4.34
206-44-0	Fluoranthene	230 U		230	3.29
86-73-7	Fluorene	230 U		230	2.35
118-74-1	Hexachlorobenzene	230 U		230	3.51
87-68-3	Hexachlorobutadiene	230 U		230	5.42
77-47-4	Hexachlorocyclopentadiene	230 U	UJ,M	230	2.77
67-72-1	Hexachloroethane	230 U		230	3.27
193-39-5	Indeno (1,2,3-cd) Pyrene	230 U		230	5.49
78-59-1	Isophorone	230 U		230	2.42
91-20-3	Naphthalene	230 U		230	3.85
98-95-3	Nitrobenzene	230 U		230	4.48

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 11:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/04/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**ASB2C**	QC Batch:	89985 -118
Sample #:	**346257**	Anal. Batch:	209009
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	230 U	230	4.61
86-30-6	N-Nitroso-di-Phenylamine	230 U	230	6.65
87-86-5	Pentachlorophenol	450 U	450	6.15
85-01-8	Phenanthrene	230 U	230	3.22
108-95-2	Phenol	230 U	230	5.54
129-00-0	Pyrene	230 U	230	2.07

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 11:15
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
Submittal #:	**36440-6**	Prepared:	10/18/03 by DJM
Submittal:	Delivery Order 0046 RAAP	Prep. Method:	
		Analyzed:	11/04/03 JMK1
Sample ID:	**ASB2C**	Anal. Method:	USEPA-8270C
Sample #:	**346257**	QC Batch:	89985 -118
Matrix:	Soil	Anal. Batch:	209009
		Percent Solids:	73
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	500	E	NJ,+
1-Heptadecanol	1454-85-9	260	E	NJ,+
Bis(2-ethylhexyl)maleate	142-16-5	76	E	NJ,+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~4300~~	~~E~~	AS 1/20/2004

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/27/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**EQB5**	QC Batch:	90710 -114
Sample #:	**346013**	Anal. Batch:	208739
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	1.2 U	1.2	0.0279
208-96-8	Acenaphthylene	1.2 U	1.2	0.0525
120-12-7	Anthracene	1.2 U	1.2	0.0024
56-55-3	Benzo (a) Anthracene	0.062 U	0.062	0.0026
50-32-8	Benzo (a) Pyrene	0.062 U	0.062	0.0069
205-99-2	Benzo (b) Fluoranthene	0.090 U	0.090	0.0138
191-24-2	Benzo (g,h,i,) Perylene	1.2 U	1.2	0.0539
207-08-9	Benzo (k) Fluoranthene	0.12 U	0.12	0.0043
218-01-9	Chrysene	1.2 U	1.2	0.0034
53-70-3	Dibenzo (a,h) Anthracene	0.24 U	0.24	0.0416
206-44-0	Fluoranthene	1.2 U	1.2	0.0074
86-73-7	Fluorene	1.2 U	1.2	0.0096
193-39-5	Indeno (1,2,3-cd) Pyrene	0.062 U	0.062	0.0050
91-20-3	Naphthalene	0.62 U	0.62	0.0422
85-01-8	Phenanthrene	1.2 U	1.2	0.0032
129-00-0	Pyrene	1.2 U	1.2	0.0194

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/27/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**EQB6**	QC Batch:	90710 -114
Sample #:	**346015**	Anal. Batch:	208739
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	1.2 U	1.2	0.0279
208-96-8	Acenaphthylene	1.2 U	1.2	0.0525
120-12-7	Anthracene	1.2 U	1.2	0.0024
56-55-3	Benzo (a) Anthracene	0.062 U	0.062	0.0026
50-32-8	Benzo (a) Pyrene	0.062 U	0.062	0.0069
205-99-2	Benzo (b) Fluoranthene	0.090 U	0.090	0.0138
191-24-2	Benzo (g,h,i,) Perylene	1.2 U	1.2	0.0539
207-08-9	Benzo (k) Fluoranthene	0.12 U	0.12	0.0043
218-01-9	Chrysene	1.2 U	1.2	0.0034
53-70-3	Dibenzo (a,h) Anthracene	0.24 U	0.24	0.0416
206-44-0	Fluoranthene	1.2 U	1.2	0.0074
86-73-7	Fluorene	1.2 U	1.2	0.0096
193-39-5	Indeno (1,2,3-cd) Pyrene	0.062 U	0.062	0.0050
91-20-3	Naphthalene	0.62 U	0.62	0.0422
85-01-8	Phenanthrene	1.2 U	1.2	0.0032
129-00-0	Pyrene	1.2 U	1.2	0.0194

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 13:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/11/03 @ 08:45
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/24/03 by TAJ
		Anal. Method:	USEPA-8310
Sample ID:	**13SD3**	QC Batch:	91080 -118
Sample #:	**346017**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	68
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	150 U	150	14.1
208-96-8	Acenaphthylene	310 U	310	17.4
120-12-7	**Anthracene**	**9.4 J**	31	1.05
56-55-3	**Benzo (a) Anthracene**	**30 J**	31	1.20
50-32-8	**Benzo (a) Pyrene**	**49**	31	1.50
205-99-2	**Benzo (b) Fluoranthene**	**36**	31	1.95
191-24-2	**Benzo (g,h,i,) Perylene**	**88**	31	18.8
207-08-9	**Benzo (k) Fluoranthene**	**24 J**	31	1.50
218-01-9	**Chrysene**	**84**	31	1.80
53-70-3	**Dibenzo (a,h) Anthracene**	**6.2 J**	31	2.10
206-44-0	**Fluoranthene**	**19 J**	31	2.55
86-73-7	Fluorene	31 U	31	1.95
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**45**	31	1.05
91-20-3	Naphthalene	150 U	150	11.9
85-01-8	**Phenanthrene**	**5.2 J**	31	0.900
129-00-0	**Pyrene**	**14 J**	31	1.35

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**SDD1**	QC Batch:	91080 -118
Sample #:	**346018**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	63
Unit:	ug/kg dry	Dilution Factor:	1.6

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	160 U	160	15.0
208-96-8	Acenaphthylene	330 U	330	18.6
120-12-7	Anthracene	33 U	33	1.12
56-55-3	Benzo (a) Anthracene	33 U	33	1.28
50-32-8	Benzo (a) Pyrene	33 U	33	1.60
205-99-2	Benzo (b) Fluoranthene	33 U	33	2.08
191-24-2	Benzo (g,h,i,) Perylene	33 U	33	20.0
207-08-9	Benzo (k) Fluoranthene	33 U	33	1.60
218-01-9	**Chrysene**	**2.6 J**	33	1.92
53-70-3	Dibenzo (a,h) Anthracene	33 U	33	2.24
206-44-0	Fluoranthene	33 U	33	2.72
86-73-7	Fluorene	33 U	33	2.08
193-39-5	Indeno (1,2,3-cd) Pyrene	33 U	33	1.12
91-20-3	Naphthalene	160 U	160	12.6
85-01-8	Phenanthrene	33 U	33	0.960
129-00-0	Pyrene	33 U	33	1.44

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**13SD2**	QC Batch:	91080 -118
Sample #:	**346019**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	65
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	150 U	150	14.1
208-96-8	Acenaphthylene	320 U	320	17.4
120-12-7	**Anthracene**	**3.8 J**	32	1.05
56-55-3	**Benzo (a) Anthracene**	**21 J**	32	1.20
50-32-8	**Benzo (a) Pyrene**	**26 J**	32	1.50
205-99-2	**Benzo (b) Fluoranthene**	**23 J**	32	1.95
191-24-2	**Benzo (g,h,i,) Perylene**	**40**	32	18.8
207-08-9	**Benzo (k) Fluoranthene**	**12 J**	32	1.50
218-01-9	**Chrysene**	**19 J**	32	1.80
53-70-3	Dibenzo (a,h) Anthracene	32 U	32	2.10
206-44-0	**Fluoranthene**	**48**	32	2.55
86-73-7	Fluorene	32 U	32	1.95
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**18 J**	32	1.05
91-20-3	Naphthalene	150 U	150	11.9
85-01-8	**Phenanthrene**	**16 J**	32	0.900
129-00-0	**Pyrene**	**45**	32	1.35

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 13:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/11/03 @ 08:45
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/27/03 by TAJ
		Anal. Method:	USEPA-8310
Sample ID:	**13SW3**	QC Batch:	90710 -114
Sample #:	**346020**	Anal. Batch:	208739
Matrix:	Surface Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	1.2 U	1.2	0.0279
208-96-8	Acenaphthylene	1.2 U	1.2	0.0525
120-12-7	Anthracene	1.2 U	1.2	0.0024
56-55-3	Benzo (a) Anthracene	0.062 U	0.062	0.0026
50-32-8	Benzo (a) Pyrene	0.062 U	0.062	0.0069
205-99-2	Benzo (b) Fluoranthene	0.090 U	0.090	0.0138
191-24-2	Benzo (g,h,i,) Perylene	1.2 U	1.2	0.0539
207-08-9	Benzo (k) Fluoranthene	0.12 U	0.12	0.0043
218-01-9	Chrysene	1.2 U	1.2	0.0034
53-70-3	Dibenzo (a,h) Anthracene	0.24 U	0.24	0.0416
206-44-0	Fluoranthene	1.2 U	1.2	0.0074
86-73-7	Fluorene	1.2 U	1.2	0.0096
193-39-5	Indeno (1,2,3-cd) Pyrene	0.062 U	0.062	0.0050
91-20-3	Naphthalene	0.62 U	0.62	0.0422
85-01-8	Phenanthrene	1.2 U	1.2	0.0032
129-00-0	Pyrene	1.2 U	1.2	0.0194

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/27/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**SWD1**	QC Batch:	90710 -114
Sample #:	**346021**	Anal. Batch:	208739
Matrix:	Surface Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	1.2 U	1.2	0.0279
208-96-8	Acenaphthylene	1.2 U	1.2	0.0525
120-12-7	Anthracene	1.2 U	1.2	0.0024
56-55-3	Benzo (a) Anthracene	0.062 U	0.062	0.0026
50-32-8	Benzo (a) Pyrene	0.062 U	0.062	0.0069
205-99-2	Benzo (b) Fluoranthene	0.090 U	0.090	0.0138
191-24-2	Benzo (g,h,i,) Perylene	1.2 U	1.2	0.0539
207-08-9	Benzo (k) Fluoranthene	0.12 U	0.12	0.0043
218-01-9	Chrysene	1.2 U	1.2	0.0034
53-70-3	Dibenzo (a,h) Anthracene	0.24 U	0.24	0.0416
206-44-0	Fluoranthene	1.2 U	1.2	0.0074
86-73-7	Fluorene	1.2 U	1.2	0.0096
193-39-5	Indeno (1,2,3-cd) Pyrene	0.062 U	0.062	0.0050
91-20-3	Naphthalene	0.62 U	0.62	0.0422
85-01-8	Phenanthrene	1.2 U	1.2	0.0032
129-00-0	Pyrene	1.2 U	1.2	0.0194

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/27/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**13SW2**	QC Batch:	90710 -114
Sample #:	**346022**	Anal. Batch:	208739
Matrix:	Surface Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1.1

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	1.2 U	1.2	0.0307
208-96-8	Acenaphthylene	1.2 U	1.2	0.0578
120-12-7	Anthracene	1.2 U	1.2	0.00264
56-55-3	Benzo (a) Anthracene	0.062 U	0.062	0.00286
50-32-8	Benzo (a) Pyrene	0.062 U	0.062	0.00759
205-99-2	Benzo (b) Fluoranthene	0.090 U	0.090	0.0152
191-24-2	Benzo (g,h,i,) Perylene	1.2 U	1.2	0.0593
207-08-9	Benzo (k) Fluoranthene	0.12 U	0.12	0.00473
218-01-9	Chrysene	1.2 U	1.2	0.00374
53-70-3	Dibenzo (a,h) Anthracene	0.24 U	0.24	0.0458
206-44-0	Fluoranthene	1.2 U	1.2	0.00814
86-73-7	Fluorene	1.2 U	1.2	0.0106
193-39-5	Indeno (1,2,3-cd) Pyrene	0.062 U	0.062	0.00550
91-20-3	Naphthalene	0.62 U	0.62	0.0464
85-01-8	Phenanthrene	1.2 U	1.2	0.00352
129-00-0	Pyrene	1.2 U	1.2	0.0213

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 08:45
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**ASB1A**	QC Batch:	91218 -118
Sample #:	**346248**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	120 U		120	11.3
208-96-8	Acenaphthylene	260 U		260	13.9
120-12-7	Anthracene	26 U		26	0.840
56-55-3	Benzo (a) Anthracene	26 U		26	0.960
50-32-8	Benzo (a) Pyrene	26 U	UJ,c	26	1.20
205-99-2	Benzo (b) Fluoranthene	26 U		26	1.56
191-24-2	Benzo (g,h,i,) Perylene	26 U		26	15.0
207-08-9	Benzo (k) Fluoranthene	26 U		26	1.20
218-01-9	**Chrysene**	**5.0 J**		26	1.44
53-70-3	Dibenzo (a,h) Anthracene	26 U		26	1.68
206-44-0	**Fluoranthene**	**17 J**	J,c	26	2.04
86-73-7	Fluorene	26 U		26	1.56
193-39-5	Indeno (1,2,3-cd) Pyrene	26 U		26	0.840
91-20-3	Naphthalene	120 U		120	9.48
85-01-8	**Phenanthrene**	**3.1 J**		26	0.720
129-00-0	**Pyrene**	**11 J**		26	1.08

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 09:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**ASB1B**	QC Batch:	91218 -118
Sample #:	**346249**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	130	12.2
208-96-8	Acenaphthylene	270 U	270	15.1
120-12-7	Anthracene	27 U	27	0.910
56-55-3	Benzo (a) Anthracene	27 U	27	1.04
50-32-8	Benzo (a) Pyrene	27 U	27	1.30
205-99-2	Benzo (b) Fluoranthene	27 U	27	1.69
191-24-2	Benzo (g,h,i,) Perylene	27 U	27	16.3
207-08-9	Benzo (k) Fluoranthene	27 U	27	1.30
218-01-9	Chrysene	27 U	27	1.56
53-70-3	Dibenzo (a,h) Anthracene	27 U	27	1.82
206-44-0	Fluoranthene	27 U	27	2.21
86-73-7	Fluorene	27 U	27	1.69
193-39-5	Indeno (1,2,3-cd) Pyrene	27 U	27	0.910
91-20-3	Naphthalene	130 U	130	10.3
85-01-8	Phenanthrene	27 U	27	0.780
129-00-0	Pyrene	27 U	27	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 09:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**ASB1C**	QC Batch:	91218 -118
Sample #:	**346250**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	130	12.2
208-96-8	Acenaphthylene	270 U	270	15.1
120-12-7	Anthracene	27 U	27	0.910
56-55-3	Benzo (a) Anthracene	27 U	27	1.04
50-32-8	Benzo (a) Pyrene	27 U	27	1.30
205-99-2	Benzo (b) Fluoranthene	27 U	27	1.69
191-24-2	Benzo (g,h,i,) Perylene	27 U	27	16.3
207-08-9	Benzo (k) Fluoranthene	27 U	27	1.30
218-01-9	Chrysene	27 U	27	1.56
53-70-3	Dibenzo (a,h) Anthracene	27 U	27	1.82
206-44-0	Fluoranthene	27 U	27	2.21
86-73-7	Fluorene	27 U	27	1.69
193-39-5	Indeno (1,2,3-cd) Pyrene	27 U	27	0.910
91-20-3	Naphthalene	130 U	130	10.3
85-01-8	Phenanthrene	27 U	27	0.780
129-00-0	Pyrene	27 U	27	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 12:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**ASB3A**	QC Batch:	91218 -118
Sample #:	**346251**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	130	12.2
208-96-8	Acenaphthylene	260 U	260	15.1
120-12-7	Anthracene	26 U	26	0.910
56-55-3	Benzo (a) Anthracene	26 U	26	1.04
50-32-8	Benzo (a) Pyrene	26 U	26	1.30
205-99-2	Benzo (b) Fluoranthene	26 U	26	1.69
191-24-2	Benzo (g,h,i,) Perylene	26 U	26	16.3
207-08-9	Benzo (k) Fluoranthene	26 U	26	1.30
218-01-9	Chrysene	26 U	26	1.56
53-70-3	Dibenzo (a,h) Anthracene	26 U	26	1.82
206-44-0	Fluoranthene	26 U	26	2.21
86-73-7	Fluorene	26 U	26	1.69
193-39-5	Indeno (1,2,3-cd) Pyrene	26 U	26	0.910
91-20-3	Naphthalene	130 U	130	10.3
85-01-8	**Phenanthrene**	**1.9 J**	26	0.780
129-00-0	Pyrene	26 U	26	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 12:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**ASB3B**	QC Batch:	91218 -118
Sample #:	**346252**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	130	12.2
208-96-8	Acenaphthylene	260 U	260	15.1
120-12-7	Anthracene	26 U	26	0.910
56-55-3	Benzo (a) Anthracene	26 U	26	1.04
50-32-8	Benzo (a) Pyrene	26 U	26	1.30
205-99-2	Benzo (b) Fluoranthene	26 U	26	1.69
191-24-2	Benzo (g,h,i,) Perylene	26 U	26	16.3
207-08-9	Benzo (k) Fluoranthene	26 U	26	1.30
218-01-9	Chrysene	26 U	26	1.56
53-70-3	Dibenzo (a,h) Anthracene	26 U	26	1.82
206-44-0	Fluoranthene	26 U	26	2.21
86-73-7	Fluorene	26 U	26	1.69
193-39-5	Indeno (1,2,3-cd) Pyrene	26 U	26	0.910
91-20-3	Naphthalene	130 U	130	10.3
85-01-8	Phenanthrene	26 U	26	0.780
129-00-0	Pyrene	26 U	26	1.17

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Client:	**URS Corporation**	Sampled:	10/11/03 @ 12:30
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**ASB3C**	QC Batch:	91218 -118
Sample #:	**346253**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	120 U	120	11.3
208-96-8	Acenaphthylene	250 U	250	13.9
120-12-7	Anthracene	25 U	25	0.840
56-55-3	Benzo (a) Anthracene	25 U	25	0.960
50-32-8	Benzo (a) Pyrene	25 U	25	1.20
205-99-2	Benzo (b) Fluoranthene	25 U	25	1.56
191-24-2	Benzo (g,h,i,) Perylene	25 U	25	15.0
207-08-9	Benzo (k) Fluoranthene	25 U	25	1.20
218-01-9	**Chrysene**	**1.8 J**	25	1.44
53-70-3	Dibenzo (a,h) Anthracene	25 U	25	1.68
206-44-0	**Fluoranthene**	**8.7 J**	25	2.04
86-73-7	Fluorene	25 U	25	1.56
193-39-5	Indeno (1,2,3-cd) Pyrene	25 U	25	0.840
91-20-3	Naphthalene	120 U	120	9.48
85-01-8	**Phenanthrene**	**3.0 J**	25	0.720
129-00-0	**Pyrene**	**9.9 J**	25	1.08

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	11/27/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**ASB2A**	QC Batch:	91218 -118
Sample #:	**346254**	Anal. Batch:	210003
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.25

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	130	11.8
208-96-8	Acenaphthylene	260 U	260	14.5
120-12-7	Anthracene	26 U	26	0.875
56-55-3	**Benzo (a) Anthracene**	**3.6 J**	26	1.00
50-32-8	Benzo (a) Pyrene	26 U	26	1.25
205-99-2	Benzo (b) Fluoranthene	26 U	26	1.63
191-24-2	Benzo (g,h,i,) Perylene	26 U	26	15.6
207-08-9	Benzo (k) Fluoranthene	26 U	26	1.25
218-01-9	**Chrysene**	**3.7 J**	26	1.50
53-70-3	Dibenzo (a,h) Anthracene	26 U	26	1.75
206-44-0	**Fluoranthene**	**7.7 J**	26	2.13
86-73-7	Fluorene	26 U	26	1.63
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**6.2 J**	26	0.875
91-20-3	Naphthalene	130 U	130	9.88
85-01-8	**Phenanthrene**	**4.0 J**	26	0.750
129-00-0	**Pyrene**	**21 J**	26	1.13

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 10:10
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**ASB2B**	QC Batch:	91218 -118
Sample #:	**346255**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	130	12.2
208-96-8	Acenaphthylene	280 U	280	15.1
120-12-7	Anthracene	28 U	28	0.910
56-55-3	Benzo (a) Anthracene	28 U	28	1.04
50-32-8	Benzo (a) Pyrene	28 U	28	1.30
205-99-2	Benzo (b) Fluoranthene	28 U	28	1.69
191-24-2	Benzo (g,h,i,) Perylene	28 U	28	16.3
207-08-9	Benzo (k) Fluoranthene	28 U	28	1.30
218-01-9	Chrysene	28 U	28	1.56
53-70-3	Dibenzo (a,h) Anthracene	28 U	28	1.82
206-44-0	Fluoranthene	28 U	28	2.21
86-73-7	Fluorene	28 U	28	1.69
193-39-5	Indeno (1,2,3-cd) Pyrene	28 U	28	0.910
91-20-3	Naphthalene	130 U	130	10.3
85-01-8	Phenanthrene	28 U	28	0.780
129-00-0	Pyrene	28 U	28	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 00:00
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/24/03 by TAJ
		Anal. Method:	USEPA-8310
Sample ID:	**SBD-10**	QC Batch:	91218 -118
Sample #:	**346256**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	72
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	140 U	140	13.2
208-96-8	Acenaphthylene	290 U	290	16.2
120-12-7	Anthracene	29 U	29	0.980
56-55-3	Benzo (a) Anthracene	29 U	29	1.12
50-32-8	Benzo (a) Pyrene	29 U	29	1.40
205-99-2	Benzo (b) Fluoranthene	29 U	29	1.82
191-24-2	Benzo (g,h,i,) Perylene	29 U	29	17.5
207-08-9	Benzo (k) Fluoranthene	29 U	29	1.40
218-01-9	Chrysene	29 U	29	1.68
53-70-3	Dibenzo (a,h) Anthracene	29 U	29	1.96
206-44-0	Fluoranthene	29 U	29	2.38
86-73-7	Fluorene	29 U	29	1.82
193-39-5	Indeno (1,2,3-cd) Pyrene	29 U	29	0.980
91-20-3	Naphthalene	140 U	140	11.1
85-01-8	Phenanthrene	29 U	29	0.840
129-00-0	Pyrene	29 U	29	1.26

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 11:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**ASB2C**	QC Batch:	91218 -118
Sample #:	**346257**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	140 U	140	13.2
208-96-8	Acenaphthylene	650 U	650	16.2
120-12-7	Anthracene	65 U	65	0.980
56-55-3	Benzo (a) Anthracene	65 U	65	1.12
50-32-8	Benzo (a) Pyrene	65 U	65	1.40
205-99-2	Benzo (b) Fluoranthene	65 U	65	1.82
191-24-2	Benzo (g,h,i,) Perylene	65 U	65	17.5
207-08-9	Benzo (k) Fluoranthene	65 U	65	1.40
218-01-9	Chrysene	65 U	65	1.68
53-70-3	Dibenzo (a,h) Anthracene	65 U	65	1.96
206-44-0	Fluoranthene	65 U	65	2.38
86-73-7	Fluorene	65 U	65	1.82
193-39-5	Indeno (1,2,3-cd) Pyrene	65 U	65	0.980
91-20-3	Naphthalene	140 U	140	11.1
85-01-8	Phenanthrene	65 U	65	0.840
129-00-0	Pyrene	65 U	65	1.26

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/17/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/27/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**EQB5**	QC Batch:	89804 -117
Sample #:	**346013**	Anal. Batch:	208354
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.65 U	0.65	0.150
99-65-0	1,3-Dinitrobenzene	0.65 U	0.65	0.121
118-96-7	2,4,6-Trinitrotoluene	0.65 U	0.65	0.102
121-14-2	2,4-Dinitrotoluene	0.65 U	0.65	0.114
606-20-2	2,6-Dinitrotoluene	0.65 U	0.65	0.217
35572-78-2	2-Amino-4,6-dinitro-toluene	1.0 U	1.0	0.245
88-72-2	2-Nitrotoluene	0.65 U	0.65	0.175
99-08-1	3-Nitrotoluene	2.0 U	2.0	0.413
19406-51-0	4-Amino-2,6-dinitro-toluene	1.0 U	1.0	0.239
99-99-0	4-Nitrotoluene	2.0 U	2.0	0.488
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.277
98-95-3	Nitrobenzene	0.65 U	0.65	0.0825
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.65 U	0.65	0.109
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	2.0 U	2.0	0.0931

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 11:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/11/03 @ 08:45
		Prepared:	10/17/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/27/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**EQB6**	QC Batch:	89804 -117
Sample #:	**346015**	Anal. Batch:	208354
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.65 U	0.65	0.150
99-65-0	1,3-Dinitrobenzene	0.65 U	0.65	0.121
118-96-7	2,4,6-Trinitrotoluene	0.65 U	0.65	0.102
121-14-2	2,4-Dinitrotoluene	0.65 U	0.65	0.114
606-20-2	2,6-Dinitrotoluene	0.65 U	0.65	0.217
35572-78-2	2-Amino-4,6-dinitro-toluene	1.0 U	1.0	0.245
88-72-2	2-Nitrotoluene	0.65 U	0.65	0.175
99-08-1	3-Nitrotoluene	2.0 U	2.0	0.413
19406-51-0	4-Amino-2,6-dinitro-toluene	1.0 U	1.0	0.239
99-99-0	4-Nitrotoluene	2.0 U	2.0	0.488
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.277
98-95-3	Nitrobenzene	0.65 U	0.65	0.0825
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.65 U	0.65	0.109
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	2.0 U	2.0	0.0931

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 13:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/11/03 @ 08:45
		Prepared:	10/21/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/24/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**13SD3**	QC Batch:	90908 -121
Sample #:	**346017**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	68
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/21/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**SDD1**	QC Batch:	90908 -121
Sample #:	**346018**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	63
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 14:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/11/03 @ 08:45
Submittal #:	**36440-6**	Prepared:	10/21/03 by DJM
Submittal:	Delivery Order 0046 RAAP	Prep. Method:	USEPA-8330
		Analyzed:	10/24/03 by JMK1
Sample ID:	**13SD2**	Anal. Method:	USEPA-8330
Sample #:	**346019**	QC Batch:	90908 -121
Matrix:	Soil	Anal. Batch:	208771
Unit:	mg/kg dry	Percent Solids:	65
		Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/17/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/27/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**13SW3**	QC Batch:	89804 -117
Sample #:	**346020**	Anal. Batch:	208354
Matrix:	Surface Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.65 U	0.65	0.150
99-65-0	1,3-Dinitrobenzene	0.65 U	0.65	0.121
118-96-7	2,4,6-Trinitrotoluene	0.65 U	0.65	0.102
121-14-2	2,4-Dinitrotoluene	0.65 U	0.65	0.114
606-20-2	2,6-Dinitrotoluene	0.65 U	0.65	0.217
35572-78-2	2-Amino-4,6-dinitro-toluene	1.0 U	1.0	0.245
88-72-2	2-Nitrotoluene	0.65 U	0.65	0.175
99-08-1	3-Nitrotoluene	2.0 U	2.0	0.413
19406-51-0	4-Amino-2,6-dinitro-toluene	1.0 U	1.0	0.239
99-99-0	4-Nitrotoluene	2.0 U	2.0	0.488
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.277
98-95-3	Nitrobenzene	0.65 U	0.65	0.0825
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.65 U	0.65	0.109
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	2.0 U	2.0	0.0931

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 00:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/11/03 @ 08:45
		Prepared:	10/17/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/28/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**SWD1**	QC Batch:	89804 -117
Sample #:	**346021**	Anal. Batch:	208354
Matrix:	Surface Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.65 U	0.65	0.150
99-65-0	1,3-Dinitrobenzene	0.65 U	0.65	0.121
118-96-7	2,4,6-Trinitrotoluene	0.65 U	0.65	0.102
121-14-2	2,4-Dinitrotoluene	0.65 U	0.65	0.114
606-20-2	2,6-Dinitrotoluene	0.65 U	0.65	0.217
35572-78-2	2-Amino-4,6-dinitro-toluene	1.0 U	1.0	0.245
88-72-2	2-Nitrotoluene	0.65 U	0.65	0.175
99-08-1	3-Nitrotoluene	2.0 U	2.0	0.413
19406-51-0	4-Amino-2,6-dinitro-toluene	1.0 U	1.0	0.239
99-99-0	4-Nitrotoluene	2.0 U	2.0	0.488
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.277
98-95-3	Nitrobenzene	0.65 U	0.65	0.0825
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.65 U	0.65	0.109
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	2.0 U	2.0	0.0931

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 14:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/11/03 @ 08:45
Submittal #:	**36440-6**	Prepared:	10/17/03 by DJM
Submittal:	Delivery Order 0046 RAAP	Prep. Method:	USEPA-8330
		Analyzed:	10/28/03 by JMK1
Sample ID:	**13SW2**	Anal. Method:	USEPA-8330
Sample #:	**346022**	QC Batch:	89804 -117
Matrix:	Surface Water	Anal. Batch:	208354
Unit:	ug/L	Percent Solids:	n/a
		Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.65 U		0.65	0.150
99-65-0	1,3-Dinitrobenzene	0.65 U		0.65	0.121
118-96-7	2,4,6-Trinitrotoluene	0.65 U		0.65	0.102
121-14-2	2,4-Dinitrotoluene	0.65 U		0.65	0.114
606-20-2	2,6-Dinitrotoluene	0.65 U		0.65	0.217
35572-78-2	2-Amino-4,6-dinitro-toluene	1.0 U		1.0	0.245
88-72-2	2-Nitrotoluene	0.65 U		0.65	0.175
99-08-1	3-Nitrotoluene	2.0 U		2.0	0.413
19406-51-0	4-Amino-2,6-dinitro-toluene	1.0 U		1.0	0.239
99-99-0	4-Nitrotoluene	2.0 U		2.0	0.488
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.277
98-95-3	Nitrobenzene	0.65 U		0.65	0.0825
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.65 U		0.65	0.109
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	2.0 U	UJ, M	2.0	0.0931

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ANALYTICAL REPORT

Client:	**URS Corporation**
Project:	Richmond, VA RAAP
Submittal #:	**36440-6**
Submittal:	Delivery Order 0046 RAAP
Sample ID:	**ASB1A**
Sample #:	**346248**
Matrix:	Soil
Unit:	mg/kg dry

Sampled:	10/11/03 @ 08:45
Sampler:	B.F.& J.S.
Received:	10/14/03 @ 09:30
Prepared:	10/23/03 by DJM
Prep. Method:	USEPA-8330
Analyzed:	10/28/03 by JMK1
Anal. Method:	USEPA-8330
QC Batch:	90905 -123
Anal. Batch:	208354
Percent Solids:	82
Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 09:00
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
Submittal #:	**36440-6**	Prepared:	10/23/03 by DJM
Submittal:	Delivery Order 0046 RAAP	Prep. Method:	USEPA-8330
		Analyzed:	10/28/03 by JMK1
Sample ID:	**ASB1B**	Anal. Method:	USEPA-8330
Sample #:	**346249**	QC Batch:	90905 -123
Matrix:	Soil	Anal. Batch:	209312
Unit:	mg/kg dry	Percent Solids:	78
		Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 09:15
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	10/23/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/28/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**ASB1C**	QC Batch:	90905 -123
Sample #:	**346250**	Anal. Batch:	209312
Matrix:	Soil	Percent Solids:	77
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 12:00
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	10/23/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/28/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**ASB3A**	QC Batch:	90905 -123
Sample #:	**346251**	Anal. Batch:	209312
Matrix:	Soil	Percent Solids:	80
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
~~121-14-2~~	~~2,4-Dinitrotoluene~~	~~25 E~~ J,Y	~~0.50~~	~~0.142~~
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

~~2,4-Dinitrotoluene~~ ~~25 E~~ ~~0.142~~ ~~0.50~~ ~~0.142~~ ~~1/15/04~~ see dilution

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 12:00
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	10/23/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/28/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**ASB3A**	QC Batch:	90905 -123
Sample #:	**346251DL**	Anal. Batch:	209312
Matrix:	Soil	Percent Solids:	80
Unit:	mg/kg dry	Dilution Factor:	5

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.700
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.795
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.835
121-14-2	✓ **2,4-Dinitrotoluene**	**20**	0.50	0.710
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	1.25
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.755
88-72-2	2-Nitrotoluene	1.0 U	1.0	1.33
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.920
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.810
99-99-0	4-Nitrotoluene	1.0 U	1.0	1.26
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	1.15
98-95-3	Nitrobenzene	0.50 U	0.50	0.510
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.655
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.845

Use only 2,4-DNT, ✓ 1/20/04

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 12:15
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
Submittal #:	**36440-6**	Prepared:	10/23/03 by DJM
Submittal:	Delivery Order 0046 RAAP	Prep. Method:	USEPA-8330
		Analyzed:	10/28/03 by JMK1
Sample ID:	**ASB3B**	Anal. Method:	USEPA-8330
Sample #:	**346252**	QC Batch:	90905 -123
Matrix:	Soil	Anal. Batch:	209312
Unit:	mg/kg dry	Percent Solids:	80
		Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**
Project:	Richmond, VA
	RAAP
Submittal #:	**36440-6**
Submittal:	Delivery Order 0046
	RAAP
Sample ID:	**ASB3C**
Sample #:	**346253**
Matrix:	Soil
Unit:	mg/kg dry

Sampled:	10/11/03 @ 12:30
Sampler:	B.F.& J.S.
Received:	10/14/03 @ 09:30
Prepared:	10/23/03 by DJM
Prep. Method:	USEPA-8330
Analyzed:	10/28/03 by JMK1
Anal. Method:	USEPA-8330
QC Batch:	90905 -123
Anal. Batch:	209312
Percent Solids:	84
Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 10:15
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	10/23/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/28/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**ASB2A**	QC Batch:	90905 -123
Sample #:	**346254**	Anal. Batch:	209312
Matrix:	Soil	Percent Solids:	80
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 10:10
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/23/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/28/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**ASB2B**	QC Batch:	90905 -123
Sample #:	**346255**	Anal. Batch:	209312
Matrix:	Soil	Percent Solids:	76
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/23/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/28/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**SBD-10**	QC Batch:	90905 -123
Sample #:	**346256**	Anal. Batch:	209312
Matrix:	Soil	Percent Solids:	72
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 11:15
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
Submittal #:	**36440-6**	Prepared:	10/23/03 by DJM
Submittal:	Delivery Order 0046 RAAP	Prep. Method:	USEPA-8330
		Analyzed:	10/28/03 by JMK1
Sample ID:	**ASB2C**	Anal. Method:	USEPA-8330
Sample #:	**346257**	QC Batch:	90905 -123
Matrix:	Soil	Anal. Batch:	209312
Unit:	mg/kg dry	Percent Solids:	73
		Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	**2,4-Dinitrotoluene**	**0.20 J**	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3510C
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by MSN
	RAAP	Anal. Method:	USEPA-8081A
Sample ID:	**EQB5**	QC Batch:	90180 -114
Sample #:	**346013**	Anal. Batch:	208237
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Chlorinated Pesticides OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
72-54-8	4,4'-DDD	0.10 U	0.10	0.0016
72-55-9	4,4'-DDE	0.10 U	0.10	0.0025
50-29-3	4,4'-DDT	0.10 U	0.10	0.0018
309-00-2	Aldrin	0.050 U	0.050	0.0019
319-84-6	Alpha-BHC	0.050 U	0.050	0.0014
57-74-9	A-Chlordane	0.050 U	0.050	0.0024
5103-74-2	G-Chlordane	0.050 U	0.050	0.0023
319-85-7	Beta-BHC	0.050 U	0.050	0.0039
319-86-8	Delta-BHC	0.050 U	0.050	0.0025
60-57-1	Dieldrin	0.10 U	0.10	0.0034
115-29-7	Endosulfan I	0.050 U	0.050	0.0026
33213-65-9	Endosulfan II	0.10 U	0.10	0.0021
1031-07-8	Endosulfan Sulfate	0.10 U	0.10	0.0022
72-20-8	Endrin	0.10 U	0.10	0.0038
7421-93-4	Endrin Aldehyde	0.10 U	0.10	0.0053
53494-70-5	Endrin Ketone	0.10 U	0.10	0.0020
58-89-9	Lindane	0.050 U	0.050	0.0016
76-44-8	Heptachlor	0.050 U	0.050	0.0021
1024-57-3	Heptachlor Epoxide	0.050 U	0.050	0.0022
72-43-5	Methoxychlor	0.50 U	0.50	0.0032
8001-35-2	Toxaphene	1.0 U	1.0	0.118

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 11:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/11/03 @ 08:45
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3510C
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/18/03 by MSN
		Anal. Method:	USEPA-8081A
Sample ID:	**EQB6**	QC Batch:	90180 -114
Sample #:	**346015**	Anal. Batch:	208237
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Chlorinated Pesticides OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
72-54-8	4,4'-DDD	0.10 U	0.10	0.0016
72-55-9	4,4'-DDE	0.10 U	0.10	0.0025
50-29-3	4,4'-DDT	0.10 U	0.10	0.0018
309-00-2	Aldrin	0.050 U	0.050	0.0019
319-84-6	Alpha-BHC	0.050 U	0.050	0.0014
57-74-9	A-Chlordane	0.050 U	0.050	0.0024
5103-74-2	G-Chlordane	0.050 U	0.050	0.0023
319-85-7	Beta-BHC	0.050 U	0.050	0.0039
319-86-8	Delta-BHC	0.050 U	0.050	0.0025
60-57-1	Dieldrin	0.10 U	0.10	0.0034
115-29-7	Endosulfan I	0.050 U	0.050	0.0026
33213-65-9	Endosulfan II	0.10 U	0.10	0.0021
1031-07-8	Endosulfan Sulfate	0.10 U	0.10	0.0022
72-20-8	Endrin	0.10 U	0.10	0.0038
7421-93-4	Endrin Aldehyde	0.10 U	0.10	0.0053
53494-70-5	Endrin Ketone	0.10 U	0.10	0.0020
58-89-9	Lindane	0.050 U	0.050	0.0016
76-44-8	Heptachlor	0.050 U	0.050	0.0021
1024-57-3	Heptachlor Epoxide	0.050 U	0.050	0.0022
72-43-5	Methoxychlor	0.50 U	0.50	0.0032
8001-35-2	Toxaphene	1.0 U	1.0	0.118

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/16/03 by JRR
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/31/03 by JLRM
	RAAP	Anal. Method:	USEPA-8081A
Sample ID:	**ASB2A**	QC Batch:	90181 -116
Sample #:	**346254**	Anal. Batch:	208635
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Chlorinated Pesticides OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
72-54-8	4,4'-DDD	25 U	25	0.286
72-55-9	4,4'-DDE	25 U	25	0.210
50-29-3	4,4'-DDT	25 U	25	0.216
309-00-2	Aldrin	25 U	25	0.365
319-84-6	Alpha-BHC	25 U	25	0.364
57-74-9	A-Chlordane	25 U	25	0.521
5103-74-2	G-Chlordane	25 U	25	0.844
319-85-7	Beta-BHC	25 U	25	1.36
319-86-8	Delta-BHC	25 U	25	0.982
60-57-1	Dieldrin	25 U	25	0.371
115-29-7	Endosulfan I	25 U	25	1.09
33213-65-9	Endosulfan II	25 U	25	0.257
1031-07-8	Endosulfan Sulfate	25 U	25	0.604
72-20-8	Endrin	25 U	25	0.358
7421-93-4	Endrin Aldehyde	25 U	25	1.33
53494-70-5	Endrin Ketone	25 U	25	0.330
58-89-9	Lindane	25 U	25	0.233
76-44-8	Heptachlor	25 U	25	0.846
1024-57-3	Heptachlor Epoxide	25 U	25	0.546
72-43-5	Methoxychlor	25 U	25	0.336
8001-35-2	Toxaphene	210 U	210	28.0

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3510C
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JLRM
	RAAP	Anal. Method:	USEPA-8082
Sample ID:	**EQB5**	QC Batch:	89851 -114
Sample #:	**346013**	Anal. Batch:	207778
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Polychlorinated Biphenyls OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
12674-11-2	PCB-1016	0.30 U	0.30	0.0753
11104-28-2	PCB-1221	0.50 U	0.50	0.0504
11141-16-5	PCB-1232	0.30 U	0.30	0.0794
53469-21-9	PCB-1242	0.30 U	0.30	0.0809
12672-29-6	PCB-1248	0.25 U	0.25	0.0828
11097-69-1	PCB-1254	0.10 U	0.10	0.0341
11096-82-5	PCB-1260	0.20 U	0.20	0.0481

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3510C
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JLRM
	RAAP	Anal. Method:	USEPA-8082
Sample ID:	**EQB6**	QC Batch:	89851 -114
Sample #:	**346015**	Anal. Batch:	207778
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Polychlorinated Biphenyls OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
12674-11-2	PCB-1016	0.30 U	0.30	0.0753
11104-28-2	PCB-1221	0.50 U	0.50	0.0504
11141-16-5	PCB-1232	0.30 U	0.30	0.0794
53469-21-9	PCB-1242	0.30 U	0.30	0.0809
12672-29-6	PCB-1248	0.25 U	0.25	0.0828
11097-69-1	PCB-1254	0.10 U	0.10	0.0341
11096-82-5	PCB-1260	0.20 U	0.20	0.0481

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/16/03 by JRR
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by JLRM
	RAAP	Anal. Method:	USEPA-8082
Sample ID:	**ASB2A**	QC Batch:	89881 -116
Sample #:	**346254**	Anal. Batch:	208229
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polychlorinated Biphenyls OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
12674-11-2	PCB-1016	82 U	82	19.2
11104-28-2	PCB-1221	41 U	41	2.40
11141-16-5	PCB-1232	41 U	41	6.00
53469-21-9	PCB-1242	41 U	41	3.60
12672-29-6	PCB-1248	41 U	41	6.00
11097-69-1	**PCB-1254**	**9.9 J**	41	3.60
11096-82-5	PCB-1260	41 U	41	8.40

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/17/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8151A
Submittal:	Delivery Order 0046	Analyzed:	10/28/03 by JLRM
	RAAP	Anal. Method:	USEPA-8151A
Sample ID:	**EQB5**	QC Batch:	90447 -117
Sample #:	**346013**	Anal. Batch:	208365
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Herbicides	Analytical Result	Reporting Limit	MDL
93-76-5	2,4,5-T	0.50 U	0.50	0.053
93-72-1	2,4,5-TP (Silvex)	0.50 U	0.50	0.104
94-75-7	2,4-D	5.0 U	5.0	0.670
94-82-6	2,4-DB	5.0 U	5.0	0.955
75-99-0	Dalapon	5.0 U	5.0	0.862
1918-00-9	Dicamba	0.50 U	0.50	0.104
120-36-5	Dichlorprop	5.0 U	5.0	0.195
88-85-7	Dinoseb	1.0 U	1.0	0.168
94-74-6	MCPA	250 U	250	76.8
93-65-2	MCPP	250 U	250	74.8

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/17/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8151A
Submittal:	Delivery Order 0046	Analyzed:	10/28/03 by JLRM
	RAAP	Anal. Method:	USEPA-8151A
Sample ID:	**EQB6**	QC Batch:	90447 -117
Sample #:	**346015**	Anal. Batch:	208365
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Herbicides	Analytical Result	Reporting Limit	MDL
93-76-5	2,4,5-T	0.50 U	0.50	0.053
93-72-1	2,4,5-TP (Silvex)	0.50 U	0.50	0.104
94-75-7	2,4-D	5.0 U	5.0	0.670
94-82-6	2,4-DB	5.0 U	5.0	0.955
75-99-0	Dalapon	5.0 U	5.0	0.862
1918-00-9	Dicamba	0.50 U	0.50	0.104
120-36-5	Dichlorprop	5.0 U	5.0	0.195
88-85-7	Dinoseb	1.0 U	1.0	0.168
94-74-6	MCPA	250 U	250	76.8
93-65-2	MCPP	250 U	250	74.8

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/17/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8151A
Submittal:	Delivery Order 0046	Analyzed:	10/28/03 by JLRM
	RAAP	Anal. Method:	USEPA-8151A
Sample ID:	**ASB2A**	QC Batch:	90218 -117
Sample #:	**346254**	Anal. Batch:	208365
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Herbicides	Analytical Result	Reporting Limit	MDL
93-76-5	2,4,5-T	62 U	62	2.40
93-72-1	2,4,5-TP (Silvex)	62 U	62	4.80
94-75-7	2,4-D	250 U	250	19.2
94-82-6	2,4-DB	250 U	250	74.4
75-99-0	Dalapon	310 U	310	68.4
1918-00-9	Dicamba	250 U	250	2.40
120-36-5	Dichlorprop	250 U	250	20.4
88-85-7	Dinoseb	250 U	250	25.2
94-74-6	MCPA	25000 U	25000	1680
93-65-2	MCPP	25000 U	25000	6070

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/10/03 @ 09:45
Sampler: B.F. & J.S.
Received: 10/11/03 @ 08:45

Submittal #: **36440-6**
Submittal: Delivery Order 0046
RAAP
Sample ID: **EQB5**
Sample #: **346013**
Matrix: QC Water

Percent Solids: n/a

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	100 U		100	18.7	ug/L	10/17/03	DSC	EPA-200.7/6010B
Antimony, Total	1.0 U		1.0	0.552	ug/L	10/16/03	JMF	EPA-200.8/6020
Arsenic, Total	1.0 U		1.0	0.429	ug/L	10/16/03	JMF	EPA-200.8/6020
Barium, Total	10 U		10	1.82	ug/L	10/17/03	DSC	EPA-200.7/6010B
Beryllium, Total	0.3 J	B,P	4.0	0.295	ug/L	10/17/03	DSC	EPA-200.7/6010B
Cadmium, Total	0.5 U		0.5	0.135	ug/L	10/16/03	JMF	EPA-200.8/6020
Calcium, Total	500 U		500	33.9	ug/L	10/17/03	DSC	EPA-200.7/6010B
Chromium, Total	4.5		1.0	0.554	ug/L	10/30/03	MSG	EPA-200.8/6020
Cobalt, Total	10 U		10	3.91	ug/L	10/17/03	DSC	EPA-200.7/6010B
Copper, Total	10 U		10	5.36	ug/L	10/17/03	DSC	EPA-200.7/6010B
Iron, Total	21 J	B,P	100	2.95	ug/L	10/17/03	DSC	EPA-200.7/6010B
Lead, Total	1.0 U		1.0	0.281	ug/L	10/16/03	JMF	EPA-200.8/6020
Magnesium, Total	500 U		500	57.4	ug/L	10/17/03	DSC	EPA-200.7/6010B
Manganese, Total	10 U		10	3.16	ug/L	10/17/03	DSC	EPA-200.7/6010B
Mercury, Total	0.4 U		0.4	0.0584	ug/L	10/22/03	MSS	USEPA-7470A
Nickel, Total	1.0 U		1.0	0.410	ug/L	10/16/03	JMF	EPA-200.8/6020
Potassium, Total	200 U		200	59.7	ug/L	10/17/03	DSC	EPA-200.7/6010B
Selenium, Total	2.0 U		2.0	0.933	ug/L	10/16/03	JMF	EPA-200.8/6020
Silver, Total	0.5 U		0.5	0.0765	ug/L	10/16/03	JMF	EPA-200.8/6020
Sodium, Total	280 J	B,P	500	76.9	ug/L	10/17/03	DSC	EPA-200.7/6010B
Thallium, Total	0.5 J		1.0	0.208	ug/L	10/16/03	JMF	EPA-200.8/6020
Vanadium, Total	10 U		10	2.89	ug/L	10/17/03	DSC	EPA-200.7/6010B
Zinc, Total	20 U		20	4.55	ug/L	10/17/03	DSC	EPA-200.7/6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/10/03 @ 11:00
Sampler: B.F. & J.S.
Received: 10/11/03 @ 08:45

Submittal #: **36440-6**
Submittal: Delivery Order 0046
RAAP
Sample ID: **EQB6**
Sample #: **346015**
Matrix: QC Water

Percent Solids: n/a

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	100 U		100	18.7	ug/L	10/17/03	DSC	EPA-200.7/6010B
Antimony, Total	1.0 U		1.0	0.552	ug/L	10/16/03	JMF	EPA-200.8/6020
Arsenic, Total	1.0 U		1.0	0.429	ug/L	10/16/03	JMF	EPA-200.8/6020
Barium, Total	10 U		10	1.82	ug/L	10/17/03	DSC	EPA-200.7/6010B
Beryllium, Total	4.0 U		4.0	0.295	ug/L	10/17/03	DSC	EPA-200.7/6010B
Cadmium, Total	0.5 U		0.5	0.135	ug/L	10/16/03	JMF	EPA-200.8/6020
Calcium, Total	500 U		500	33.9	ug/L	10/17/03	DSC	EPA-200.7/6010B
Chromium, Total	0.9 J	B,P	1.0	0.554	ug/L	10/16/03	JMF	EPA-200.8/6020
Cobalt, Total	10 U		10	3.91	ug/L	10/17/03	DSC	EPA-200.7/6010B
Copper, Total	10 U		10	5.36	ug/L	10/17/03	DSC	EPA-200.7/6010B
Iron, Total	7.6 J	B,P	100	2.95	ug/L	10/17/03	DSC	EPA-200.7/6010B
Lead, Total	1.0 U		1.0	0.281	ug/L	10/16/03	JMF	EPA-200.8/6020
Magnesium, Total	500 U		500	57.4	ug/L	10/17/03	DSC	EPA-200.7/6010B
Manganese, Total	10 U		10	3.16	ug/L	10/17/03	DSC	EPA-200.7/6010B
Mercury, Total	0.4 U		0.4	0.0584	ug/L	10/22/03	MSS	USEPA-7470A
Nickel, Total	1.0 U		1.0	0.410	ug/L	10/16/03	JMF	EPA-200.8/6020
Potassium, Total	200 U		200	59.7	ug/L	10/17/03	DSC	EPA-200.7/6010B
Selenium, Total	2.0 U		2.0	0.933	ug/L	10/16/03	JMF	EPA-200.8/6020
Silver, Total	0.5 U		0.5	0.0765	ug/L	10/16/03	JMF	EPA-200.8/6020
Sodium, Total	180 J	B,P	500	76.9	ug/L	10/17/03	DSC	EPA-200.7/6010B
Thallium, Total	0.4 J		1.0	0.208	ug/L	10/16/03	JMF	EPA-200.8/6020
Vanadium, Total	10 U		10	2.89	ug/L	10/17/03	DSC	EPA-200.7/6010B
Zinc, Total	4.6 J		20	4.55	ug/L	10/17/03	DSC	EPA-200.7/6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/10/03 @ 13:00
Sampler: B.F. & J.S.
Received: 10/11/03 @ 08:45

Submittal #: **36440-6**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SD3**
Sample #: **346017**
Matrix: Soil

Percent Solids: 68

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	23400		500	5.10	mg/kg dry	10/23/03	DSC	USEPA-6010B
Antimony, Total	3.5		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	3.4		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	169		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	1.3		1.0	0.167	mg/kg dry	11/03/03	KLVM	USEPA-6010B
Cadmium, Total	1.0		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	2080	K,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	40		5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	13		1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	36		2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	37100		1000	71.6	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	247		50	1.09	mg/kg dry	10/24/03	DWJ	USEPA-6020
Magnesium, Total	3870	K,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	544		5.0	0.264	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Mercury, Total	0.13		0.10	0.0077	mg/kg dry	10/21/03	MSS	USEPA-7471A
Nickel, Total	19		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1950		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	1.2		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.12	J	3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	52	J	100	8.92	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Thallium, Total	0.52		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	44		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	541		40	3.35	mg/kg dry	10/23/03	DSC	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/10/03 @ 00:00
Sampler: B.F. & J.S.
Received: 10/11/03 @ 08:45

Submittal #: **36440-6**
Submittal: Delivery Order 0046
RAAP
Sample ID: **SDD1**
Sample #: **346018**
Matrix: Soil

Percent Solids: 63

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	19600		50	1.83	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Antimony, Total	1.9		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	3.7		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	131		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	1.3		1.0	0.167	mg/kg dry	11/03/03	KLVM	USEPA-6010B
Cadmium, Total	0.94 J		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	1620	K,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	31		5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	12		1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	31		2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	32000		1000	71.6	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	271		50	1.09	mg/kg dry	10/24/03	DWJ	USEPA-6020
Magnesium, Total	3030	K,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	644		5.0	0.264	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Mercury, Total	0.11		0.10	0.0077	mg/kg dry	10/21/03	MSS	USEPA-7471A
Nickel, Total	18		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1520		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	1.2		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.14 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	38 J		100	8.92	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Thallium, Total	0.49 J		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	32		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	541		40	3.35	mg/kg dry	10/23/03	DSC	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/10/03 @ 14:00
Sampler: B.F. & J.S.
Received: 10/11/03 @ 08:45

Submittal #: **36440-6**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SD2**
Sample #: **346019**
Matrix: Soil

Percent Solids: 65

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	9870		50	1.83	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Antimony, Total	0.18 J		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	3.3		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	101		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	0.83 J		1.0	0.167	mg/kg dry	11/03/03	JMF	USEPA-6010B
Cadmium, Total	0.57 J		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
* Calcium, Total	1270	K,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	27		5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	9.9		1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	14		2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	34600		1000	71.6	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	132		25	0.545	mg/kg dry	10/24/03	DWJ	USEPA-6020
* Magnesium, Total	2130	K,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	720		5.0	0.264	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Mercury, Total	0.033 J		0.10	0.0077	mg/kg dry	10/21/03	MSS	USEPA-7471A
Nickel, Total	12		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1020		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.85 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.12 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	53 J		100	8.92	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Thallium, Total	0.46 J		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	19		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	442		40	3.35	mg/kg dry	10/23/03	DSC	USEPA-6010B

* See attached Statement of Data Qualifications.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/10/03 @ 13:00
Sampler: B.F. & J.S.
Received: 10/11/03 @ 08:45

Submittal #: **36440-6**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SW3**
Sample #: **346020**
Matrix: Surface Water

Percent Solids: n/a

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	66 J		100	18.7	ug/L	10/17/03	DSC	EPA-200.7/6010B
Aluminum, Dissolved	100 U		100	18.7	ug/L	10/29/03	DSC	EPA-200.7/6010B
Antimony, Total	0.7 J		1.0	0.552	ug/L	10/16/03	JMF	EPA-200.8/6020
Antimony, Dissolved	0.8 J		2.0	0.552	ug/L	10/30/03	MSG	EPA-200.8/6020
Arsenic, Total	1.0 U		1.0	0.429	ug/L	10/16/03	JMF	EPA-200.8/6020
Arsenic, Dissolved	2.0 U		2.0	0.429	ug/L	10/30/03	MSG	EPA-200.8/6020
Barium, Total	21		10	1.82	ug/L	10/17/03	DSC	EPA-200.7/6010B
Barium, Dissolved	18		10	1.82	ug/L	10/29/03	DSC	EPA-200.7/6010B
Beryllium, Total	4.0 U		4.0	0.295	ug/L	10/17/03	DSC	EPA-200.7/6010B
Beryllium, Dissolved	4.0 U		4.0	0.295	ug/L	10/29/03	DSC	EPA-200.7/6010B
Cadmium, Total	0.5 U		0.5	0.135	ug/L	10/16/03	JMF	EPA-200.8/6020
Cadmium, Dissolved	0.5 U		0.5	0.135	ug/L	10/30/03	MSG	EPA-200.8/6020
Calcium, Total	13000		2500	170	ug/L	10/23/03	KLVM	EPA-200.7/6010B
Calcium, Dissolved	13000		2500	170	ug/L	10/29/03	DSC	EPA-200.7/6010B
Chromium, Total	0.8 J	B,P	1.0	0.554	ug/L	10/16/03	JMF	EPA-200.8/6020
Chromium, Dissolved	0.6 J		2.0	0.554	ug/L	10/30/03	MSG	EPA-200.8/6020
Cobalt, Total	10 U		10	3.91	ug/L	10/17/03	DSC	EPA-200.7/6010B
Cobalt, Dissolved	20 U		20	3.91	ug/L	10/29/03	DSC	EPA-200.7/6010B
Copper, Total	10 U		10	5.36	ug/L	10/17/03	DSC	EPA-200.7/6010B
Copper, Dissolved	20 U		20	5.36	ug/L	10/29/03	DSC	EPA-200.7/6010B
Iron, Total	180		100	2.95	ug/L	10/17/03	DSC	EPA-200.7/6010B
Iron, Dissolved	38 J		100	2.95	ug/L	10/29/03	DSC	EPA-200.7/6010B
Lead, Total	0.9 J	B,P	1.0	0.281	ug/L	10/16/03	JMF	EPA-200.8/6020
Lead, Dissolved	1.0 U		1.0	0.281	ug/L	10/30/03	MSG	EPA-200.8/6020
Magnesium, Total	5400		500	57.4	ug/L	10/17/03	DSC	EPA-200.7/6010B
Magnesium, Dissolved	5500		500	57.4	ug/L	10/29/03	DSC	EPA-200.7/6010B
Manganese, Total	30		10	3.16	ug/L	10/17/03	DSC	EPA-200.7/6010B
Manganese, Dissolved	7.9 J		10	3.16	ug/L	10/29/03	DSC	EPA-200.7/6010B
Mercury, Total	0.4 U		0.4	0.0584	ug/L	10/22/03	MSS	USEPA-7470A
Mercury, Dissolved	0.4 U		0.4	0.0584	ug/L	10/22/03	MSS	USEPA-7470A
Nickel, Total	0.8 J		1.0	0.410	ug/L	10/16/03	JMF	EPA-200.8/6020
Nickel, Dissolved	1.0 J		2.0	0.410	ug/L	10/30/03	MSG	EPA-200.8/6020
Potassium, Total	1900		200	59.7	ug/L	10/17/03	DSC	EPA-200.7/6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/10/03 @ 13:00
Sampler: B.F. & J.S.
Received: 10/11/03 @ 08:45

Submittal #: **36440-6**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SW3**
Sample #: **346020**
Matrix: Surface Water

Percent Solids: n/a

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Potassium, Dissolved	1600	200	59.7	ug/L	10/29/03	DSC	EPA-200.7/6010B
Selenium, Total	2.0 U	2.0	0.933	ug/L	10/16/03	JMF	EPA-200.8/6020
Selenium, Dissolved	3.0 U	3.0	0.933	ug/L	10/30/03	MSG	EPA-200.8/6020
Silver, Total	0.5 U	0.5	0.0765	ug/L	10/16/03	JMF	EPA-200.8/6020
Silver, Dissolved	0.5 U	0.5	0.0765	ug/L	10/30/03	MSG	EPA-200.8/6020
Sodium, Total	5100 J,S	500	76.9	ug/L	10/17/03	DSC	EPA-200.7/6010B
Sodium, Dissolved	5100	500	76.9	ug/L	10/29/03	DSC	EPA-200.7/6010B
Thallium, Total	0.3 J	1.0	0.208	ug/L	10/16/03	JMF	EPA-200.8/6020
Thallium, Dissolved	1.0 U	1.0	0.208	ug/L	10/30/03	MSG	EPA-200.8/6020
Vanadium, Total	10 U	10	2.89	ug/L	10/17/03	DSC	EPA-200.7/6010B
Vanadium, Dissolved	10 U	10	2.89	ug/L	10/29/03	DSC	EPA-200.7/6010B
Zinc, Total	20 U	20	4.55	ug/L	10/17/03	DSC	EPA-200.7/6010B
Zinc, Dissolved	20 U	20	4.55	ug/L	10/29/03	DSC	EPA-200.7/6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/10/03 @ 00:00
Sampler: B.F. & J.S.
Received: 10/11/03 @ 08:45

Submittal #: **36440-6**
Submittal: Delivery Order 0046
RAAP
Sample ID: **SWD1**
Sample #: **346021**
Matrix: Surface Water

Percent Solids: n/a

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	53 J		100	18.7	ug/L	10/17/03	DSC	EPA-200.7/6010B
Aluminum, Dissolved	100 U		100	18.7	ug/L	10/29/03	DSC	EPA-200.7/6010B
Antimony, Total	1.0 U		1.0	0.552	ug/L	10/16/03	JMF	EPA-200.8/6020
Antimony, Dissolved	2.0 U		2.0	0.552	ug/L	10/30/03	MSG	EPA-200.8/6020
Arsenic, Total	1.0 U		1.0	0.429	ug/L	10/16/03	JMF	EPA-200.8/6020
Arsenic, Dissolved	2.0 U		2.0	0.429	ug/L	10/30/03	MSG	EPA-200.8/6020
Barium, Total	21		10	1.82	ug/L	10/17/03	DSC	EPA-200.7/6010B
Barium, Dissolved	17		10	1.82	ug/L	10/29/03	DSC	EPA-200.7/6010B
Beryllium, Total	4.0 U		4.0	0.295	ug/L	10/17/03	DSC	EPA-200.7/6010B
Beryllium, Dissolved	4.0 U		4.0	0.295	ug/L	10/29/03	DSC	EPA-200.7/6010B
Cadmium, Total	0.5 U		0.5	0.135	ug/L	10/16/03	JMF	EPA-200.8/6020
Cadmium, Dissolved	0.5 U		0.5	0.135	ug/L	10/30/03	MSG	EPA-200.8/6020
Calcium, Total	13000		2500	170	ug/L	10/23/03	KLVM	EPA-200.7/6010B
Calcium, Dissolved	13000		2500	170	ug/L	10/29/03	DSC	EPA-200.7/6010B
Chromium, Total	0.6 J	B,P	1.0	0.554	ug/L	10/16/03	JMF	EPA-200.8/6020
Chromium, Dissolved	0.8 J		2.0	0.554	ug/L	10/30/03	MSG	EPA-200.8/6020
Cobalt, Total	10 U		10	3.91	ug/L	10/17/03	DSC	EPA-200.7/6010B
Cobalt, Dissolved	20 U		20	3.91	ug/L	10/29/03	DSC	EPA-200.7/6010B
Copper, Total	10 U		10	5.36	ug/L	10/17/03	DSC	EPA-200.7/6010B
Copper, Dissolved	20 U		20	5.36	ug/L	10/29/03	DSC	EPA-200.7/6010B
Iron, Total	170		100	2.95	ug/L	10/17/03	DSC	EPA-200.7/6010B
Iron, Dissolved	36 J		100	2.95	ug/L	10/29/03	DSC	EPA-200.7/6010B
Lead, Total	0.9 J	B,P	1.0	0.281	ug/L	10/16/03	JMF	EPA-200.8/6020
Lead, Dissolved	1.0 U		1.0	0.281	ug/L	10/30/03	MSG	EPA-200.8/6020
Magnesium, Total	5300		500	57.4	ug/L	10/17/03	DSC	EPA-200.7/6010B
Magnesium, Dissolved	5400		500	57.4	ug/L	10/29/03	DSC	EPA-200.7/6010B
Manganese, Total	24		10	3.16	ug/L	10/17/03	DSC	EPA-200.7/6010B
Manganese, Dissolved	4.3 J		10	3.16	ug/L	10/29/03	DSC	EPA-200.7/6010B
Mercury, Total	0.4 U		0.4	0.0584	ug/L	10/22/03	MSS	USEPA-7470A
Mercury, Dissolved	0.4 U		0.4	0.0584	ug/L	10/22/03	MSS	USEPA-7470A
Nickel, Total	0.8 J		1.0	0.410	ug/L	10/16/03	JMF	EPA-200.8/6020
Nickel, Dissolved	0.8 J		2.0	0.410	ug/L	10/30/03	MSG	EPA-200.8/6020
Potassium, Total	1800		200	59.7	ug/L	10/17/03	DSC	EPA-200.7/6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/10/03 @ 00:00
Sampler: B.F. & J.S.
Received: 10/11/03 @ 08:45

Submittal #: **36440-6**
Submittal: Delivery Order 0046
RAAP
Sample ID: **SWD1**
Sample #: **346021**
Matrix: Surface Water

Percent Solids: n/a

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Potassium, Dissolved	1700		200	59.7	ug/L	10/29/03	DSC	EPA-200.7/6010B
Selenium, Total	2.0 U		2.0	0.933	ug/L	10/16/03	JMF	EPA-200.8/6020
Selenium, Dissolved	3.0 U		3.0	0.933	ug/L	10/30/03	MSG	EPA-200.8/6020
Silver, Total	0.5 U		0.5	0.0765	ug/L	10/16/03	JMF	EPA-200.8/6020
Silver, Dissolved	0.5 U		0.5	0.0765	ug/L	10/30/03	MSG	EPA-200.8/6020
Sodium, Total	5000	J,S	500	76.9	ug/L	10/17/03	DSC	EPA-200.7/6010B
Sodium, Dissolved	5000		500	76.9	ug/L	10/29/03	DSC	EPA-200.7/6010B
Thallium, Total	0.24 J		1.0	0.208	ug/L	10/16/03	JMF	EPA-200.8/6020
Thallium, Dissolved	1.0 U		1.0	0.208	ug/L	10/30/03	MSG	EPA-200.8/6020
Vanadium, Total	10 U		10	2.89	ug/L	10/17/03	DSC	EPA-200.7/6010B
Vanadium, Dissolved	10 U		10	2.89	ug/L	10/29/03	DSC	EPA-200.7/6010B
Zinc, Total	20 U		20	4.55	ug/L	10/17/03	DSC	EPA-200.7/6010B
Zinc, Dissolved	20 U		20	4.55	ug/L	10/29/03	DSC	EPA-200.7/6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/10/03 @ 14:00
Sampler: B.F. & J.S.
Received: 10/11/03 @ 08:45

Submittal #: **36440-6**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SW2**
Sample #: **346022**
Matrix: Surface Water

Percent Solids: n/a

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	74 J		100	18.7	ug/L	10/17/03	DSC	EPA-200.7/6010B
Aluminum, Dissolved	100 U		100	18.7	ug/L	10/29/03	DSC	EPA-200.7/6010B
Antimony, Total	1.0 U		1.0	0.552	ug/L	10/16/03	JMF	EPA-200.8/6020
Antimony, Dissolved	2.0 U		2.0	0.552	ug/L	10/30/03	MSG	EPA-200.8/6020
Arsenic, Total	1.0 U		1.0	0.429	ug/L	10/16/03	JMF	EPA-200.8/6020
Arsenic, Dissolved	2.0 U		2.0	0.429	ug/L	10/30/03	MSG	EPA-200.8/6020
Barium, Total	22		10	1.82	ug/L	10/17/03	DSC	EPA-200.7/6010B
Barium, Dissolved	18		10	1.82	ug/L	10/29/03	DSC	EPA-200.7/6010B
Beryllium, Total	4.0 U		4.0	0.295	ug/L	10/17/03	DSC	EPA-200.7/6010B
Beryllium, Dissolved	4.0 U		4.0	0.295	ug/L	10/29/03	DSC	EPA-200.7/6010B
Cadmium, Total	0.5 U		0.5	0.135	ug/L	10/16/03	JMF	EPA-200.8/6020
Cadmium, Dissolved	0.5 U		0.5	0.135	ug/L	10/30/03	MSG	EPA-200.8/6020
Calcium, Total	13000		2500	170	ug/L	10/23/03	KLVM	EPA-200.7/6010B
Calcium, Dissolved	13000		2500	170	ug/L	10/29/03	DSC	EPA-200.7/6010B
Chromium, Total	0.8 J	B,P	1.0	0.554	ug/L	10/16/03	JMF	EPA-200.8/6020
Chromium, Dissolved	2.0 U		2.0	0.554	ug/L	10/30/03	MSG	EPA-200.8/6020
Cobalt, Total	10 U		10	3.91	ug/L	10/17/03	DSC	EPA-200.7/6010B
Cobalt, Dissolved	20 U		20	3.91	ug/L	10/29/03	DSC	EPA-200.7/6010B
Copper, Total	10 U		10	5.36	ug/L	10/17/03	DSC	EPA-200.7/6010B
Copper, Dissolved	20 U		20	5.36	ug/L	10/29/03	DSC	EPA-200.7/6010B
Iron, Total	190		100	2.95	ug/L	10/17/03	DSC	EPA-200.7/6010B
Iron, Dissolved	37 J		100	2.95	ug/L	10/29/03	DSC	EPA-200.7/6010B
Lead, Total	0.6 J	B,P	1.0	0.281	ug/L	10/16/03	JMF	EPA-200.8/6020
Lead, Dissolved	1.0 U		1.0	0.281	ug/L	10/30/03	MSG	EPA-200.8/6020
Magnesium, Total	5700		500	57.4	ug/L	10/17/03	DSC	EPA-200.7/6010B
Magnesium, Dissolved	5600		500	57.4	ug/L	10/29/03	DSC	EPA-200.7/6010B
Manganese, Total	27		10	3.16	ug/L	10/17/03	DSC	EPA-200.7/6010B
Manganese, Dissolved	10		10	3.16	ug/L	10/29/03	DSC	EPA-200.7/6010B
Mercury, Total	0.4 U		0.4	0.0584	ug/L	10/22/03	MSS	USEPA-7470A
Mercury, Dissolved	0.4 U		0.4	0.0584	ug/L	10/22/03	MSS	USEPA-7470A
Nickel, Total	0.96 J		1.0	0.410	ug/L	10/16/03	JMF	EPA-200.8/6020
Nickel, Dissolved	1.1 J		2.0	0.410	ug/L	10/30/03	MSG	EPA-200.8/6020
Potassium, Total	1800		200	59.7	ug/L	10/17/03	DSC	EPA-200.7/6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/10/03 @ 14:00
Sampler: B.F. & J.S.
Received: 10/11/03 @ 08:45

Submittal #: **36440-6**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SW2**
Sample #: **346022**
Matrix: Surface Water

Percent Solids: n/a

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Potassium, Dissolved	1600	200	59.7	ug/L	10/29/03	DSC	EPA-200.7/6010B
Selenium, Total	2.0 U	2.0	0.933	ug/L	10/16/03	JMF	EPA-200.8/6020
Selenium, Dissolved	3.0 U	3.0	0.933	ug/L	10/30/03	MSG	EPA-200.8/6020
Silver, Total	0.5 U	0.5	0.0765	ug/L	10/16/03	JMF	EPA-200.8/6020
Silver, Dissolved	0.5 U	0.5	0.0765	ug/L	10/30/03	MSG	EPA-200.8/6020
Sodium, Total	5100 J,S	500	76.9	ug/L	10/17/03	DSC	EPA-200.7/6010B
Sodium, Dissolved	5100	500	76.9	ug/L	10/29/03	DSC	EPA-200.7/6010B
Thallium, Total	1.0 U	1.0	0.208	ug/L	10/16/03	JMF	EPA-200.8/6020
Thallium, Dissolved	1.0 U	1.0	0.208	ug/L	10/30/03	MSG	EPA-200.8/6020
Vanadium, Total	10 U	10	2.89	ug/L	10/17/03	DSC	EPA-200.7/6010B
Vanadium, Dissolved	10 U	10	2.89	ug/L	10/29/03	DSC	EPA-200.7/6010B
Zinc, Total	5.5 J	20	4.55	ug/L	10/17/03	DSC	EPA-200.7/6010B
Zinc, Dissolved	20 U	20	4.55	ug/L	10/29/03	DSC	EPA-200.7/6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/11/03 @ 08:45
Sampler: B.F.& J.S.
Received: 10/14/03 @ 09:30

Submittal #: **36440-6**
Submittal: Delivery Order 0046
RAAP
Sample ID: **ASB1A**
Sample #: **346248**
Matrix: Soil

Percent Solids: 82

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	32000		250	9.15	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Antimony, Total	0.086 J		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	3.0		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	86		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	0.53 J		1.0	0.0333	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Cadmium, Total	0.94 J		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	2569		250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	38	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	8.8	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	155		5.0	1.84	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Iron, Total	41600		200	42.4	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Lead, Total	76		10	0.218	mg/kg dry	10/24/03	DWJ	USEPA-6020
Magnesium, Total	2450		250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	315		5.0	0.264	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Mercury, Total	0.067 J		0.10	0.0077	mg/kg dry	10/21/03	MSS	USEPA-7471A
Nickel, Total	13		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1540		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.56 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.070 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	95 J		100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.24 J	B,X	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	68	L,M	1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	78		4.0	0.517	mg/kg dry	10/23/03	KLVM	USEPA-6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/11/03 @ 09:00
Sampler: B.F.& J.S.
Received: 10/14/03 @ 09:30

Submittal #: **36440-6**
Submittal: Delivery Order 0046
RAAP
Sample ID: **ASB1B**
Sample #: **346249**
Matrix: Soil

Percent Solids: 78

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	30800	250	9.15	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Antimony, Total	0.50 U	0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	1.8	0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	99	5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	0.90 J	1.0	0.167	mg/kg dry	11/03/03	KLVM	USEPA-6010B
Cadmium, Total	1.0 U	1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	408	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	31 J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	24 J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	20	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	37500	1000	71.6	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	26	1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	2050	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	1750	25	1.32	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Mercury, Total	0.019 J	0.10	0.0077	mg/kg dry	10/21/03	MSS	USEPA-7471A
Nickel, Total	16	0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1840	100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.52 J	1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.061 J	3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	122	100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.43 J	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	66 L,M	1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	56	4.0	0.517	mg/kg dry	10/23/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/11/03 @ 09:15
Sampler: B.F.& J.S.
Received: 10/14/03 @ 09:30

Submittal #: **36440-6**
Submittal: Delivery Order 0046
RAAP
Sample ID: **ASB1C**
Sample #: **346250**
Matrix: Soil

Percent Solids: 77

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	36300	250	9.15	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Antimony, Total	0.18 J	0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	8.1	0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	115	5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	1.8	1.0	0.167	mg/kg dry	11/03/03	KLVM	USEPA-6010B
Cadmium, Total	0.46 J	1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	126 J	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	40 J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	15 J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	43	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	42200	1000	71.6	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	19	1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	5870	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	1170	25	1.32	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Mercury, Total	0.075 J	0.10	0.0077	mg/kg dry	10/21/03	MSS	USEPA-7471A
Nickel, Total	28	0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	3780	100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.99 J	1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.11 J	3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	54 J	100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.45 J	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	56 L,M	1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	109	20	2.59	mg/kg dry	10/27/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/11/03 @ 12:00
Sampler: B.F.& J.S.
Received: 10/14/03 @ 09:30

Submittal #: **36440-6**
Submittal: Delivery Order 0046
RAAP
Sample ID: **ASB3A**
Sample #: **346251**
Matrix: Soil

Percent Solids: 80

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	32100	250	9.15	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Antimony, Total	0.50 U	0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	1.9	0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	114	5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	0.62 J	1.0	0.0333	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Cadmium, Total	1.0 U	1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	3910	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	33 J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	24 J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	36	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	38300	1000	71.6	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	34	1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	2090	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	2400	25	1.32	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Mercury, Total	0.052 J	0.10	0.0077	mg/kg dry	10/21/03	MSS	USEPA-7471A
Nickel, Total	12	0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1410	100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.30 J	1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.054 J	3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	207	100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.48 J	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	68 L,M	1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	56	4.0	0.517	mg/kg dry	10/23/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/11/03 @ 12:15
Sampler: B.F.& J.S.
Received: 10/14/03 @ 09:30

Submittal #: **36440-6**
Submittal: Delivery Order 0046
RAAP
Sample ID: **ASB3B**
Sample #: **346252**
Matrix: Soil

Percent Solids: 80

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	28300	250	9.15	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Antimony, Total	0.50 U	0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	1.6	0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	63	5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	0.57 J	1.0	0.0333	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Cadmium, Total	0.75 J	1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	644	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	30 J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	12 J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	17	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	36500	1000	71.6	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	11	1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	1980	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	483	5.0	0.264	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Mercury, Total	0.030 J	0.10	0.0077	mg/kg dry	10/21/03	MSS	USEPA-7471A
Nickel, Total	13	0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1670	100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.40 J	1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.048 J	3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	237	100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.20 J B,X	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	66 L,M	1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	46	4.0	0.517	mg/kg dry	10/23/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/11/03 @ 12:30
Sampler: B.F.& J.S.
Received: 10/14/03 @ 09:30

Submittal #: **36440-6**
Submittal: Delivery Order 0046
RAAP
Sample ID: **ASB3C**
Sample #: **346253**
Matrix: Soil

Percent Solids: 84

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	24500	50	1.83	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Antimony, Total	0.50 U	0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	2.2	0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	50	5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	0.64 J	1.0	0.0333	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Cadmium, Total	1.0 U	1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	293	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	41 J,m	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	11 J,s	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	14	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	33600	1000	71.6	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	12	1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	1160	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	330	5.0	0.264	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Mercury, Total	0.025 J	0.10	0.0077	mg/kg dry	10/21/03	MSS	USEPA-7471A
Nickel, Total	14	0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1010	100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.40 J	1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.074 J	3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	131	100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.15 J B,x	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	42 L,m	1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	44	4.0	0.517	mg/kg dry	10/23/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/11/03 @ 10:15
Sampler: B.F.& J.S.
Received: 10/14/03 @ 09:30

Submittal #: **36440-6**
Submittal: Delivery Order 0046
RAAP
Sample ID: **ASB2A**
Sample #: **346254**
Matrix: Soil

Percent Solids: 80

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	28500		250	9.15	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Antimony, Total	0.071 J		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	2.9		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	61		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	0.55 J		1.0	0.0333	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Cadmium, Total	0.26 J		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	6100		250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	36	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	9.3	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	57		2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	38100		1000	71.6	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	25		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	3180		250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	426		5.0	0.264	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Mercury, Total	0.045 J		0.10	0.0077	mg/kg dry	10/21/03	MSS	USEPA-7471A
Nickel, Total	13		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1220		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.47 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.072 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	77 J		100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.23 J	B,X	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	63	L,M	1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	58		4.0	0.517	mg/kg dry	10/23/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/11/03 @ 10:10
Sampler: B.F.& J.S.
Received: 10/14/03 @ 09:30

Submittal #: **36440-6**
Submittal: Delivery Order 0046
RAAP
Sample ID: **ASB2B**
Sample #: **346255**
Matrix: Soil

Percent Solids: 76

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	32300		250	9.15	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Antimony, Total	0.50 U		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	3.4		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	77		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	1.3		1.0	0.167	mg/kg dry	11/03/03	KLVM	USEPA-6010B
Cadmium, Total	0.36 J		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	867		250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	39	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	14	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	19		2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	40300		1000	71.6	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	8.8	J,F	1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	5220	J,F	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	648		5.0	0.264	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Mercury, Total	0.014 J		0.10	0.0077	mg/kg dry	10/21/03	MSS	USEPA-7471A
Nickel, Total	36	J,F	0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	2750	J,F	100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.60 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.093 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	77 J		100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.23 J	B,X	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	55	L,M	1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	45		4.0	0.517	mg/kg dry	10/23/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/11/03 @ 00:00
Sampler: B.F.& J.S.
Received: 10/14/03 @ 09:30

Submittal #: **36440-6**
Submittal: Delivery Order 0046
RAAP
Sample ID: **SBD-10**
Sample #: **346256**
Matrix: Soil

Percent Solids: 72

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	34800		250	9.15	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Antimony, Total	0.068 J		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	4.7		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	98		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	0.86 J		1.0	0.167	mg/kg dry	11/03/03	JMF	USEPA-6010B
Cadmium, Total	1.0 U		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	380		250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	41	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	22	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	23		2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	38000		1000	71.6	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	13	J,f	1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	2800	J,f	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	859		5.0	0.264	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Mercury, Total	0.022 J		0.10	0.0077	mg/kg dry	10/21/03	MSS	USEPA-7471A
Nickel, Total	21	J,f	0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1560	J,f	100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.50 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.094 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	50 J		100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.22 J	B,x	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	49	L,M	1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	37		4.0	0.517	mg/kg dry	10/23/03	KLVM	USEPA-6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/11/03 @ 11:15
Sampler: B.F.& J.S.
Received: 10/14/03 @ 09:30

Submittal #: **36440-6**
Submittal: Delivery Order 0046
RAAP
Sample ID: **ASB2C**
Sample #: **346257**
Matrix: Soil

Percent Solids: 73

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	35000		250	9.15	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Antimony, Total	0.50 U		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	4.5		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	88		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	0.59 J		1.0	0.167	mg/kg dry	11/03/03	JMF	USEPA-6010B
Cadmium, Total	1.0 U		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	310		250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
* Chromium, Total	52	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	20	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	22		2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	40200		1000	71.6	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	12		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	2120		250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	704		5.0	0.264	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Mercury, Total	0.020 J		0.10	0.0077	mg/kg dry	10/21/03	MSS	USEPA-7471A
Nickel, Total	20		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1260		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.45 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.075 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	50 J		100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.21 J	B,X	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
* Vanadium, Total	54	L,M	1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	40		4.0	0.517	mg/kg dry	10/23/03	KLVM	USEPA-6010B

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
Submittal #:	**36440-6**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**EQB5**		
Sample #:	**346013**		
Matrix:	QC Water	Percent Solids:	n/a

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Cyanide, Total	10 U	10	3.40	ug/L	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 11:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/11/03 @ 08:45
Submittal #:	**36440-6**		
Submittal:	Delivery Order 0046 RAAP		
Sample ID:	**EQB6**		
Sample #:	**346015**		
Matrix:	QC Water	Percent Solids:	n/a

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Cyanide, Total	10 U	10	3.40	ug/L	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
Submittal #:	**36440-6**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**13SD3**		
Sample #:	**346017**		
Matrix:	Soil	Percent Solids:	68

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	68	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.20 J	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 00:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/11/03 @ 08:45
Submittal #:	**36440-6**		
Submittal:	Delivery Order 0046 RAAP		
Sample ID:	**SDD1**		
Sample #:	**346018**		
Matrix:	Soil	Percent Solids:	63

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	63	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.39 J	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
Submittal #:	**36440-6**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**13SD2**		
Sample #:	**346019**		
Matrix:	Soil	Percent Solids:	65

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	65	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.07 J	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/10/03 @ 13:00
Sampler: B.F. & J.S.
Received: 10/11/03 @ 08:45

Submittal #: **36440-6**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SW3**
Sample #: **346020**
Matrix: Surface Water

Percent Solids: n/a

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Cyanide, Total	10 U	10	3.40	ug/L	10/16/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/10/03 @ 00:00
Sampler: B.F. & J.S.
Received: 10/11/03 @ 08:45

Submittal #: **36440-6**
Submittal: Delivery Order 0046
RAAP
Sample ID: **SWD1**
Sample #: **346021**
Matrix: Surface Water

Percent Solids: n/a

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Cyanide, Total	10 U	10	3.40	ug/L	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 14:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/11/03 @ 08:45
Submittal #:	**36440-6**		
Submittal:	Delivery Order 0046 RAAP		
Sample ID:	**13SW2**		
Sample #:	**346022**		
Matrix:	Surface Water	Percent Solids:	n/a

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Cyanide, Total	10 U	10	3.40	ug/L	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 08:45
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
Submittal #:	**36440-6**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**ASB1A**		
Sample #:	**346248**		
Matrix:	Soil	Percent Solids:	82

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	82	0.1	0.1	%	10/16/03	TAM	SW-846 3550B
Cyanide, Total	0.06 J	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 09:00
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
Submittal #:	**36440-6**		
Submittal:	Delivery Order 0046 RAAP		
Sample ID:	**ASB1B**		
Sample #:	**346249**		
Matrix:	Soil	Percent Solids:	78

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	78	0.1	0.1	%	10/16/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 09:15
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
Submittal #:	**36440-6**		
Submittal:	Delivery Order 0046 RAAP		
Sample ID:	**ASB1C**		
Sample #:	**346250**		
Matrix:	Soil	Percent Solids:	77

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	77	0.1	0.1	%	10/16/03	TAM	SW-846 3550B
Cyanide, Total	0.47 J	0.50	0.0356	mg/kg dry	10/24/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 12:00
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
Submittal #:	**36440-6**		
Submittal:	Delivery Order 0046 RAAP		
Sample ID:	**ASB3A**		
Sample #:	**346251**		
Matrix:	Soil	Percent Solids:	80

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	80	0.1	0.1	%	10/16/03	TAM	SW-846 3550B
Cyanide, Total	0.15 J	0.50	0.0356	mg/kg dry	10/24/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 12:15
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
Submittal #:	**36440-6**		
Submittal:	Delivery Order 0046 RAAP		
Sample ID:	**ASB3B**		
Sample #:	**346252**		
Matrix:	Soil	Percent Solids:	80

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	80	0.1	0.1	%	10/16/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/24/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/11/03 @ 12:30
Sampler: B.F.& J.S.
Received: 10/14/03 @ 09:30

Submittal #: **36440-6**
Submittal: Delivery Order 0046
RAAP
Sample ID: **ASB3C**
Sample #: **346253**
Matrix: Soil

Percent Solids: 84

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	84	0.1	0.1	%	10/16/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/24/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/11/03 @ 10:15
Sampler: B.F.& J.S.
Received: 10/14/03 @ 09:30

Submittal #: **36440-6**
Submittal: Delivery Order 0046
RAAP
Sample ID: **ASB2A**
Sample #: **346254**
Matrix: Soil

Percent Solids: 80

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	80	0.1	0.1	%	10/16/03	TAM	SW-846 3550B
Cyanide, Total	0.23 J	0.50	0.0356	mg/kg dry	10/24/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/11/03 @ 10:10
Sampler: B.F.& J.S.
Received: 10/14/03 @ 09:30

Submittal #: **36440-6**
Submittal: Delivery Order 0046
RAAP
Sample ID: **ASB2B**
Sample #: **346255**
Matrix: Soil

Percent Solids: 76

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	76	0.1	0.1	%	10/16/03	TAM	SW-846 3550B
Cyanide, Total	0.18 J	0.50	0.0356	mg/kg dry	10/24/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
Submittal #:	**36440-6**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**SBD-10**		
Sample #:	**346256**		
Matrix:	Soil	Percent Solids:	72

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	72	0.1	0.1	%	10/16/03	TAM	SW-846 3550B
Cyanide, Total	0.14 J	0.50	0.0356	mg/kg dry	10/24/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/11/03 @ 11:15
Sampler: B.F.& J.S.
Received: 10/14/03 @ 09:30

Submittal #: **36440-6**
Submittal: Delivery Order 0046
RAAP
Sample ID: **ASB2C**
Sample #: **346257**
Matrix: Soil

Percent Solids: 73

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	73	0.1	0.1	%	10/16/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/24/03	JLB	USEPA-9012A

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DATA VALIDATION WORKSHEET

Volatile Organic Analysis by GC/MS

Reviewer: AS
Date: January-04
DV Level: II III IV
Review Document:
X NFG - Region III Modifications
X Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-6
Test Name: 8260B
Method No.: VOC

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Do sample preservation, collection and storage condition meet method requirement?	x		
	If the temperature of the cooler was elevated (> 10 °C) or bubble size in aqueous sample was too big (tiny bubble is OK.), then flag all positive results with a "L" and all non-detects "UL".			
1.5	Do any soil samples contain more than 50% water?		x	
	If any sample analyzed as a soil, other than TCLP, contains % moisture greater than 50%, noted in the DV report.			

Notes: ten coolers @ 3.8C, 2.8C, 2.6C, 9.8C, 2.6C, 2.1C, 3.9C, 2.1C, 2.0C, & 3.5C.

1.0 Cooler TM0436 received at laboratory at 9.8C contained EQB5 for all parameters except VOC. All VOC sample containers were received in TM0500 at 3.8C.

2.0 All samples from Area A were collected on Saturday 10/11/03 and could not be shipped until Monday the 13th. Samples were received at laboratory on Tuesday the 14th. The encore aliquots could not be used since the holding time to preservation had expired. All sample aliquots were taken from bulk.

2.0 Holding Times		Yes	No	NA
2.1	Were sample preserved as specified in the method or project QAPP?	see above		
2.2	Have any technical holding times, determined from date of sampling to date of analysis, been exceeded? If yes, L(+)/UL(-). For aqueous unpreserved - 7 days for aromatic compounds All others - 14 days.		x	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, L(+)/R(-) .		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per GCMS, 20 samples, batch, matrix, and level)?	x		
3.2	Do any method blanks have positive results? Action: If yes, positive sample results should be reported and qualified "B", if the concentration of the compound in the sample is less than or equal to 5 times (or 10 times for the common volatile lab contaminants - methylene chloride, acetone, and 2-butanone) the amount in the associated blank.	x		
3.3	Do any field equipment blanks/trip blanks have positive results? If Yes, use same rules above.	x		
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, noted in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If no, use professional judgement to determine the effect on the data and note in the reviewer narrative.	x		
4.3	Has a continuing calibration standard been analyzed for every 12 hours of sample analysis per instrument?	x		
4.4	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 15% and %D < ± 20%		x	
	For initial Calibration: for %RSD > ±15%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 20% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >20%, J(+).			
4.5	Do any SPCC compounds have an RRF < control limit? Control limits: >0.10 for chloromethane, 1,1-dichloroethane, & bromoform or >0.30 for chlorobenzene & 1,1,2,2-tetrachloroethane. If yes, L(+)/R(-).		x	

Notes: The second source for methyl acetate was analyzed after sample analyses, but passed at 89% - no action was taken.

5.0 GC/MS Instrument Performance Check		Yes	No	NA
5.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?	x		
5.2	Are BFB enchanced bar graph spectrum and mass/charge (m/z) listing provided for each 12-hour shift?	x		
5.3	Have all samples been analyzed within twelve hours of the BFB tune?	x		
	If twelve hours have elapsed according to the system clock, and the laboratory had analyzed standards, blanks, field samples or QC samples after twelve (12) hours, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
5.4	Have ion abundance criteria for BFB been met for each instrument used?	x		
	If the BFB criteria were not met prior to the analyses of the standards, blanks, field samples and QC samples, all standards, blanks, field samples and QC samples are rejected "R".			

Notes:

6.0 Surrogate Recovery		Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
6.2	Are surrogate recoveries within acceptance criteria (not to exceed 50-150%) for all samples and method blanks?	x		
6.3	If No in Section 6.2, are these sample(s) or method blank(s) reanalyzed?			x
	If any system monitoring compound(s) in the volatile fraction is out of specification, there should be a reanalysis to confirm that the non-compliance is because of sample matrix effects rather than laboratory deficiencies.			
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? DV report should indicate that extraction efficiency/ method accuracy cannot be verified.			x
	1 or more <10% / 1 high/low / 2 or 3 high/low / 2 or 3 all low / 2 or 3 all high			
	Positives: L / J / J / L / K			
	Non-detects: R / UJ / UJ / UL / NONE			
	Note: The B qualifier remains over surrogate flagging.			

Notes:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 50-150%?	x		
7.4	Are there any RPD outside the QC limits not to exceed 50%?	x		
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

8.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)		Yes	No	NA
8.1	Is the LCS/LCSD recovery form present?	x		
8.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
8.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 50-150%?	x		
	If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
8.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 50%?			x
	If Yes, J(+) only.			

Notes:

9.0 Internal Standard		Yes	No	NA
9.1	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration? If not, J(+)/UJ(-).	x		
	If extremely low area counts are reported, or performance exhibits a major abrupt drop-off, then a severe loss of sensitivity is indicated. Non-detect target compounds should then be qualified as unusable (R).			
9.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	x		
	The chromatographic profile for that sample must be examined to determine if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction. Positive results should not needed to be qualified as "R", if the mass spectral criteria are met.			

Notes:

10.0 Field Duplicate		Yes	No	NA
10.1	Was a field duplicate prepared and analyzed at the correct frequency (one per 20 samples, matrix, and level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
10.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

11.0 Tentatively Identified Compounds (TICs) and Detection Limit Verification		Yes	No	NA
11.1	Are any TICs detected in the field samples? If Yes, all TIC results should be flagged "NJ" (tentatively identified and approximate concentration).		x	
11.2	Do detection limits meet those required by the project QAPP and were they properly adjusted to reflect all sample dilutions and dry weight factors?	x		
11.3	Were sample concentrations above the highest standard run at a dilution? If not, for ion saturation flag "L", unsaturated results "J".			x

Notes:

12.0 Data Completeness		Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit 90%)	x		
	Number of samples: 22			
	Number of target compounds in each analysis:50			
	Number of results rejected and not reported:0			
	% Completeness = (12.1.1 x 12.1.2 - 12.1.3) x 100/(12.1.1 x 12.1.2)			
	% Completeness = 100.0%			

Notes:

DATA VALIDATION WORKSHEET

Semivolatile Organic Analysis

Reviewer: AS
Date: January-04
DV Level: II III IV
Review Document:
X NFG - Region III Modifications
X Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-6
Test Name: SVOC
Method No.: 8270C

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	
1.4	Do sample preservation, collection and storage condition meet method requirement?		x	
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 °C), then flag all positive results with a "L" and all non-detects "UL".			
1.5	Do any soil samples contain more than 50% water?		x	
	If any sample analyzed as a soil, other than TCLP, contains % moisture greater than 50%, noted in the DV report.			

Notes: ten coolers @ 3.8C, 2.8C, 2.6C, 9.8C, 2.6C, 2.1C, 3.9C, 2.1C, 2.0C, & 3.5C.

Cooler TM0436 received at laboratory at 9.8C contained EQB5 for all parameters except VOC. All VOC sample containers were received in TM0500.

2.0 Holding Times		Yes	No	NA
2.1	Were sample preserved as specified in the method or project QAPP?	x		
2.2	Have any technical holding times, determined from date of sampling to date of analysis, been exceeded? If yes, L(+)/UL(-). For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, L(+)/R(-) .		x	

Notes:

Since cooler temperature of 9.8C is less than 10C, no qualifying action was taken.

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x		
3.2	Do any preparation/instrument/reagent blanks have positive results? Action: If yes, positive sample results should be reported and qualified "B", if the concentration of the compound in the sample is less than or equal to 5 times (or 10 times for the common phthalate contaminants) the amount in the associated blank.	x		
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.	x		
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, noted in the Dv report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If no, use professional judgement to determine the effect on the data and note in the reviewer narrative.	x		
4.3	Has a continuing calibration standard been analyzed for every 12 hours of sample analysis per instrument?	x		
4.4	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD ≤ 15%, ICV %D < 30%, and CCV %D ≤ 20%.		x	
	For initial Calibration: for %RSD > ±15%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 20% and < + 60%, J(+)/UJ(-), >60%J(+)/R(-); displaying a positive bias >20%, J(+).			
4.5	Do any SPCC compounds have an RRF < 0.05? (n-nitroso-di-n-propylamine,hexachlorocyclopentadiene,2,4-dinitrophenol, & 4-nitrophenol) If yes, J(+)/R(-).		x	

Notes:

5.0 GC/MS Instrument Performance Check		Yes	No	NA
5.1	Are GC/MS Tuning and Mass Calibration forms present for decafluorotriphenylphosphine (DFTPP)?	x		
5.2	Are DFTPP enchanced bar graph spectrum and mass/charge (m/z) listing provided for each 12-hour shift?	x		
	If DFTPP was analyzed simultaneously with any calibration standard or blank, the instrument performance check (IPC) is rejected "R" as well as all associated data.			
5.3	Have all samples been analyzed within twelve hours of the DFTPP tune?	x		
	If twelve hours have elapsed according to the system clock, and the laboratory had analyzed standards, blanks, field samples or QC samples after twelve (12) hours, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
5.4	Have ion abundance criteria for DFTPP been met for each instrument used?	x		
	If the DFTPP criteria were not met prior to the analyses of the standards, blanks, field samples and QC samples, all standards, blanks, field samples and QC samples are rejected "R".			

Notes:

6.0 Surrogate Recovery		Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
6.2	Are surrogate recoveries within acceptance criteria not to exceed 10-150% for all samples and method blanks?		x	
6.3	If No in Section 6.2, are these sample(s) or method blank(s) reanalyzed?		x	
	If any two base/neutral or acid fraction are out of specification, or if any one base/neutral or acid extractable surrogate has a recovery of less than 10%, then there should be a reanalysis to confirm that the non-compliance is because of sample matrix effects rather than laboratory deficiencies.			
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? (recoveries may be diluted out.)	x		
	1 or more <10% / 2 or 3 high/low / 2 or 3 all low / 2 or 3 all high Positives: L / J / L / K Non-detects: R / UJ / UL / NONE			
	Note: The B qualifier remains over surrogate flagging.			

Notes:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 10-150%?	x		
7.4	Are there any RPDs outside the QC limits not to exceed 60%?	x		
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

8.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)		Yes	No	NA
8.1	Is the LCS/LCSD recovery form present?	x		
8.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
8.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 10-150%?	x		
	If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
8.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 50%?		x	
	If Yes, J(+) only.			

Notes:

9.0 Internal Standard		Yes	No	NA
9.1	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration? If not, J(+)/UJ(-).		x	
	If extremely low area counts are reported, or performance exhibits a major abrupt drop-off, then a severe loss of sensitivity is indicated. Non-detect target compounds should then be qualified as unusable (R).			
9.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	x		
	The chromatographic profile for that sample must be examined to determine if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction. Positive results should not needed to be qualified as "R", if the mass spectral criteria are met.			

Notes:

10.0 Field Duplicate		Yes	No	NA
10.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
10.2	Are all analyte duplicate results within control limits? Generally, no action is taken on the basis of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.		x	

Notes:

11.0 Tentatively Identified Compounds (TICs) and Detection Limit Verification		Yes	No	NA
11.1	Are any TICs detected in the field samples? If Yes, all TIC results should be flagged "NJ" (tentativelyidenified, and approximate concentration).	x		
11.2	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture?	x		
11.3	Were sample concentrations above the highest standard run at a dilution? If not, for ion saturation flag "L", unsaturated results "J".			x

Notes:

12.0 Data Completeness		Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit 90%)	x		
	Number of samples: 18			
	Number of target compounds in each analysis:66			
	Number of results rejected and not reported:0			
	% Completeness = (12.1.1 x 12.1.2 - 12.1.3) x 100/(12.1.1 x 12.1.2)			
	% Completeness = 100.0%			

Notes:

DATA VALIDATION WORKSHEET

Polyaromatic Hydrocarbons

Reviewer: AS
Date: January-04
DV Level: II III IV

Review Document:

__X__ Region III Modified for National Functional Guidelines
_____ NFG for organic Data review (February 1994)
__X__ Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-6
Test Name: PAH
Method No.: 8310-HPLC

1.0 Laboratory Deliverables

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. % solids		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes: ten coolers @ 3.8C, 2.8C, 2.6C, 9.8C, 2.6C, 2.1C, 3.9C, 2.1C, 2.0C, & 3.5C.

Cooler TM0436 received at laboratory at 9.8C contained EQB5 for all parameters except VOC. All VOC sample containers were received in TM0500.

2.0 Holding Times

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?		see above	
	Action: If the temperature of the cooler was elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyses, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes:

Since cooler temperature of 9.8C is less than 10C, no qualifying action was taken.

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%		x	
	For initial Calibration: for %RSD > ±20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?		x	
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?			x
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.			x
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 40-150%?	x		
	Are there any RPDs outside the QC limits not to exceed 60%?		x	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

7.0 Laboratory Control Sample (LCS)		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 40-150%?		x	
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?		x	
	Action: If Yes, J(+) only.			

Notes:

8.0 Field Duplicate		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.	x		
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.			x
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	x		

Notes:

10.0 Data Completeness			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		x		
	Number of samples:	18			
	Number of target compounds in each analysis:	16			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

DATA VALIDATION WORKSHEET

Reviewer: AS
Date: January-04
DV Level: II III IV
Review Document:
_X_ Region III Modified for National Functional Guidelines
____ NFG for organic Data review (February 1994)
_X_ Project QAPP/SAP

Explosives

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-6
Test Name: Explosives
Method No.: 8330-HPLC

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. % solids		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes: ten coolers @ 3.8C, 2.8C, 2.6C, 9.8C, 2.6C, 2.1C, 3.9C, 2.1C, 2.0C, & 3.5C.

Cooler TM0436 received at laboratory at 9.8C contained EQB5 for all parameters except VOC. All VOC sample containers were received in TM0500.

2.0 Holding Times		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?		see above	
	Action: If the temperature of the cooler was elevated (> 10 ^{O}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyese, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes:

Since cooler temperature of 9.8C is less than 10C, no qualifying action was taken.

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%		x	
	For initial Calibration: for %RSD > ±20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?	x		
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?			x
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.			x
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 40-150%?	x		
6.4	Are there any RPDs outside the QC limits not to exceed 60%?	x		
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes: 13SD2 RPDs out
13SW2 tetryl 42/40% (50%)
ASB2C RPDs out

7.0 Laboratory Control Sample (LCS)		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 40-150%?		x	
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?			x
	Action: If Yes, J(+) only.			

Notes:

8.0 Field Duplicate		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.	x		
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.	x		
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	x		

Notes:

10.0 Data Completeness			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		x		
	Number of samples:	18			
	Number of target compounds in each analysis:	14			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

DATA VALIDATION WORKSHEET

Pesticides/PCBs

Reviewer:	AS	**Project Name:**	Radford SSP
Date:	January-04	**Project Number:**	15291974.30000
DV Level:	II III IV	**Laboratory:**	TriMatrix
Review Document:		**SDG No.:**	36440-6
X SW-846 - 8081/8082		**Test Name:**	PEST/PCB
X NFG - Region III Modifications		**Method No.:**	8081A/8082
___ CLP			

1.0 Laboratory Deliverables		**Yes**	**No**	**NA**
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Do any soil samples contain more than 50% water?		x	
	If any sample analyzed as a soil, other than TCLP, contains % moisture greater than 50%, noted in the DV report.			

Notes: ten coolers @ 3.8C, 2.8C, 2.6C, 9.8C, 2.6C, 2.1C, 3.9C, 2.1C, 2.0C, & 3.5C.

Cooler TM0436 received at laboratory at 9.8C contained EQB5 for all parameters except VOC. All VOC sample containers were received in TM0500.

2.0 Preservation/ Holding Times		**Yes**	**No**	**NA**
2.1	Do sample preservation, collection and storage condition meet method requirement?		see above	
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 20 °C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampleing to date of analysis, been exceeded? If yes, J(+)/UJ(-). For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, J(+)/R(-) .		x	

Notes: sampled on 10/2/03, extracted on 10/8-9/03, analyzed 10/10-30/03

Since cooler temperature of 9.8C is less than 10C, no qualifying action was taken.

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix)?	x		
3.2	Do any preparation/instrument/reagent blanks have positive results? Action: If yes, positive sample results should be reported and qualified "B", if the concentration of the compound in the sample is less than or equal to five times the amount in the associated blank.		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note it in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards included in the calibration curve? 1016 and 1260 need at least three peaks at five concentrations. The multi-component target compounds (the other Aroclors, Toxaphene, & Chlordane) must each be analyzed separately at a single concentration level during the initial calibration sequence.	x		
4.2	Has a continuing calibration standard been analyzed for every 12 hours or twenty samples?	x		
4.3	Are all calibration standard (IC and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r>0.99, %RSD < ± 20% and %D < ± 15%		x	
	For initial Calibration: for %RSD > ± 20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Do all standard retention times in the continuing calibration fall within the RT windows established during the initial calibration sequence? If No, the associated sample result should be carefully evaluated.	x		

Notes:

5.0 GC/ECD Instrument Performance Check for Pesticides		Yes	No	NA
5.1	Is the 4,4'-DDT breakdown </= to 15%? If No, for positive DDT results, DDT-L(+), DDD/DDE - NJ(+). For non-detect DDT results, DDD/DDE - R(+).	x		
5.2	Is the endrin breakdown </= to 15%? If No, for positive endrin results, endrin-L(+), endrin aldehyde/ketone - NJ(+). For non-detect DDT results, endrin aldehyde/ketone - R(+).	x		

Notes:

6.0 Surrogate Recovery					Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?				x		
6.2	Do all surrogate retention times fall within the RT windows established during the initial calibration sequence? If No, the associated sample result should be carefully evaluated.				x		
6.3	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?				x		
6.4	If No in Section 6.3, are these sample(s) or method blank(s) reanalyzed?						x
6.5	If No in Section 6.4, is any sample dilution factor greater than 10? (recoveries may be diluted out.)						x
	# of outliers	Recovery	Sample result from column with non-conformance	Sample result from column without non-conformance			
	1 out	high/low	No action	No action			
	2 out	2 high same column	K	No action			
		2 low same column	L, UL	No action			
		mixed same column	J, UJ	No action			
		2 high diff columns	J	Not applicable			
		2 low diff columns	J, UJ	Not applicable			
		mixed diff columns	Professional judgement	Not applicable			
	3 out	All high	K	Not applicable			
		All low	L, UL	Not applicable			
		2 high, 1 low	K (2 high)	J (1 low 2nd column)			
		2 low, 1 high	L, UJ (2 low)	J (1 high 2nd column)			
		other mixed	J, UJ	Not applicable			
	4 out	All high	K	Not applicable			
		All low	L, UL	Not applicable			
		Mixed	J, UJ	Not applicable			
	If any recovery is >0% and <10% then L(+)/R(-).						
	If any recovery is 0% then R(+/-).						

Notes:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 30-150%?	pest	pcb	
7.4	Are there any RPDs outside the QC limits not to exceed 60%?	pest	pcb	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes: MS/MSD from SDG 36440-1

8.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)		Yes	No	NA
8.1	Is the LCS/LCSD recovery form present?	x		
8.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
8.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 30-150%?			
	If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).		x	
8.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?		x	
	If Yes, J(+) only.			

Notes:

9.0 Field Duplicate		Yes	No	NA
9.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
9.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes: QSB1A/SBD1 submitted in SDG 36440-2, BDL for pest and 0.053/0.051 for Aroclor 1254.

10.0 Compound Identification and Detection Limit Verification		Yes	No	NA
10.1	Is the percent difference calculated for the positive sample results on both columns < 40%? If No, J(+).	x		
10.2	Do detection limits meet those required by the project QAPP and were properly adjusted for dilution factors and moisture?	x		

Notes:

11.0 Pesticide Cleanup Checks		Yes	No	NA
11.1	Is Form IX PEST-1 present and complete for each lot of Florisil Cartridges used? (Florisil Cleanup is required for all Pest/PCB extracts to reduce matrix interference caused by polar compounds.)			x
	Every lot number of Florisil cartridges used for sample cleanup must be checked by spiking with 2,4,5-trichlorophenol and the midpoint concentration of Individual Standard Mixture A.			
11.2	Are all samples listed on the Pesticide Florisil cartridge Check Form?			
11.3	Are percent recoveries of pesticide and surrogate compounds within control limit, 80-120%(if the recovery of 2,4,5-trichlorophenol < 5%), for the florisil cartridge check? If No, the raw data should be examined for the presence of polar interferences and professional judgement should be used in qualifying the data.			

Notes:

Florisil cleanup was performed, no laboratory submission for these CLP descriptors was provided.

12.0 Data Completeness				Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit 90%)	Pest	PCB	x		
	Number of samples:	3	3			
	Number of target compounds in each analysis:	21	7			
	Number of results rejected and not reported:	0	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)					
	% Completeness =	100%	100%			

Notes:

DATA VALIDATION WORKSHEET

Herbicides

Reviewer: AS
Date: January-04
DV Level: II III IV
Review Document:
__X__ Region III Modified for National Functional Guidelines
_____ NFG for organic Data review (February 1994)
__X__ Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-6
Test Name: Herbicides
Method No.: 8151A

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. % solids		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes: ten coolers @ 3.8C, 2.8C, 2.6C, 9.8C, 2.6C, 2.1C, 3.9C, 2.1C, 2.0C, & 3.5C.

Cooler TM0436 received at laboratory at 9.8C contained EQB5 for all parameters except VOC. All VOC sample containers were received in TM0500.

2.0 Holding Times		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?		see above	
	Action: If the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyese, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes:

Since cooler temperature of 9.8C is less than 10C, no qualifying action was taken.

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%	x		
	For initial Calibration: for %RSD > ±20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 25-150% for all samples and method blanks?		x	
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?		x	
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.		x	
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 25-150%?	x		
6.4	Are there any RPDs outside the QC limits not to exceed 60%?	x		
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes: MS/MSD see SDG 36440-1

7.0 Laboratory Control Sample (LCS)		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 25-150%?	x		
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?		x	
	Action: If Yes, J(+) only.			

Notes: original extraction Dinoseb LCS recovery low, re-extraction passed.

8.0 Field Duplicate		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes: QSB1A and SDB-3 submitted in SDG 36440-2 were both non-detect.

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.	x		
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.	x		
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	x		

Notes:

10.0 Data Completeness			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		x		
	Number of samples:	3			
	Number of target compounds in each analysis:	10			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

DATA VALIDATION WORKSHEET
INORGANIC - ICP, CVAA, AND CYANIDE
REGION III - NATIONAL FUNCTIONAL GUIDELINES

Project Name: Radford SSP
SDG No.: 36440-6 **Reviewer:** AS
Project No.: 15291974.30000 **Date:** January-04

1.0 Chain of Custody/Sample Condition/Raw Data		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples which were analyzed?	x			x			x			x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x			x			x			x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x			x			x			x	
1.4	Does sample preservation, collection and storage meet method requirement? (For metal: water samples: with Nitric Acid to pH < 2, and soil/sediment samples: 4 ^{O}C $\pm$ 2 ^{O}C)		x			x			x			x	
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes. % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	x			x			x			x		

Note: ten coolers @ 3.8C, 2.8C, 2.6C, 9.8C, 2.6C, 2.1C, 3.9C, 2.1C, 2.0C, & 3.5C.

Cooler TM0436 received at laboratory at 9.8C contained EQB5 for all parameters except VOC. All VOC sample containers were received in TM0500.

2.0 Holding Time		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, CN: 14 days, other metals: 6 months) Action:L(+)/UL(-). If the holding time is grossly exceeded (twice the holding time criteria), L(+)/R(-).		x			x		x			x		

Note: 38SB2C was collected on 10/3/03 and distilled/analyzed on 10/21/03 the 18th day.

Since cooler temperature of 9.8C is less than 10C, no qualifying action was taken.

3.0 Instrument Calibration		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? (ICP& ICPMS: blank + one standard & a RL standard OR 3 standards and a blank with one standard at the RL; CVAA: blank + five standards with one standard at the RL). If not, qualify with "R".	7 + BLK			4 + BLK			5 + BLK			6 + BLK		
3.2	Are the correlation coefficients > 0.99? Action: J(+)/UJ(-).	x			x			x			x		
3.3	Once per calibration, did a high and low distilled standard recovery within 85-115%? If no, follow 3.6.										x		
3.4	Was an initial calibration check standard (labelled LCS by TriMatrix) analyzed immediately after instrument system had been calibrated? Action: If no, all associated data are rejected "R".	x			x			x			x		
3.5	Was continuing calibration standard (CCS) analyzed at a minimum frequency of 10% (every 10 samples) during an analytical run and at the end of the analytical run? If not, document and flag based on professional judgement.	x			x			x			x		
3.6	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? FOR ICP 90%-110%, FOR Hg 80-120%, FOR CN 85-115%.	x			x			x			x		
	ICV and CCV: Action: L(+)/R(-) L(+)/UL(-) K(+) Mercury < 65% 65% - 79% > 120% Cyanide < 65% 65% - 84% > 115% Other Metals < 75% 75% - 89% > 110%												
3.7	For ICP & ICPMS, did the CRDL standard recover between 80-120%?	x					x	x			x		
	<50% 50%-79% >120% 2xCRDL>[sample]>IDL L(+)/R(-) L(+)/UL(-) K							passed within 70-130%			passed within 59-101%		

Note: A high point added to Al, Ba, Ca, Fe, Mg, Mn, & K curves and the RLs were elevated by 5.

4.0 Blanks		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were method blank (MB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x			x			x			x		
4.2	Were calibration blanks (ICB and CCBs) analyzed immediately after each and every ICV and CCVs? Action: If no ICB was run, all associated data are rejected. If the frequency of the CCBs does not follow requirement, all associated data are qualified "J".	x			x			x			x		
4.3	Are there reported MB or ICB/CCBs values > RL?	x			x				x			x	
	Sample Results > RL												
	< 5X Blank Contamination B												
4.4	Are there negative blank results with the absolute value > RL?		x			x			x			x	
	Sample Results Non-detects > RL												
	< 5X absolute Blank Contamination UL L												
4.5	Are there reported field blank > ± RL?	x			x				x			x	
	Sample Results > RL												
	< 5X Blank Contamination B												

Note: _____

5.0 ICP Interference Check Sample (ICS)		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1	Was ICS analyzed at beginning of each ICP run?	x			x								
5.2	Are the ICS AB recoveries within 80% - 120%?	x			x								
5.3	Are the results for unspiked analytes (in ICS A) < ± RL?	x			x								
5.4	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?			x			x						
	If not...												
	Action: Not Spiked Analytes Spiked analytes (ICS AB analytes)												
	< -RL > RL < 50% 50% - 79% >120%												
	L(+)/UL(-) K(+) L(+)/R(-) L(+)/UL(-) K(+)												

Note: _____

6.0 Laboratory Control Sample (LCS)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	x			x			x			x		
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)		x			x			x			x	
	Action: Solid: < LCL L(+)/UL(-); > UCL K(+). Aqueous: < 50% L(+)/R(-); 50% - 79% L(+)/UL(-); > 120% K(+)												

Note: _____

7.0 Laboratory Duplicates (MSD)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), using professional judgement, analytes not associated with duplicate results.	x			x			x			x		
	For aqueous 6010B and Hg - RPD< 25%, aqueous CN - RPD < 20%, aqueous 6020 - RPD < 20%, and for soil - use laboratory generated limits for MS/MSD.												
7.2	Are all analyte duplicate results within control limits? If no, qualify all associated field samples J(+)/UJ(-) for the analyte with results that fall outside criteria.	x			x			x			x		

Note: _____

8.0 Spike Sample Analysis -Pre-Digestion/Post-Digestion

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
8.1	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, batch, matrix and level)? If not, J(+) with professional judgement.	x			x			x			x		
8.2	For all analytes with sample concentration > 4 x spike concentration, are spike recoveries within the control limit of 75-125% for aqueous and lab limits for soil?	x				x		x			x		
	%R > 125% 30%< %R < 74% < 30%												
	Positive K L L												
	Non-detect None UL R												
8.3	Where pre-digestion matrix spike analytes were outside the acceptable recovery limits(except Ag), was a post-digestion spike performed? Note any failures in DV report, but no data qualifying action is required.	x			x					x			x

Note: 13SD2 Calcium and Magnesium, post digetion spike passes

13SW2 passes for pre and post

ASB2C Chromium and Vanadium, post digestion spike recovery passes

9.0 Instrument Detection Limits (IDL)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1	Are all IDLs/RLs equal to or less than the reporting limits specified?	x			x			x			x		

Note:

10.0 ICP/AA Serial Dilutions (Not for Mercury Analysis)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	x			x								
10.2	Was a five-fold dilution performed?	x			x								
10.3	Did the serial dilution results agree within 10% for ICP analyte concentration > 5 X the RL for 6010 or > 20 X the RL for 6020 in the original sample? If no, J(+).	x				x							

Note: Serial Dilution: 13SW2 - total sodium 15.7% , post digestion spike recovery pass

Serial Dilution: ASB2C - cobalt 30.0% , post digestion spike recovery passes

Serial Dilution: 13SD2 - calcium 12.6% , post digestion spike recovery pass

11.0 Field Duplicate Samples		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?	x			x			x			x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.												
11.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report		x			x							

Note: _____

12.0 Result Verification/ Internal Standards/ Tune		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?	x			x			x			x		
12.2	Were all dilution reflected in the positive results and detection limits?	x			x			x			x		
12.3	Were the Internal Standard recoveries within 30-120%	x			x								
12.4	Were the tunes run at a minimum of four times with RSD < 5% for analytes in solution?	x											
12.5	Were the tune mass calibrations < 0.1 amu from the true value?	x											
12.6	Was the resolution check peak width < 0.9 amu at 10% peak height?	x											

Note: _____

Several metals by 6010B and lead by 6020 were analyzed straight and then at dilution due to the presence of high target concentrations

13.0 Completeness Calculation		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
13.1	Is % completeness within the control limits? (Control limit 90%)	x			x			x			x		
13.1.1	Number of samples: 18												
13.1.2	Number of target compounds in each analysis: various												
13.1.3	Number of results rejected and not reported: 0												
	% Completeness = (13.1.1 x 13.1.2 - 13.1.3) x 100/(13.1.1 x 13.1.2)												
	% Completeness = 100%	100%			100%			100%			100%		

Note: _____

Cart 1
602-R-12

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1140 000058

Project Number	Project Name
89604 317	TCFAAP

Project Contact (Name and Phone Number): Doreen Frame (804) 765 9008

Samplers: Brett Fisher / John Spangler

LAB: Test-America

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, [redacted])	Dioxin/Furan(8290)	TAL Metals (Including Mercury) / CN	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	[redacted]	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
375G1 B	10/10/03 915	5		X	5	F	/	3	X														346012
EQB5	10/10/03 945	5		X	4	HPC	/	14	X	X	X	X	X	X		X						X	346013
Trip Blank	10/10/03 945 T							2	X														346014
	TIME for TB added - WR 10/13/03																						

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
Brett Fisher	10/10/03 1800				
Relinquished by:	Date/time	Received by: (for lab) John Spangler	Date/Time 10/11/03 08:45	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

36440-6

23-1

Cart 602-R-12

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1139

000059

Project Number	Project Name
09604317	RFAAP

Project Contact (Name and Phone Number): Darren Renne (804) 965 9000

Samplers: Brett Fisher / John Spaylen

LAB: Tri-Matrix

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, [redacted])	Dioxin/Furan(8290)	TAL Metals (Including Mercury) /CN	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	~~Pulp Filter (1663)~~ Herb	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
EQB 6	10/10/03 1100	J		X	4	ASC EF	U	14	X	X	X	X	X	X		X						X	346015
Trip Blank	10/10/03 1100							2	X														346016
	TimE for TB added - wrk 10/13/03																						

Box #1	Box #2	Box #3	Box #4
1. Surface Water 2. Ground Water 3. Leachate 4. Rinsate 5. Soil Sediment/Sludge 6. Trip Blank 7. Oil 8. Waste 9. Other _____	A. HCl + Ice B. HNO3 + Ice C. NaOH + Ice D. H2SO4 + Ice E. Unpreserved F. Ice Only G. Other _____ H. NaHSO4 + Ice I. ZnAc + NaOH + Ice	F. Filtered U. Unfiltered	R. Rush - 3 Day S. Standard 28 Day T. Timely 14 Day O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
Brett Fisher	10/10/03 1800				
Relinquished by:	Date/time	Received by: (for lab) JAF	Date/Time 10/11/03 08:45	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

36440-6

23-1

TMO 616

VOC Rack # 400, 602-R-12
Carts 4 + 1

Radford Army Ammunition Plant
Chain Of Custody Record

Vol Soil Fridge No 1111

Project Number	Project Name
69604 317	RFAAP

Project Contact (Name and Phone Number): Darren Rentz (804) 765 9000

Samplers: Brett Fisher / John Spangler

LAB: Tri-Matrix

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330)	Dioxin/Furan(8290)	TAL Metals (Including Mercury) (ICP)	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	Paint Filter (9095B)	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
1355D3	10/10/03 1300	5		X	5	F	/	5	X	X	X			X		X							346017
5DD1	10/10/03 —	5		X	5	F	/	5	X	X	X			X		X							346018
1355D2	10/10/03 1400	5		X	5	F	/	5	X	X	X			X		X							346019
1355D2MS	10/10/03 1400	5		X	5	F	/	5	X	X	X			X		X							—
1355D2MSD	10/10/03 1400	5		X	5	F	/	5	X	X	X			X		X							—

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
[signature]	10/10/03 800				
Relinquished by:	Date/time	Received by: (for lab) JAF	Date/Time 10/11/03 08:45	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

36440-6

23-1

TM0086 3

Radford Army Ammunition Plant
Chain Of Custody Record

Nº 1116

000061

Project Number	Project Name
96043.17	RFAAP

Project Contact (Name and Phone Number): Darren Reese (804) 765-9000

Samplers: Brett Fisher / John Sparks

LAB: Tri-Matrix

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	ANALYSES: TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, [illegible])	Dioxin/Furan(8290)	TAL Metals (Including Mercury) /CN	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	Paint Filter (9095B)	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
155W3	10/10/03 1300	5		X	1	BC EF	F/U	14		X	X			X		X				3	60	20	Metals also filtered

Box #1			Box #2			Box #3		Box #4	
1.	Surface Water	6. Trip Blank	A.	HCl + Ice	F. Ice Only	F.	Filtered	R.	Rush - 3 Day
2.	Ground Water	7. Oil	B.	HNO3 + Ice	G. Other _____	U.	Unfiltered	S.	Standard 28 Day
3.	Leachate	8. Waste	C.	NaOH + Ice	H. NaHSO4 + Ice			T.	Timely 14 Day
4.	Rinsate	9. Other _____	D.	H2SO4 + Ice	I. ZnAc + NaOH + Ice			O.	Other _____
5.	Soil Sediment/Sludge		E.	Unpreserved					

Relinquished by:	Date/Time	Received by:	Relinquished by:	Date/Time	Received by:
[signature]	10/10/03 1800				
Relinquished by:	Date/time	Received by: (for lab) JAF	Date/Time 10/11/03 08:45	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

36440-6

23-1

TM0435

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1117 00062

Project Number	Project Name
960317	RFAAP

Project Contact (Name and Phone Number): Darren Keene (804) 965 9000

Samplers: Brett Fisher / John Spagna

LAB: TH: Matrix

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	ANALYSES: TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, [redacted])	Dioxin/Furan(8290)	TAL Metals (Including Mercury) /CN	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	Paint Filter (9095B)	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
SWD1	10/10/03	5		X	1	BC EF	F/U	14		X	X			X		X					346021		Metals also filtered

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
[signature]	10/10/03 1800				
Relinquished by:	Date/time	Received by: (for lab) JAF	Date/Time 10/11/03 08:45	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

36440-6

23-1

TM0166

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1113

000063

Project Number	Project Name
09604 317	RFAAP

Project Contact (Name and Phone Number): Darren Renna (804)965-9000

Samplers: Brett Fisher / John Snyder

LAB: Tri-Matrix

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, 8332)	Dioxin/Furan(8290)	TAL Metals (Including Mercury)/CN	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	Paint Filter (9095B)	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
135WS	10/10/03 1300	5		X	1	ABC EF	F/U		X														Metals filtered —
135WD1	10/10/03 —	5		X	1	↓	↓	JAF	X														as well —
135WS2	10/10/03 1400	5		X	1			(14)	X	X	X			X		X							346022
135WS2 MS	10/10/03 1400	5		X	1				X														—
135WS2 MSD	10/10/03 1400	5		X	1	↓	↓		X														—
TRIP BLANK	10/10/03	1400						2	X														

added by us 10/16/03

Box #1			Box #2			Box #3	Box #4	
1. Surface Water	6. Trip Blank		A. HCl + Ice	F. Ice Only		F. Filtered	R. Rush - 3 Day	
2. Ground Water	7. Oil		B. HNO3 + Ice	G. Other _____		U. Unfiltered	S. Standard 28 Day	
3. Leachate	8. Waste		C. NaOH + Ice	H. NaHSO4 + Ice			T. Timely 14 Day	
4. Rinsate	9. Other _____		D. H2SO4 + Ice	I. ZnAc + NaOH + Ice			O. Other _____	
5. Soil Sediment/Sludge			E. Unpreserved					

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
Brett Fisher	10/10/03 1800				
Relinquished by:	Date/time	Received by: (for lab) JAF	Date/Time 10/11/03 08:45	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

36440-6

23-1

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1114

000064

Project Number	Project Name
09604-317	RFAAP

Project Contact (Name and Phone Number): Darren Renne (804) 965 9000

Samplers: Brett Fisher / John Spayler

LAB:

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, [redacted])	Dioxin/Furan(8290)	TAL Metals (Including Mercury) /CN	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	Paint Filter (9095B)	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
13SW2M3	10/10/03 1400	S		X	1	BC EF	F/U	14		X	X			X		X							Metals filtered as well.

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
[signature]	10/10/03 1800				
Relinquished by:	Date/time	Received by: (for lab) JAF	Date/Time 10/11/03 08:45	**NOTE:** Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

36440-6

23-1

TM0579

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1115

000065

Project Number	Project Name
09604317	RFAAP

Project Contact (Name and Phone Number): Darren Reese (804) 965 9000

Samplers: Brett Fisher / John Spagher

LAB:

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, 8332)	Dioxin/Furan(8290)	TAL Metals (Including Mercury) /CN	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	Paint Filter (9095B)	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
135W2 MSD	10/10/03 1400	5		X	1	BC EF	F/U	14		X	X			X		X							Metals also filtered

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
[signature]	10/10/03 1800				
Relinquished by:	Date/time	Received by: (for lab) JAF	Date/Time 10/11/03 08:45	**NOTE:** Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

23-1

TM0380

Cart 7
TM0128

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1118

000081

Project Number	Project Name
09604317	SSP

Project Contact (Name and Phone Number): Darren Renn 804 965 9000

Samplers: John Spangler

LAB: Trimatrix

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, [redacted])	Dioxin/Furan(8290)	TAL Metals (Including Mercury)/CN	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	Paint Filter (9095B)	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
A5D1A	10/11/03 8:45			X	5	F	-	5	X	X	X			X		X							
A5B1B	10/11/03 9:00			X	5	F	-	5	X	X	X			X		X							
A5B1C	9:15			X	5	F	-	5	X	X	X			X		X							
A5B3A	12:00			X	5	F	-	5	X	X	X			X		X							
A5B3B	12:15			X	5	F	-	5	X	X	X			X		X							
A5B3C	12:30			X	5	F	-	5	X	X	X			X		X							

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
[signature]	10/13/03 1400				
Relinquished by:	Date/time	Received by: (for lab) [signature]	Date/Time 10/14/03 9:30		

NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement

36440-6

Cart 7
TM0621

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1119

Project Number	Project Name
09601317	RFAAP SSP

Project Contact (Name and Phone Number): Darren Renne

Samplers: J Spangler

LAB: TRIMATRIX

AIRBILL No:

Courier:

ANALYSES

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, [illegible])	Dioxin/Furan(8290)	TAL Metals (Including Mercury) /CN	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	~~Paint Filter (9095B)~~ HerB	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
ASB2A	10-11-03 10:15	S		X	5	F	-	7	X	X	X	X	X	X		X						X	
ASB2B	10:30	S		X	5	F	-	5	X	X	X			X		X							
SBD-10	—	S		X	5	F	-	5	X	X	X			X		X							
ASB2C	11:15	S		X	5	F	.	5	X	X	X			X		X							
ASB2C-MS	11:15	S		X	5	F	.	5	X	X	X			X		X							—
ASB2C-MSD	11:15	S		X	5	F	.	5	X	X	X			X		X							—

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
J Spangler	10/13/03 1400				
Relinquished by:	Date/time	Received by: (for lab) Jai Plakos	Date/Time 10/14/03 9:30	**NOTE:** Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

27-9

36440-6

2

DataChem Laboratories

PETN and Nitroglycerin

DATA VALIDATION REPORT - Level III Review

SDG No.: 03E-0424-01 **Fraction:** PETN_&_Nitroglycerin

Lab: TriMatrix **Project Name:** Radford_SSP

Reviewer: AS **Date:** February_3,_2004

This report presents the findings of a review of the referenced data. The report consists of this summary, copies of data reports with data qualifying flags applied (as required), the completed data validation checklist, supporting documentation, and an explanation of the data qualifying flags employed. The review performed is based on the USEPA Region III Modifications to the National Functional Guidelines for Data Review as pertains to the specifics of the analytical methods employed and provisions of the approved project-specific Quality Assurance Project Plan (QAPP).

Major Anomalies: None.

Minor Anomalies: None.

Correctable Anomalies: The laboratory incorrectly interpreted the field identification symbol 'S' for '5'. The field sample identifications were manually corrected by the data reviewer. The units displayed on the sample results forms were 'ug/g'. Since the project reporting units of 'mg/Kg' is the same as 'ug/g', the data reviewer manually entered 'or mg/Kg' on the sample result forms.

Comments: All data are usable, as qualified, for their intended purpose based on the data reviewed.

Signed: Andrea Sansom

Andrea Sansom

DATA CHEM LABORATORIES
A Sorenson Company

COVER PAGE

ANALYTICAL REPORT FOR
URS Group, Inc.

Form COVER-V1.4
10060315052560
Page 1

G039001M

DCL Report Group..: **03E-0424-01**

Date Printed.....: 06-OCT-03 15:05

Project Protocol #: P021C002
Client Ref Number.: Subcontract DCL-09
Release Number....: 09604-317

Analysis Method(s): 8332

URS Group, Inc.
Attention: Mr. J Darren Renne
5540 Falmouth Street
Suite 201
Richmond, VA 23229

Client Sample Name	Laboratory Sample Name	Date Sampled	Date Received
Method Blank	BL-211265-1	NA	NA
LCS	QC-211265-1	NA	NA
FSB1A	03E04093	30-SEP-03	01-OCT-03
FSB1B	03E04094	30-SEP-03	01-OCT-03
FSB1C	03E04095	30-SEP-03	01-OCT-03
FSB2A	03E04096	30-SEP-03	01-OCT-03
FSB2AMS	03E04096MS	30-SEP-03	01-OCT-03
FSB2AMSD	03E04096MSD	30-SEP-03	01-OCT-03
FSB2B	03E04097	30-SEP-03	01-OCT-03
SBD-1	03E04098	30-SEP-03	01-OCT-03
FSB2C	03E04099	30-SEP-03	01-OCT-03

Analyst: Gloria W. Heung — Date 10/6/03

Reviewer: Thomas T McKay — Date 10/9/03

Lab Supervisor: Richard W. Wade — Date 10/9/03

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COVER PAGE

ANALYTICAL REPORT FOR
URS Group, Inc.

Form COVER-V1.4
10080317203891
Page 1

G039100B

DCL Report Group..: **03E-0426-01**

Date Printed.....: 08-OCT-03 17:20

Project Protocol #: P021C002
Client Ref Number.: Subcontract DCL-09
Release Number....: 09604-317

Analysis Method(s): 8332

URS Group, Inc.
Attention: Mr. J Darren Renne
5540 Falmouth Street
Suite 201
Richmond, VA 23229

VALUE CHANGES
AS 2/2/2004

Client Sample Name	Laboratory Sample Name	Date Sampled	Date Received
FSB3A	03E04106	01-OCT-03	02-OCT-03
FSB3B	03E04107	01-OCT-03	02-OCT-03
FSB3C	03E04108	01-OCT-03	02-OCT-03
46SB1A	03E04109	01-OCT-03	02-OCT-03
46SB1B	03E04110	01-OCT-03	02-OCT-03
46SB1C	03E04111	01-OCT-03	02-OCT-03
~~465B2A~~ 46SB2A	03E04112	01-OCT-03	02-OCT-03
~~465B2B~~ 46SB2B	03E04113	01-OCT-03	02-OCT-03
~~465B2C~~ 46SB2C	03E04114	01-OCT-03	02-OCT-03
SBD2	03E04115	01-OCT-03	02-OCT-03
~~375B1A~~ 37SB1A	03E04116	01-OCT-03	02-OCT-03
Method Blank	BL-211265-1	NA	NA
LCS	QC-211265-1	NA	NA

Analyst: Gloria W. Heung — Date: 10-9-03 / ~~10/8/03~~ 10-9-03 GH

Reviewer: Thomas T McKay — Date: 10/9/03

Lab Supervisor: Richard W. Wade — Date: 10/9/02

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DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

Form RLIMS63A-V1.4
10060315052560
Page 3

S0390063

Date Printed.....: 06-OCT-03 15:05

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 01-OCT-03 00:00

Client Sample Name: **FSB1A**
DCL Sample Name...: **03E04093**
DCL Report Group..: **03E-0424-01**

Matrix.....: SOIL
Date Sampled.....: 30-SEP-03 14:00
Reporting Units...: ug/g or mg/kg ts 2/4/04
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 16.9

DCL Preparation Group: G039100L
Date Prepared.....: 02-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

DCL Analysis Group: G039100L
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	03-OCT-03 14:16	0.268	ND		U	1	1.20
Nitroglycerin	03-OCT-03 14:16	0.195	ND		U	1	0.602

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S0390064

Date Printed.....: 06-OCT-03 15:05

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 01-OCT-03 00:00

DCL Preparation Group: G039100L
Date Prepared.....: 02-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: FSB1B
DCL Sample Name...: 03E04094
DCL Report Group..: 03E-0424-01

Matrix.....: SOIL
Date Sampled.....: 30-SEP-03 14:15
Reporting Units....: ug/g or mg/kg TS 2/3/04
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 24.3

DCL Analysis Group: G039100L
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	03-OCT-03 14:38	0.295	ND		U	1	1.32
Nitroglycerin	03-OCT-03 14:38	0.214	ND		U	1	0.661

007

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006

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S0390065

Date Printed.....: 06-OCT-03 15:05

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 01-OCT-03 00:00

Client Sample Name: **FSB1C**
DCL Sample Name...: **03E04095**
DCL Report Group..: **03E-0424-01**

Matrix.....: SOIL
Date Sampled.....: 30-SEP-03 14:30
Reporting Units...: ug/g or mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 36.7

DCL Preparation Group: G039100L
Date Prepared.....: 02-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

DCL Analysis Group: G039100L
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	03-OCT-03 15:01	0.352	ND		U	1	1.58
Nitroglycerin	03-OCT-03 15:01	0.256	ND		U	1	0.790

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DATA CHEM LABORATORIES
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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S0390066

Date Printed.....: 06-OCT-03 15:05

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 01-OCT-03 00:00

Client Sample Name: FSB2A
DCL Sample Name...: 03E04096
DCL Report Group..: 03E-0424-01

Matrix.....: SOIL
Date Sampled.....: 30-SEP-03 15:00
Reporting Units....: ug/g or mg/kg ts 2/3/04
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 26.7

DCL Preparation Group: G039100L
Date Prepared.....: 02-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

DCL Analysis Group: G039100L
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	03-OCT-03 15:24	0.304	ND		U	1	1.36
Nitroglycerin	03-OCT-03 15:24	0.221	ND		U	1	0.682

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S0390069

Date Printed.....: 06-OCT-03 15:05

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 01-OCT-03 00:00

DCL Preparation Group: G039100L
Date Prepared.....: 02-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **FSB2B**
DCL Sample Name...: **03E04097**
DCL Report Group..: **03E-0424-01**

Matrix.....: SOIL
Date Sampled.....: 30-SEP-03 15:15
Reporting Units...: ug/g or mg/kg ks 2/3/04
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 18.4

DCL Analysis Group: G039100L
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	03-OCT-03 16:55	0.273	ND		U	1	1.23
Nitroglycerin	03-OCT-03 16:55	0.199	ND		U	1	0.613

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039006B

Date Printed.....: 06-OCT-03 15:05

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 01-OCT-03 00:00

DCL Preparation Group: G039100L
Date Prepared.....: 02-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **SBD-1**
DCL Sample Name...: **03E04098**
DCL Report Group..: **03E-0424-01**

Matrix.....: SOIL
Date Sampled.....: 30-SEP-03 00:00
Reporting Units...: ug/g or mg/kg 4/21/04
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 10.8

DCL Analysis Group: G039100L
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	03-OCT-03 17:18	0.250	ND		U	1	1.12
Nitroglycerin	03-OCT-03 17:18	0.182	ND		U	1	0.561

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039006C

Date Printed.....: 06-OCT-03 15:05

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 01-OCT-03 00:00

DCL Preparation Group: G039100L
Date Prepared.....: 02-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **FSB2C**
DCL Sample Name...: **03E04099**
DCL Report Group..: **03E-0424-01**

Matrix.....: SOIL
Date Sampled.....: 30-SEP-03 00:00
Reporting Units...: ug/g or mg/kg 12/3/04
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 20.0

DCL Analysis Group: G039100L
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	03-OCT-03 17:41	0.279	ND		U	1	1.25
Nitroglycerin	03-OCT-03 17:41	0.203	ND		U	1	0.625

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DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039100K

Date Printed.....: 08-OCT-03 17:20

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 02-OCT-03 00:00

DCL Preparation Group: G039100L
Date Prepared.....: 02-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 GM
Net Weight/Volume....: Not Required

Client Sample Name: **FSB3A**
DCL Sample Name...: **03E04106**
DCL Report Group..: **03E-0426-01**

Matrix.....: SOIL
Date Sampled.....: 01-OCT-03 08:00
Reporting Units...: ug/g or mg/kg ✓ 2/3/04
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 14.5

DCL Analysis Group: G039100L
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	03-OCT-03 18:04	0.261	ND		U	1	1.17
Nitroglycerin	03-OCT-03 18:04	0.189	ND		U	1	0.585

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039100L

Date Printed.....: 08-OCT-03 17:20

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 02-OCT-03 00:00

DCL Preparation Group: G039100L
Date Prepared.....: 02-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 GM
Net Weight/Volume....: Not Required

Client Sample Name: **FSB3B**
DCL Sample Name...: **03E04107**
DCL Report Group..: **03E-0426-01**

Matrix.....: SOIL
Date Sampled.....: 01-OCT-03 08:15
Reporting Units...: ug/g or mg/kg 2/3/04
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 16.1

DCL Analysis Group: G039100L
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	03-OCT-03 18:27	0.266	ND		U	1	1.19
Nitroglycerin	03-OCT-03 18:27	0.193	ND		U	1	0.596

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DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039100M

Date Printed.....: 08-OCT-03 17:20

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 02-OCT-03 00:00

DCL Preparation Group: G039100L
Date Prepared.....: 02-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 GM
Net Weight/Volume....: Not Required

Client Sample Name: **FSB3C**
DCL Sample Name...: **03E04108**
DCL Report Group..: **03E-0426-01**

Matrix.....: SOIL
Date Sampled.....: 01-OCT-03 08:30
Reporting Units...: ug/g or mg/kg 3/2/04
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 31.2

DCL Analysis Group: G039100L
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	03-OCT-03 18:49	0.324	ND		U	1	1.45
Nitroglycerin	03-OCT-03 18:49	0.235	ND		U	1	0.727

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DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039100N

Date Printed.....: 08-OCT-03 17:20

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 02-OCT-03 00:00

DCL Preparation Group: G039100L
Date Prepared.....: 02-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 GM
Net Weight/Volume....: Not Required

Client Sample Name: **46SB1A**
DCL Sample Name...: **03E04109**
DCL Report Group..: **03E-0426-01**

Matrix.....: SOIL
Date Sampled.....: 01-OCT-03 12:10
Reporting Units....: ug/g or mg/kg *2/3/04
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 17.0

DCL Analysis Group: G039100L
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	03-OCT-03 19:35	0.269	ND		U	1	1.20
Nitroglycerin	03-OCT-03 19:35	0.195	ND		U	1	0.602

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039100P

Date Printed.....: 08-OCT-03 17:20

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 02-OCT-03 00:00

DCL Preparation Group: G039100L
Date Prepared.....: 02-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 GM
Net Weight/Volume....: Not Required

Client Sample Name: **46SB1B**
DCL Sample Name...: **03E04110**
DCL Report Group..: **03E-0426-01**

Matrix.....: SOIL
Date Sampled.....: 01-OCT-03 12:20
Reporting Units...: ug/g or mg/kg ds 2/3/04
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 28.5

DCL Analysis Group: G039100L
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	03-OCT-03 19:58	0.312	ND		U	1	1.40
Nitroglycerin	03-OCT-03 19:58	0.227	ND		U	1	0.699

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039100Q

Date Printed.....: 08-OCT-03 17:20

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 02-OCT-03 00:00

DCL Preparation Group: G039100L
Date Prepared.....: 02-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 GM
Net Weight/Volume....: Not Required

Client Sample Name: 46SB1C
DCL Sample Name...: 03E04111
DCL Report Group..: 03E-0426-01

Matrix.....: SOIL
Date Sampled.....: 01-OCT-03 12:50
Reporting Units...: ug/g or mg/kg ts 2/3/04
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 23.6

DCL Analysis Group: G039100L
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	03-OCT-03 20:21	0.292	ND		U	1	1.31
Nitroglycerin	03-OCT-03 20:21	0.212	ND		U	1	0.654

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A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039100R

Date Printed.....: 08-OCT-03 17:20

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 02-OCT-03 00:00

DCL Preparation Group: G039100L
Date Prepared.....: 02-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 GM
Net Weight/Volume....: Not Required

Client Sample Name: ~~465B2A~~ 4/2/04 46SB2A
DCL Sample Name...: 03E04112
DCL Report Group..: 03E-0426-01

Matrix.....: SOIL
Date Sampled.....: 01-OCT-03 13:25
Reporting Units...: ug/g or mg/kg 4/2/04
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 19.7

DCL Analysis Group: G039100L
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	03-OCT-03 20:44	0.278	ND		U	1	1.25
Nitroglycerin	03-OCT-03 20:44	0.202	ND		U	1	0.623

VALUE CHANGES

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039100S

Date Printed.....: 08-OCT-03 17:20

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 02-OCT-03 00:00

DCL Preparation Group: G039100L
Date Prepared.....: 02-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 GM
Net Weight/Volume....: Not Required

As 2/2/2004
Client Sample Name: ~~465B2B~~ 46SB2B
DCL Sample Name...: 03E04113
DCL Report Group..: 03E-0426-01

Matrix.....: SOIL
Date Sampled.....: 01-OCT-03 13:40
Reporting Units...: ug/g or mg/kg As 2/3/04
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 20.4

DCL Analysis Group: G039100L
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	03-OCT-03 21:08	0.280	ND		U	1	1.26
Nitroglycerin	03-OCT-03 21:08	0.204	ND		U	1	0.628

VALUE CHANGES

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039100T

Date Printed.....: 08-OCT-03 17:20

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 02-OCT-03 00:00

DCL Preparation Group: G039100L
Date Prepared.....: 02-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 GM
Net Weight/Volume....: Not Required

Client Sample Name: ~~465B2C~~ 465B2C
DCL Sample Name...: 03E04114
DCL Report Group..: 03E-0426-01

Matrix.....: SOIL
Date Sampled.....: 01-OCT-03 13:50
Reporting Units...: ug/g or mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 36.1

DCL Analysis Group: G039100L
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	03-OCT-03 21:31	0.349	ND		U	1	1.56
Nitroglycerin	03-OCT-03 21:31	0.254	ND		U	1	0.782

VALUE CHANGES

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

Form RLIMS63A-V1.4
10080317203891
Page 12

S039100V

Date Printed.....: 08-OCT-03 17:20

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 02-OCT-03 00:00

DCL Preparation Group: G039100L
Date Prepared.....: 02-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 GM
Net Weight/Volume....: Not Required

Client Sample Name: SBD2
DCL Sample Name...: 03E04115
DCL Report Group..: 03E-0426-01

Matrix.....: SOIL
Date Sampled.....: 01-OCT-03 00:00
Reporting Units...: ug/g or mg/kg 12/3/04
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 35.9

DCL Analysis Group: G039100L
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	03-OCT-03 21:55	0.348	ND		U	1	1.56
Nitroglycerin	03-OCT-03 21:55	0.253	ND		U	1	0.780

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039100W

Date Printed.....: 08-OCT-03 17:20

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 02-OCT-03 00:00

DCL Preparation Group: G039100L
Date Prepared.....: 02-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 GM
Net Weight/Volume....: Not Required

Client Sample Name: ~~375B1A~~ 375B/A
DCL Sample Name...: 03E04116
DCL Report Group..: 03E-0426-01

Matrix.....: SOIL
Date Sampled.....: 01-OCT-03 15:30
Reporting Units...: ug/g or mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 28.7

DCL Analysis Group: G039100L
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	03-OCT-03 22:18	0.313	ND		U	1	1.40
Nitroglycerin	03-OCT-03 22:18	0.227	ND		U	1	0.701

VALUE CHANGES

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DATA VALIDATION WORKSHEET

Explosives

Reviewer: AS
Date: January-04
DV Level: II III IV
Review Document:

X Region III Modified for National Functional Guidelines
___ NFG for organic Data review (February 1994)
X Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: DataChem
SDG No.: 03E-0424-01 & 426-01
Test Name: Explosives
Method No.: 8332-HPLC

1.0 Laboratory Deliverables

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. % solids		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes:

2.0 Holding Times

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	Action: If the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyese, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%	x		
	For initial Calibration: for %RSD > ±20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?	x		
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?			x
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.			x
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 40-150%?		x	
6.4	Are there any RPDs outside the QC limits not to exceed 60%?		x	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

7.0 Laboratory Control Sample (LCS)

		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 40-150%?		x	
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?			x
	Action: If Yes, J(+) only.			

Notes:

8.0 Field Duplicate

		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

	SBD1	FSB2B		SBD2	46SB2C
PETN	ND	ND		ND	ND
nitroglycerin	ND	ND		ND	ND

9.0 Compound Identification and Detection Limit Verification

		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.			x
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.			x
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	x		

Notes:

10.0 Data Completeness

			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		x		
	Number of samples:	18			
	Number of target compounds in each analysis:	2			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

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FORM F (TYPE I)
SINGLE METHOD ANALYSES

QUALITY CONTROL DATA SHEET
MATRIX SPIKE SAMPLE
MATRIX SPIKE DUPLICATE SAMPLE


S0390067

Client Name.....: URS Group, Inc.
Release Number.....: 09604-317

Matrix.....: SOIL
Reporting Units.....: ug/g

DCL Preparation Group: G039100L
Date Prepared.....: 02-OCT-03 00:00
Preparation Method...: 8332

DCL Sample Name...: **03E04096MS**
Date Printed.....: 06-OCT-03 15:05

DCL Analysis Group: G039100L
Analysis Method...: OL-SW-8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

QC Limit Type.....: Method

Analytical Results

Analyte	Date Analyzed	Sample Result	Spiked Result	Spike Added	Percent Recovery	QC Limits	QC Flag
PETN	03-OCT-03 15:47	ND	15.8	20.0	79.2	65.0/125.	
Nitroglycerin	03-OCT-03 15:47	ND	14.8	20.0	73.8	65.0/125.	


S0390068

DCL Sample Name...: **03E04096MSD**

Analytical Results

Analyte	Date Analyzed	Duplicate Result	Percent Recovery	Mean	Range	RPD	QC Limits	QC Flag
PETN	03-OCT-03 16:10	16.6	82.8	16.2	0.725	4.5	0.00/35.0	
Nitroglycerin	03-OCT-03 16:10	15.8	79.1	15.3	1.06	6.9	0.00/35.0	

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DATA CHEM LABORATORIES
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ANALYTICAL REPORT

10080309513755X

Date _____
Laboratory Group Name 03E-0432-03
Account No. 08001

URS
Attention: Andrea Sansom
849 Intermountain Dr.
Sutie 320
Linthicum, MD 21090

FAX (410) 859-5202
Telephone (410) 859-5049
E-mail Andrea_Sansom@URScorp.com

Sampling Collection and Shipment

Sampling Site 09604-317 Date of Collection October 03, 2003

Date Samples Received at Laboratory October 04, 2003

Analysis

Method of Analysis XX-EP-800

Date(s) of Analysis October 08, 2003

Analytical Results

Field Sample Number	Laboratory Number	Sample Type	MOISTURE %							
38SB2A	03E04150	SOIL	14.0							
38SB2A	03E04150MD	SOIL	13.9							
38SB2B	03E04151	SOIL	15.5							
SBD4	03E04152	SOIL	26.9							
38SB2C	03E04153	SOIL	5.1							
38SB1A	03E04154	SOIL	28.5							
38SB1B	03E04155	SOIL	24.2							
38SB1C	03E04156	SOIL	22.7							
38SB3A	03E04157	SOIL	32.8							
38SB3B	03E04158	SOIL	18.8							
38SB3C	03E04159	SOIL	18.0							
Limit of Detection										

† See comment on last page.
ND Parameter not detected above LOD.
NR Parameter not requested.
NA Parameter not applicable.

** See comment on last page.
( ) Parameter between LOD and LOQ.

Norman Breese
Analyst: Norman Breese

Reviewer: Michael J. Schwendiman

DATA CHEM LABORATORIES
A Sorenson Company

ANALYTICAL REPORT

Form ARF-AL
Page 1 of 2
Part 1 of 1
10080309341575X

Date _____
Laboratory Group Name 03E-0429-03
Account No. 08001

URS
Attention: Andrea Sansom
849 Intermountain Dr.
Sutie 320
Linthicum, MD 21090

FAX (410) 859-5202
Telephone (410) 859-5049
E-mail Andrea_Sansom@URScorp.com

Sampling Collection and Shipment

Sampling Site 09604-317 Date of Collection October 02, 2003

Date Samples Received at Laboratory October 03, 2003

Analysis

Method of Analysis XX-EP-800

Date(s) of Analysis October 08, 2003

Analytical Results

Field Sample Number	Laboratory Number	Sample Type	MOISTURE %							
37SB2A	03E04126	SLUDGE	56.4							
37SB2AMD	03E04126MD	SLUDGE	57.6							
Limit of Detection										

† See comment on last page.
ND Parameter not detected above LOD.
NR Parameter not requested.
NA Parameter not applicable.

** See comment on last page.
( ) Parameter between LOD and LOQ.

Analyst: Norman Breese

Reviewer: Michael J. Schwendiman

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FAX (801) 268-9992 E-mail: lab@datachem.com

DATA CHEM LABORATORIES
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ANALYTICAL REPORT

10080309273673X

Date _____
Laboratory Group Name 03E-0426-02
Account No. 08001

URS
Attention: Andrea Sansom
849 Intermountain Dr.
Sutie 320
Linthicum, MD 21090

FAX (410) 859-5202
Telephone (410) 859-5049
E-mail Andrea_Sansom@URScorp.com

Sampling Collection and Shipment

Sampling Site 09604-317 Date of Collection October 01, 2003

Date Samples Received at Laboratory October 02, 2003

Analysis

Method of Analysis XX-EP-800

Date(s) of Analysis October 08, 2003

Analytical Results

Field Sample Number	Laboratory Number	Sample Type	MOISTURE %							
FSB3A	03E04106	SOIL	14.5							
FSB3A	03E04106MD	SOIL	14.2							
FSB3B	03E04107	SOIL	16.1							
FSB3C	03E04108	SOIL	31.2							
46SB1A	03E04109	SOIL	17.0							
46SB1B	03E04110	SOIL	28.5							
46SB1C	03E04111	SOIL	23.6							
465B2A	03E04112	SOIL	19.7							
465B2B	03E04113	SOIL	20.4							
465B2C	03E04114	SOIL	36.1							
SBD2	03E04115	SOIL	35.9							
375B1A	03E04116	SOIL	28.7							
Limit of Detection										

† See comment on last page.
ND Parameter not detected above LOD.
NR Parameter not requested.
NA Parameter not applicable.

** See comment on last page.
( ) Parameter between LOD and LOQ.

Analyst: Norman Breese

Reviewer: Michael J. Schwendiman

This report contains 10 pages

Date of Extraction:	OCT 2, 2003	DataChem Laboratories Extraction Notebook	Book # Ext 246 Page#
Account #(s):	8001		
DCL Set ID(s):	03E-0424-01, 0426-01		Matrix: SOIL
Group/Lot ID:	G039100L		Method: 8332

	DCL Sample ID	Field ID	Initial Vol. / WT	Initial pH	Adj pH		Surr. Added	Matrix Spike		Final Volume
1	BL-211265-1	BL-211265-1	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
2	QC-211265-1	QC-211265-1	1.0gm	N/A	N/A	N/A	1mL	1mL	----	2mL
3	03E04093	FSB1A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
4	03E04094	FSB1B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
5	03E04095	FSB1C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
6	03E04096	FSB2A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
7	03E04096MS	FSB2AMS	1.0gm	N/A	N/A	N/A	1mL	1mL	----	2mL
8	03E04096MSD	FSB2AMSD	1.0gm	N/A	N/A	N/A	1mL	1mL	----	2mL
9	03E04097	FSB2B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
10	03E04098	SBD-1	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
11	03E04099	FSB2C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
12	03E04106	FSB3A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
13	03E04107	FSB3B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
14	03E04108	FSB3C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
15	03E04109	46SB1A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
16	03E04110	46SB1B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
17	03E04111	46SB1C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
18	03E04112	465B2A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
19	03E04113	465B2B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
20	03E04114	465B2C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
21	03E04115	SBD2	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
22	03E04116	375B1A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
23										
24										
25										
26										
27										
28										
29										
30										
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										

Solvents:	MeCN	CH016	Comments:
Surrogate Spike:	239 ws 3	1/30/04 By:	
Matrix Spike:	239 ws 2	1/30/04 By:	
Matrix Spike:	----------	---------- By:	
Extractionist:	Bonnie Yan	10/2/03	
Checker:	Wen Yang	10/02/03	Sonicators tunned by:

*=Entry Error

DATA CHEM
LABORATORIES, INC.
A SORENSON COMPANY

37, 38, 46, F

Case Narrative

Method:	SW-846 8332	**Client:**	URS
Analysis:	Nitroglycerin, PETN	**Account:**	8001
Preparation SOP #:	OL-SW-8332	**Matrix:**	Soil
Analysis SOP#:	OL-SW-8332		
DCL Set ID's:	03E-0424-01		
	03E-0426-01		

RECEIVED
BY JS DATE 10/15/03

General Set Information: This set contained eighteen soil samples, a method blank, a laboratory control sample (LCS), a matrix spiked sample (MS) and a matrix spike duplicate.

Method Summary: A 1.0 gram portion of the soil samples was weighed, transferred into a suitable container, and 2 ml of acetonitrile was added. The samples were placed in an ultrasonic bath for a minimum of one hour. The samples were allowed to settle and the supernatant was filtered through a 0.45µ PTFE filter. One part acetonitrile extract was mixed with one part of a 1% calcium chloride solution, then injected into an HP1050 HPLC equipped with UV detection and a Phenomenex Ultracarb ODS C18 column. The instrument was adjusted to the proper operating parameters and allowed to equilibrate until a stable baseline was established. Initial calibration standards were analyzed and linear calibration curves were generated from the data. A continuing calibration standard was analyzed at the beginning of sample analysis, after each ten samples, and at the end of the analysis. The response of the continuing calibration standard must be within method limits when compared to the initial calibration curve.

Samples and QCs were analyzed under identical conditions as those used for initial and continuing calibration. Quantitation was based on calibration curves using the initial calibration standards. Results were reported in units of µg/g.

Sample Preparation: No anomalies were observed during the preparation of the samples.

Holding Times: The samples were prepared and analyzed within method required hold times.

Dilution(s): None.

This report contains
47 pages

Quality Control Data:

Blank: No confirmed method analytes were detected in the method blank above half of the CRDL.

Laboratory Control Samples: All recoveries met the method limits.

Surrogate Recovery: Surrogate recoveries were acceptable.

MS/MSD: Matrix spiking was performed on sample 03E04096. All percent recoveries and RPDs were within method limits.

Instrument QC: All initial and continuing calibration verification samples met method criteria.

Flagging Codes: The "U" flag indicates that the analyte was not detected at or above the MDL level. The "J" flag indicates that a value reported between the MDL and CRDL.

NC/CAR: None.

Miscellaneous Comments: None.

Confirmation Analyses: Any sample with a positive result above the MDL was qualitatively analyzed for confirmation on a second column. For samples requiring confirmation, one part acetonitrile extract was mixed with one part of a 1% calcium chloride solution, then injected into an HP1050 HPLC equipped with UV detection and a Phenomenex Synergi Polar-RP column. The instrument was adjusted to the proper operating parameters and allowed to equilibrate until a stable baseline was established. A CCV standard was run to establish retention times and a standard at a level near the reporting limits was run to verify low level sensitivity. The second column analyses were used for qualitative confirmation of analytes based on retention time. If a positive result is confirmed, the quantitative result from the primary column is reported.

Gloria W. Heung 10-9-03

Gloria W. Heung Date

03E-0424

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1074

Project Number	Project Name
09604-317	RFAAP

Project Contact (Name and Phone Number): Darren Renne (804) 965-9000

Samplers: Brett Fisher / John Spangler

LAB: Data Chem

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8332)	Dioxin/Furan(8290)	TAL Metals (Including Mercury)	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	Paint Filter (9095B)	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
FSB1A	9/30/03 1400	S		X	5	F	/	1						X									03E04093
FSB1B	9/30/03 1415	S		X	5	F	/	1						X									94
FSB1C	9/30/03 1430	S		X	5	F	/	1						X									95
FSB2A	9/30/03 1500	S		X	5	F	/	1						X									96
FSB2A MS	9/30/03 1500	S		X	5	F	/	1						X									96ms
FSB2A MSD	9/30/03 1500	S		X	5	F	/	1						X									96msD
FSB2B	9/30/03 1515	S		X	5	F	/	1						X									97
SBD-1	9/30/03	S		X	5	F	/	1						X									98
FSB2C	9/30/03	S		X	5	F	/	1						X									99

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
Brett [signature]	9/30/03	FedEx			
Relinquished by: FedEx	Date/time 10/1/03 0845	Received by: (for lab) [signature] R-33-1	Date/Time		

NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement

DATACHEM LABORATORIES CLIENT-RELATED INFORMATION REPORT (CRIR)

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill In or Circle)

Client Name: URS

Project/Task/Site: 03E-0424

Date/Time of Receipt: 10/1/03 0845

Number of Coolers Received: 1

Condition of Coolers: (Acceptable)/Unacceptable

Custody Seals: (Present)/Absent/NA

(Intact)/Broken/NA

Tamper Evident: Yes/(No)/NA

Ice Present: (Yes)/No/NA

(Frozen)/Melted/NA

Temperature Control: (Present)/Not Included

Location Temp Taken: (Control)/Between Samples

Are all temperatures within project specific guidelines? (Yes)/No/NA

Are all applicable pHs within specific guidelines? Yes/No/(NA)

PH Check:							
	Metals	Yes/No/NA	Total Phenolics	Yes/No/NA	NO3/NO2	Yes/No/NA
	Cyanide	Yes/No/NA	TPH – 418.1	Yes/No/NA	Oil & Grease	Yes/No/NA
	Sulfide	Yes/No/NA	COD	Yes/No/NA	Total Phosphorous	Yes/No/NA
	Ammonia	Yes/No/NA	TKN	Yes/No/NA	Gross A.B, Gamma Spec	Yes/No/NA

Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.
1	C03- 0426	2 °C	4	C03-	°C	7	C03-	°C
2	C03-	°C	5	C03-	°C	8	C03-	°C
3	C03-	°C	6	C03-	°C	9	C03-	°C

Taken By: _____ (Signature) J. Pate (Printed Name) 10/1/03 (Date)

CLIENT-RELATED INFORMATION

- ☐ Missing Cooler
- ☐ Cooler Conditions
- ☐ Missing Paperwork
- ☐ Missing/Incorrect Bottle labels
- ☐ Missing Samples/Bottles
- ☐ Broken/Leaking Samples
- ☐ Incorrect Bottle Type
- ☐ Cooler Temperatures Out of range
- ☐ Incorrect Preservation
- ☐ pH Criteria Not Met
- ☐ Head Space in Bottles
- ☐ Insufficient Sample Volume
- ☐ Chain of Custody Problems
- ☐ Other:

EPA Custody Seal:

BRIEFLY DESCRIBE THE PROBLEM AND THE ACTION TAKEN:

Date 9/30/03 FedEx Tracking Number 832942539734

Sender's Name Brent Eisler Phone 804 965-9000

Company DAMES & MOORE/URS/CRC

Address 5540 FALMOUTH ST STE 201 Dept/Floor/Suite/Room

Faxed to Client? YES ☐ NO ☐

RICHMOND State VA ZIP 23230

Response Req'd

PROJEC Your Internal Billing Reference 09604-317

PROJECT MANAGER COMMENTS:

DCL Project Manager: _____ (Printed Name) Returned to Sample Receipt by: _____ (Signature) Date: _____

SLC/CRIR.doc

Revised 6/28/01

Earliest Sampling Date: 30-Sep-2003

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 15-Oct-2003

Project/Job/Task: P021C002 | *Split:* | **Root Set ID:** 03E-0424 * | **Reporting Group**

Client: URS | **Account:** 08001

Comments:

Verified: 10/2/03

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Customer ID 2	Analysis 01 Nitroglycerin/PETN by 8332	Analysis 02 Moisture	# Bottles
30-Sep-2003	FSB1A	03E04093			SOIL		X	X	1
30-Sep-2003	FSB1B	03E04094			SOIL		X	X	1
30-Sep-2003	FSB1C	03E04095			SOIL		X	X	1
30-Sep-2003	FSB2A	03E04096			SOIL		X	X	1
30-Sep-2003	FSB2AMS	03E04096MS		MS	SOIL		X	X JP 10/2/03	1
30-Sep-2003	FSB2AMSD	03E04096MSD		MSD	SOIL		X	X JP	1
30-Sep-2003	FSB2B	03E04097			SOIL		X	X	1
30-Sep-2003	SBD-1	03E04098			SOIL		X	X	1
30-Sep-2003	FSB2C	03E04099			SOIL		X	X	1
30-Sep2003	FSB2AMD	03E04096MD		MD	SOIL	JP 10/2/03		X	

R33-1 SA

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Walk-in/ Room/ Shelf/ Fridge	10/2 12:55		

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

Check box if there is a continuation page ☐

Printed 10/1/2003 16:30

Form: COFC1.01-SWV2.30

Earliest Sampling Date: 30-Sep-2003

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 15-Oct-2003

Project/Job/Task: P021C002 | *Split:* | **Root Set ID:** 03E-0424* | **Reporting Group**

Client: URS | **Account:** 08001

Comments:

Verified: Quinton Green 10/2/03

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Customer ID 2	Analysis 01 Nitroglycerin/PETN by 8332	Analysis 02 Moisture	# Bottles
30-Sep-2003	FSB1A	03E04093			SOIL		X	X	1
30-Sep-2003	FSB1B	03E04094			SOIL		X	X	1
30-Sep-2003	FSB1C	03E04095			SOIL		X	X	1
30-Sep-2003	FSB2A	03E04096			SOIL		X	X	1
30-Sep-2003	FSB2AMS	03E04096MS		MS	SOIL		X	X JP 10/2/03	1
30-Sep-2003	FSB2AMSD	03E04096MSD		MSD	SOIL		X	X JP	1
30-Sep-2003	FSB2B	03E04097			SOIL		X	X	1
30-Sep-2003	SBD-1	03E04098			SOIL		X	X	1
30-Sep-2003	FSB2C	03E04099			SOIL		X	X	1
30-Sep-2003	FSB2AMD	03E04096MD		MD	Soil			X	

JP 10/2/03

R33-1 SA

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Walk-in/ Room/ Shelf/ Fridge R-33-1 NB	10-02-03 15:00	Norman Brace	0/4 moisture & Solids - MCB 10/2/03
Norman Brace	10-02-03 15:56	R-319-1 NB	storage

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

Check box if there is a continuation page ☐

Printed 10/1/2003 16:30

Form: COFC1.01-SWV2.30

03E-0426

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1076

Project Number	Project Name
9601-317	RFNAP

Project Contact (Name and Phone Number): Doreen Payne (804) 765-9060

Samplers: Brent Fisher / John Spangler

LAB: Datachem

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, 8332) PETN/NG	Dioxin/Furan(8290)	TAL Metals (Including Mercury)	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	Paint Filter (9095B)	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
FSB3A	10/1/03 900	5		X	S	F	/	1						X									03E04106
FSB3B	10/1/03 915	5		X	S	F	/	1						X									07
FSB3C	10/1/03 930	5		X	S	F	/	1						X									08
465B1A	10/1/03 1210	5		X	S	F	/	1						X									09
465B1B	10/1/03 1220	5		X	S	F	/	1						X									10
465B1C	10/1/03 1250	5		X	S	F	/	1						X									11
465B2A	10/1/03 1325	5		X	S	F	/	1						X									12
465B2B	10/1/03 1340	5		X	S	F	/	1						X									13
465B2C	10/1/03 1350	5		X	S	F	/	1						X									14
SBD2	10/1/03 —	5		X	S	F	/	1						X									15
375B1A	10/1/03 1530	5		X	S	F	/	1						X									16
375B1B	10/1/03 1545	5		X	S	F	/	1						X									17
375B1C	10/1/03 1600	5		X	S	F	/	1						X									18

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
Brent Fisher	10/1/03 1800	FedEx			
Relinquished by: FedEx	Date/time 10/2/03 0900	Received by: (for lab) R-33-1	Date/Time	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

DATACHEM LABORATORIES CLIENT-RELATED INFORMATION REPORT (CRIR)

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill In or Circle)

Client Name: CRS

Project/Task/Site: 03E-0426

Date/Time of Receipt: 10/2/03 0900

Number of Coolers Received: 1

Condition of Coolers: (Acceptable)/Unacceptable

Custody Seals: (Present)/Absent/NA

(Intact)/Broken/NA

Tamper Evident: Yes/(No)/NA

Ice Present: (Yes)/No/NA

(Frozen)/Melted/NA

Temperature Control: (Present)/Not Included

Location Temp Taken: (Cooler)/Between Samples

Are all temperatures within project specific guidelines? (Yes)/No/NA

Are all applicable pHs within specific guidelines? Yes/(No)/NA

PH Check:								
	Metals	Yes/No/NA	Total Phenolics	Yes/No/NA	NO3/NO2	Yes/No/NA		
	Cyanide	Yes/No/NA	TPH – 418.1	Yes/No/NA	Oil & Grease	Yes/No/NA		
	Sulfide	Yes/No/NA	COD	Yes/No/NA	Total Phosphorous	Yes/No/NA		
	Ammonia	Yes/No/NA	TKN	Yes/No/NA	Gross A.B, Gamma Spec	Yes/No/NA		

Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.
1	C03- 0428	3 °C	4	C03-	°C	7	C03-	°C
2	C03-	°C	5	C03-	°C	8	C03-	°C
3	C03-	°C	6	C03-	°C	9	C03-	°C

Taken By: _____ (Signature) J. Pate (Printed Name) 10/2/03 (Date)

CLIENT-RELATED INFORMATION

- ☐ Missing Cooler
- ☐ Cooler Conditions
- ☐ Missing Paperwork
- ☐ Missing/Incorrect Bottle labels
- ☐ Missing Samples/Bottles
- ☐ Broken/Leaking Samples
- ☐ Incorrect Bottle Type
- ☐ Cooler Temperatures Out of range
- ☐ Incorrect Preservation
- ☐ pH Criteria Not Met
- ☐ Head Space in Bottles
- ☐ Insufficient Sample
- ☐ Chain of Custody Problems
- ☐ Other:

EPA Custody Seal:

BRIEFLY DESCRIBE THE PROBLEM AND THE ACTION TAKEN:

Date 10/1/03 FedEx Tracking Number 832942539013

Sender's Name Brett Fisher Phone 804 965-9000

Company DAMES & MOORE/URS/CRC

Address 5540 FALMOUTH ST STE 201 Dept/Floor/Suite/Room

City RICHMOND State VA ZIP 23230

Faxed to Client? YES ☐ NO ☐

Response Requi

Your Internal Billing Reference 09604-317

PROJECT

PROJECT MANAGER COMMENTS:

DCL Project Manager: _____ (Printed Name) Returned to Sample Receipt by: _____ (Signature) Date: _____

Earliest Sampling Date: 1-Oct-2003

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 16-Oct-2003

Project/Job/Task: P021C002 | *Split:* | **Root Set ID:** 03E-0426 * | **Reporting Group**

Client: URS | **Account:** 08001

Comments:

Verified: Quinton Green 10/2/03

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Customer ID 2	Analysis 03 Nitroglycerin/PETN by 8332	Analysis 04 Moisture	# Bottles
1-Oct-2003	~~375B1B~~	~~03E04117~~			~~SOIL~~ → CANCEL 10/6/03		X	X	1
1-Oct-2003	375B1C → B	03E04118			SOIL		X	X	1
	PR 10/6/03								

2B 3B

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Walk-in/ Room/ Shelf/ Fridge			

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

Printed 10/2/2003 10:57

Check box if there is a continuation page ☐

Form: COFC1.01-SWV2.30

Earliest Sampling Date: 1-Oct-2003

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 16-Oct-2003

Project/Job/Task: P021C002 | *Split:* | **Root Set ID:** 03E-0426 * | **Reporting Group**

Account: 08001

Client: URS

Comments:

Verified: [signature] 10/2/03

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Customer ID 2	Analysis 01 Nitroglycerin/PETN by 8332	Analysis 02 Moisture	# Bottles
1-Oct-2003	FSB3A	03E04106			SOIL		X	X	1
1-Oct-2003	FSB3B	03E04107			SOIL		X	X	1
1-Oct-2003	FSB3C	03E04108			SOIL		X	X	1
1-Oct-2003	46SB1A	03E04109			SOIL		X	X	1
1-Oct-2003	46SB1B	03E04110			SOIL		X	X	1
1-Oct-2003	46SB1C	03E04111			SOIL		X	X	1
1-Oct-2003	465B2A	03E04112			SOIL		X	X	1
1-Oct-2003	465B2B	03E04113			SOIL		X	X	1
1-Oct-2003	465B2C	03E04114			SOIL		X	X	1
1-Oct-2003	SBD2	03E04115			SOIL		X	X	1

R-33-1 Cart 3P

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Walk-in/ Room/ Shelf/ Fridge R-33-1 MB	10/02/03 14:30	Norman Brewer	% moisture
Norman Brewer	10/02/03 15:18	R-318-1 MB	storage cart

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

Printed 10/2/2003 10:5

Check box if there is a continuation page ☐

Form: COFC1.01-SWV2.30

Earliest Sampling Date: 1-Oct-2003

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 16-Oct-2003

Project/Job/Task: P021C002 | *Split:* | **Root Set ID:** 03E-0426 * | **Reporting Group**

Account: 08001

Client: URS

Comments:

Verified: 10/2/03

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Customer ID 2	Analysis 01 Nitroglycerin/PETN by 8332	Analysis 02 Moisture	# Bottles
1-Oct-2003	375B1A	03E04116			SOIL		X	X	1

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

R-33-1 Cart-3P

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Walk-in/ Room/ Shelf/ Fridge R-33-1 NB	10/07/03 14:30	Norman Bruce	% moisture
Norman Bruce	10/07/03 15:18	R-319-1 NB	cart storage

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

Printed 10/2/2003 10:56

Check box if there is a continuation page ☐

Form: COFC1.01-SWV2.30

Fax To: URS - Andrea Sansom
(410)859-5202
Date Faxed:_____

Radford SSP

Corrective Action Log

Laboratory: DATACHEM LABORATORIES
Instrument: HPLC/UV
Method: EPA 532

Sample Date: 10/1/03
Analysis Date: _____

Project Number/ Batch Number	Affected Samples	Excursions	Criteria Comparison	Corrective Action Proposed
9604-317	375B1B 375B1C			SAMPLE 375B1B WAS removed as per Andrea Sansom's request. SAMPLE 375B1C WAS renamed 375B1B and analyzed. SET ID 03E-0426-03

Reviewed By: _____
Section Supervisor Date

Reviewed By: _____
QA/QC Officer Date

Reviewed By: _____
Project Supervisor Date

Pope, Paul E.

From: Andrea_Sansom@URSCorp.com
Sent: Friday, October 03, 2003 8:06 AM
To: roudebushw@trimatrixlabs.com; Mikesell, Tim; Pope, Paul E.
Cc: Darren_Renne@URSCorp.com
Subject: Radford SSP 37SB on hold

The samples that you have on hold:

discard 37SB1B
relabel 37SB1C as 37SB1B and analyze this sample

Samples that you receive today:

discard 37SB1B
analyze 37SB1C

After you have done this you should end up with 37SB1A and 37SB1B from one sample date and 37SB1C from the next sampling day.

Data Qualifying Codes

Two types of data qualifying codes or flags are applied in the course of the data review. The data validation flags indicate data that are not usable for decision-making, more than normally biased and/or variable, or not representative of field conditions. These codes and their definitions are presented below in the hierarchy stipulated in the USEPA Region III Modifications to the National Functional Guidelines for Data Review (September 1994).

Data Validation Flags

Flag	Interpretation
R	Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.
U	Not detected. The associated number indicates the approximate sample concentration is necessary to be detected.
B	Not detected substantially above the level reported in laboratory or field blanks.
N	Tentative Identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.
J	Analyte present. Reported value may not be accurate or precise.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
UL	Not detected, quantitation limit is probably higher.
NT	Not tested, no analytical result provided.

The other type of code used by URS is a "Reason Code". The reason code indicates the type of quality control failure that led to the application of the data validation flag.

Reason Codes

GC/MS Organics		GC and HPLC Organics		Inorganics and Conventionals	
Code	Interpretation	Code	Interpretation	Code	Interpretation
a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence
b	Bubble found in vial >6mm	b	Instrument performance failure	c	Calibration failure
c	Calibration failure; poor or unstable response	c	Calibration failure; poor or unstable response	d	MS/MSD imprecision
d	MS/MSD imprecision	d	MS/MSD imprecision	e	LCSD imprecision
e	LCSD imprecision	e	LCSD imprecision	f	Field duplicate imprecision
f	Field duplicate imprecision	f	Field duplicate imprecision	h	Holding time violation
h	Holding time violation	g	Dual column confirmation imprecision	k	Laboratory duplicate imprecision
i	Internal standard failure	h	Holding time violation	l	LCS recovery failure
j	Tuning failure or poor mass spectrometer performance	i	Internal standard failure	m	MS/MSD recovery failure
l	LCS recovery failure	l	LCS recovery failure	n	ICS failure
m	MS/MSD recovery failure	m	MS/MSD recovery failure	o	Calibration blank contamination
p	Poor chromatography	p	Poor chromatography	p	Preparation blank contamination
q	Concentration exceeded the linear range of the instrument	q	Concentration exceeded the linear range	q	Concentration exceeded the linear range
r	Linearity failure in initial calibration	r	Linearity failure in initial calibration	r	Linearity failure in calibration or MSA
s	Surrogate failure	s	Surrogate failure	s	Serial dilution failure
t	TIC	u	No confirmation column	v	Post-digestion spike failure
w	Identification criteria failure	w	Retention time failure	w	CRDL Standard Failure
x	Field blank contamination	x	Field blank contamination	x	Field blank contamination
y	Trip blank contamination	z	Method blank contamination	z	Laboratory storage blank contamination
z	Method blank contamination				

DATA VALIDATION REPORT - Level III Review

SDG No.: 03E-0426-03 **Fraction:** PETN_&_Nitroglycerin

Lab: TriMatrix **Project Name:** Radford_SSP

Reviewer: AS **Date:** February_3,_2004

This report presents the findings of a review of the referenced data. The report consists of this summary, copies of data reports with data qualifying flags applied (as required), the completed data validation checklist, supporting documentation, and an explanation of the data qualifying flags employed. The review performed is based on the USEPA Region III Modifications to the National Functional Guidelines for Data Review as pertains to the specifics of the analytical methods employed and provisions of the approved project-specific Quality Assurance Project Plan (QAPP).

Major Anomalies: None.

Minor Anomalies: None.

Correctable Anomalies: None.

Comments: All data are usable, as qualified, for their intended purpose based on the data reviewed.

Signed: Andrea Sansom

Andrea Sansom

DATA CHEM LABORATORIES
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COVER PAGE

ANALYTICAL REPORT FOR
URS Group, Inc.

Form COVER-V1.4
10100313391949
Page 1

G039100J

DCL Report Group..: **03E-0426-03**

Date Printed.....: 10-OCT-03 13:39

Project Protocol #: P021C002
Client Ref Number.: Subcontract DCL-09
Release Number....: 09604-317

Analysis Method(s): 8332

URS Group, Inc.
Attention: Mr. J Darren Renne
5540 Falmouth Street
Suite 201
Richmond, VA 23229

Client Sample Name	Laboratory Sample Name	Date Sampled	Date Received
Method Blank	BL-211275-1	NA	NA
LCS	QC-211275-1	NA	NA
37SB1B	03E04118	01-OCT-03	02-OCT-03

Analyst: Gloria W. Heung — 10/10/03 Date

Reviewer: Thomas T McKay — 10/13/03 Date

Lab Supervisor: Richard W. Wade — 10/14/03 Date

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DATA CHEM LABORATORIES
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ANALYTICAL REPORT FOR
URS Group, Inc.

Form COVER-V1.4
10100313423758
Page 1

G039200R

DCL Report Group..: **03E-0429-02**

Date Printed.....: 10-OCT-03 13:42

Project Protocol #: P021C002
Client Ref Number.: Subcontract DCL-09
Release Number....: 09604-317

Analysis Method(s): 8332

URS Group, Inc.
Attention: Mr. J Darren Renne
5540 Falmouth Street
Suite 201
Richmond, VA 23229

Client Sample Name	Laboratory Sample Name	Date Sampled	Date Received
37SB2A	03E04126	02-OCT-03	03-OCT-03
37SB2AMS	03E04126MS	02-OCT-03	03-OCT-03
37SB2AMSD	03E04126MSD	02-OCT-03	03-OCT-03
Method Blank	BL-211275-1	NA	NA
LCS	QC-211275-1	NA	NA

Analyst: Gloria W. Heung — Date: 10-10-03

Reviewer: Thomas T McKay — Date: 10/13/03

Lab Supervisor: Richard W. Wade — Date: 10/14/03

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DATA CHEM LABORATORIES
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ANALYTICAL REPORT FOR URS

Phone(410) 859-5049 Fax(410) 859-5202
E-mail: Andrea_Sansom@URScorp.com

G039500J

DCL Report Group..: **03E-0432-02**

Date Printed.....: 10-OCT-03 13:42

Project Protocol #: P021C002
Client Ref Number.: 09604-317
Release Number....: 09604-317

Analysis Method(s): 8332

URS
Attention: Andrea Sansom
849 Intermountain Dr.
Sutie 320
Linthicum, MD 21090

Client Sample Name	Laboratory Sample Name	Date Sampled	Date Received
38SB2A	03E04150	03-OCT-03	04-OCT-03
38SB2B	03E04151	03-OCT-03	04-OCT-03
SBD4	03E04152	03-OCT-03	04-OCT-03
38SB2C	03E04153	03-OCT-03	04-OCT-03
38SB1A	03E04154	03-OCT-03	04-OCT-03
38SB1B	03E04155	03-OCT-03	04-OCT-03
38SB1C	03E04156	03-OCT-03	04-OCT-03
38SB3A	03E04157	03-OCT-03	04-OCT-03
38SB3B	03E04158	03-OCT-03	04-OCT-03
38SB3C	03E04159	03-OCT-03	04-OCT-03
Method Blank	BL-211275-1	NA	NA
LCS	QC-211275-1	NA	NA

Gloria W. Heung — Analyst: Gloria W. Heung — 10-10-03 — Date

Thomas T McKay — Reviewer: Thomas T McKay — 10/13/03 — Date

Richard W. Wade — Lab Supervisor: Richard W. Wade — 10/14/03 — Date

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039102N

Date Printed.....: 10-OCT-03 13:39

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 02-OCT-03 00:00

DCL Preparation Group: G039601B
Date Prepared.....: 07-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **37SB1B**
DCL Sample Name...: **03E04118**
DCL Report Group..: **03E-0426-03**

Matrix.....: SOIL
Date Sampled.....: 01-OCT-03 16:00
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 15.4

DCL Analysis Group: G039601B
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Quál.	Dilution	CRDL
PETN	09-OCT-03 15:44	0.264	ND		U	1	1.18
Nitroglycerin	09-OCT-03 15:44	0.191	ND		U	1	0.591

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039200Y

Date Printed.....: 10-OCT-03 13:42

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 03-OCT-03 00:00

DCL Preparation Group: G039601B
Date Prepared.....: 07-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **37SB2A**
DCL Sample Name...: **03E04126**
DCL Report Group..: **03E-0429-02**

Matrix.....: SLUDGE
Date Sampled.....: 02-OCT-03 09:30
Reporting Units...: mg/kg
Report Basis.....: ☐As Received ☒Dried
Percent Moisture..: 56.4

DCL Analysis Group: G039601B
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒Primary
☐Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	09-OCT-03 16:06	0.511	ND		U	1	2.29
Nitroglycerin	09-OCT-03 16:06	0.372	ND		U	1	1.15

SAMPLE ANALYSIS DATA SHEET

S039500P

Date Printed.....: 10-OCT-03 13:42

Client Name.....: URS
Client Ref Number....: 09604-317
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 04-OCT-03 00:00

DCL Preparation Group: G039601B
Date Prepared.....: 07-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **38SB2A**
DCL Sample Name...: **03E04150**
DCL Report Group..: **03E-0432-02**

Matrix.....: SOIL
Date Sampled.....: 03-OCT-03 08:50
Reporting Units...: mg/Kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 14.0

DCL Analysis Group: G039601B
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	09-OCT-03 17:11	0.259	ND		U	1	1.16
Nitroglycerin	09-OCT-03 17:11	0.188	ND		U	1	0.581

DATA CHEM LABORATORIES
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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039500Q

Date Printed.....: 10-OCT-03 13:42

Client Name.....: URS
Client Ref Number....: 09604-317
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 04-OCT-03 00:00

DCL Preparation Group: G039601B
Date Prepared.....: 07-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **38SB2B**
DCL Sample Name...: **03E04151**
DCL Report Group..: **03E-0432-02**

Matrix.....: SOIL
Date Sampled.....: 03-OCT-03 09:00
Reporting Units...: mg/Kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 15.5

DCL Analysis Group: G039601B
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	09-OCT-03 17:33	0.264	ND		U	1	1.18
Nitroglycerin	09-OCT-03 17:33	0.192	ND		U	1	0.592

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039500R

Date Printed.....: 10-OCT-03 13:42

Client Name.....: URS
Client Ref Number....: 09604-317
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 04-OCT-03 00:00

DCL Preparation Group: G039601B
Date Prepared.....: 07-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **SBD4**
DCL Sample Name...: **03E04152**
DCL Report Group..: **03E-0432-02**

Matrix.....: SOIL
Date Sampled.....: 03-OCT-03 00:00
Reporting Units...: mg/Kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 26.9

DCL Analysis Group: G039601B
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	09-OCT-03 17:55	0.305	ND		U	1	1.37
Nitroglycerin	09-OCT-03 17:55	0.222	ND		U	1	0.684

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SAMPLE ANALYSIS DATA SHEET



Date Printed.....: 10-OCT-03 13:42

Client Name.....: URS
Client Ref Number....: 09604-317
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 04-OCT-03 00:00

DCL Preparation Group: G039601B
Date Prepared.....: 07-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **38SB2C**
DCL Sample Name...: **03E04153**
DCL Report Group..: **03E-0432-02**

Matrix.....: SOIL
Date Sampled.....: 03-OCT-03 09:10
Reporting Units...: mg/Kg
Report Basis.....: ☐As Received ☒Dried
Percent Moisture..: 5.1

DCL Analysis Group: G039601B
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒Primary
☐Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	09-OCT-03 18:39	0.235	ND		U	1	1.05
Nitroglycerin	09-OCT-03 18:39	0.171	ND		U	1	0.527

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039500T

Date Printed.....: 10-OCT-03 13:42

Client Name.....: URS
Client Ref Number....: 09604-317
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 04-OCT-03 00:00

DCL Preparation Group: G039601B
Date Prepared.....: 07-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **38SB1A**
DCL Sample Name...: **03E04154**
DCL Report Group..: **03E-0432-02**

Matrix.....: SOIL
Date Sampled.....: 03-OCT-03 10:45
Reporting Units...: mg/Kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 28.5

DCL Analysis Group: G039601B
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	09-OCT-03 19:01	0.312	ND		U	1	1.40
Nitroglycerin	09-OCT-03 19:01	0.227	ND		U	1	0.699

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039500V

Date Printed.....: 10-OCT-03 13:42

Client Name.....: URS
Client Ref Number....: 09604-317
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 04-OCT-03 00:00

DCL Preparation Group: G039601B
Date Prepared.....: 07-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **38SB1B**
DCL Sample Name...: **03E04155**
DCL Report Group..: **03E-0432-02**

Matrix.....: SOIL
Date Sampled.....: 03-OCT-03 11:00
Reporting Units...: mg/Kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 24.2

DCL Analysis Group: G039601B
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	09-OCT-03 19:22	0.294	ND		U	1	1.32
Nitroglycerin	09-OCT-03 19:22	0.214	ND		U	1	0.660

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DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039500W

Date Printed.....: 10-OCT-03 13:42

Client Name.....: URS
Client Ref Number....: 09604-317
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 04-OCT-03 00:00

DCL Preparation Group: G039601B
Date Prepared.....: 07-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **38SB1C**
DCL Sample Name...: **03E04156**
DCL Report Group..: **03E-0432-02**

Matrix.....: SOIL
Date Sampled.....: 03-OCT-03 11:20
Reporting Units...: mg/Kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 22.7

DCL Analysis Group: G039601B
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	09-OCT-03 19:44	0.288	ND		U	1	1.29
Nitroglycerin	09-OCT-03 19:44	0.210	ND		U	1	0.647

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DATA CHEM LABORATORIES
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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039500X

Date Printed.....: 10-OCT-03 13:42

Client Name.....: URS
Client Ref Number....: 09604-317
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 04-OCT-03 00:00

DCL Preparation Group: G039601B
Date Prepared.....: 07-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **38SB3A**
DCL Sample Name...: **03E04157**
DCL Report Group..: **03E-0432-02**

Matrix.....: SOIL
Date Sampled.....: 03-OCT-03 12:00
Reporting Units...: mg/Kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 32.8

DCL Analysis Group: G039601B
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	09-OCT-03 20:06	0.332	ND		U	1	1.49
Nitroglycerin	09-OCT-03 20:06	0.241	ND		U	1	0.744

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DATA CHEM LABORATORIES
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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039500Y

Date Printed.....: 10-OCT-03 13:42

Client Name.....: URS
Client Ref Number....: 09604-317
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 04-OCT-03 00:00

DCL Preparation Group: G039601B
Date Prepared.....: 07-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **38SB3B**
DCL Sample Name...: **03E04158**
DCL Report Group..: **03E-0432-02**

Matrix.....: SOIL
Date Sampled.....: 03-OCT-03 12:15
Reporting Units...: mg/Kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 18.8

DCL Analysis Group: G039601B
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	09-OCT-03 20:28	0.275	ND		U	1	1.23
Nitroglycerin	09-OCT-03 20:28	0.200	ND		U	1	0.616

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FAX (801) 268-9992 E-mail: lab@datachem.com

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039500Z

Date Printed.....: 10-OCT-03 13:42

Client Name.....: URS
Client Ref Number....: 09604-317
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 04-OCT-03 00:00

DCL Preparation Group: G039601B
Date Prepared.....: 07-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **38SB3C**
DCL Sample Name...: **03E04159**
DCL Report Group..: **03E-0432-02**

Matrix.....: SOIL
Date Sampled.....: 03-OCT-03 12:30
Reporting Units...: mg/Kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 18.0

DCL Analysis Group: G039601B
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	09-OCT-03 20:50	0.272	ND		U	1	1.22
Nitroglycerin	09-OCT-03 20:50	0.198	ND		U	1	0.610

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DATA VALIDATION WORKSHEET

Explosives

Reviewer: AS
Date: January-04
DV Level: II III IV

Review Document:

_X_ Region III Modified for National Functional Guidelines
___ NFG for organic Data review (February 1994)
_X_ Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: DataChem
SDG No.: 03E-042603,042902,043202
Test Name: Explosives
Method No.: 8332-HPLC

1.0 Laboratory Deliverables

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. % solids		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes:

2.0 Holding Times

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	Action: If the temperature of the cooler was elevated (> 10 ^{O}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyese, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%	x		
	For initial Calibration: for %RSD > ±20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?	x		
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?			x
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.			x
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 40-150%?		x	
6.4	Are there any RPDs outside the QC limits not to exceed 60%?		x	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

7.0 Laboratory Control Sample (LCS)

		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 40-150%?		x	
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?			x
	Action: If Yes, J(+) only.			

Notes:

8.0 Field Duplicate

		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

	SBD4	38SB2B
PETN	ND	ND
nitroglycerin	ND	ND

9.0 Compound Identification and Detection Limit Verification

		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.			x
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.			x
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	x		

Notes:

10.0 Data Completeness

			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		x		
	Number of samples:	12			
	Number of target compounds in each analysis:	2			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

DATA CHEM LABORATORIES
A Sorenson Company

FORM F (TYPE I)
SINGLE METHOD ANALYSES

QUALITY CONTROL DATA SHEET
MATRIX SPIKE SAMPLE
MATRIX SPIKE DUPLICATE SAMPLE


S039200Z

Client Name.....: URS Group, Inc.
Release Number.....: 09604-317

Matrix.....: SOIL
Reporting Units.....: mg/Kg

DCL Preparation Group: G039601B
Date Prepared.....: 07-OCT-03 00:00
Preparation Method...: 8332

DCL Sample Name...: **03E04126MS**
Date Printed.....: 10-OCT-03 13:39

DCL Analysis Group: G039601B
Analysis Method...: OL-SW-8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

QC Limit Type.....: Method

Analytical Results

Analyte	Date Analyzed	Sample Result	Spiked Result	Spike Added	Percent Recovery	QC Limits	QC Flag
PETN	09-OCT-03 16:28	ND	14.1	20.0	70.7	65.0/125.	
Nitroglycerin	09-OCT-03 16:28	ND	15.4	20.0	76.9	65.0/125.	


S0392010

DCL Sample Name...: **03E04126MSD**

Analytical Results

Analyte	Date Analyzed	Duplicate Result	Percent Recovery	Mean	Range	RPD	QC Limits	QC Flag
PETN	09-OCT-03 16:50	13.1	65.7	13.6	1.00	7.3	0.00/35.0	
Nitroglycerin	09-OCT-03 16:50	14.9	74.4	15.1	0.496	3.3	0.00/35.0	

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Bmg 10/7/03

Date of Extraction:	OCT 7, 2003
Account #(s):	8001
DCL Set ID(s):	03E-0432-02 -0429.02 0426.03
Group/Lot ID:	G039601B

DataChem Laboratories Extraction Notebook

Book #	Ext 246	Page#
Matrix:	SOIL	
Method:	8332	

	DCL Sample ID	Field ID	Initial Vol. / WT	Initial pH	Adj pH		Surr. Added	Matrix Spike		Final Volume
1	BL-211275-1	BL-211275-1	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
2	QC-211275-1	QC-211275-1	1.0gm	N/A	N/A	N/A	1mL	1mL	----	2mL
3	03E04118	37SB1B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
4	03E04126	37SB2A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
5	03E04126MS	37SB2AMS	1.0gm	N/A	N/A	N/A	1mL	1mL	----	2mL
6	03E04126MSD	37SB2AMSD	1.0gm	N/A	N/A	N/A	1mL	1mL	----	2mL
7	03E04150	38SB2A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
8	03E04151	38SB2B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
9	03E04152	SBD4	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
10	03E04153	38SB2C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
11	03E04154	38SB1A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
12	03E04155	38SB1B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
13	03E04156	38SB1C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
14	03E04157	38SB3A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
15	03E04158	38SB3B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
16	03E04159	38SB3C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
17										
18										
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Bmg 10/7/03

Solvents:	MeCN	CH016	Comments:
Surrogate Spike:	239 ws 3	1/30/04 By: Bmg	
Matrix Spike:	239 ws 2	11/30/04 By: Bmg	
Matrix Spike:	----------	----------By:	
Extractionist:	Bming Yang	10/7/03	
Checker:	Bmg	10/7/03	Sonicators tunned by:

*=Entry Error

37, 38

DATA CHEM LABORATORIES, INC.
A SORENSON COMPANY

RECEIVED
DATE 10/15/03

Case Narrative

Method:	SW-846 8332	**Client:**	URS
Analysis:	Nitroglycerin, PETN	**Account:**	8001
Preparation SOP #:	OL-SW-8332	**Matrix:**	Solid
Analysis SOP#:	OL-SW-8332		
DCL Set ID's:	03E-0426-03		
	03E-0429-02		
	03E-0432-02		

General Set Information: This lot contained twelve solid samples, a method blank, a laboratory control sample (LCS), a matrix spiked sample (MS) and a matrix spike duplicate.

Method Summary: A 1.0 gram portion of the soil samples was weighed, transferred into a suitable container, and 2 ml of acetonitrile was added. The samples were placed in an ultrasonic bath for a minimum of one hour. The samples were allowed to settle and the supernatant was filtered through a 0.45µ PTFE filter. One part acetonitrile extract was mixed with one part of a 1% calcium chloride solution, then injected into an HP1050 HPLC equipped with UV detection and a Phenomenex Ultracarb ODS C18 column. The instrument was adjusted to the proper operating parameters and allowed to equilibrate until a stable baseline was established. Initial calibration standards were analyzed and linear calibration curves were generated from the data. A continuing calibration standard was analyzed at the beginning of sample analysis, after each ten samples, and at the end of the analysis. The response of the continuing calibration standard must be within method limits when compared to the initial calibration curve.

Samples and QCs were analyzed under identical conditions as those used for initial and continuing calibration. Quantitation was based on calibration curves using the initial calibration standards. Results were reported in units of µg/g.

Sample Preparation: No anomalies were observed during the preparation of the samples.

Holding Times: The samples were prepared and analyzed within method required hold times.

Dilution(s): None.

This report contains
45 pages

Quality Control Data:

Blank: No confirmed method analytes were detected in the method blank above half of the CRDL.

Laboratory Control Samples: All recoveries met the method limits.

Surrogate Recovery: Surrogate recoveries were acceptable.

MS/MSD: Matrix spiking was performed on sample 03E04126. All percent recoveries and RPDs were within method limits.

Instrument QC: All initial and continuing calibration verification samples met method criteria.

Flagging Codes: The "U" flag indicates that the analyte was not detected at or above the MDL level. The "J" flag indicates that a value reported between the MDL and CRDL.

NC/CAR: None.

Miscellaneous Comments: None.

Confirmation Analyses: Any sample with a positive result above the MDL was qualitatively analyzed for confirmation on a second column. For samples requiring confirmation, one part acetonitrile extract was mixed with one part of a 1% calcium chloride solution, then injected into an HP1050 HPLC equipped with UV detection and a Phenomenex Synergi Polar-RP column. The instrument was adjusted to the proper operating parameters and allowed to equilibrate until a stable baseline was established. A CCV standard was run to establish retention times and a standard at a level near the reporting limits was run to verify low concentration sensitivity. The second column analyses were used for qualitative confirmation of analytes based on retention time. If a positive result is confirmed, the quantitative result from the primary column is reported.

Gloria W. Heung 10/10/03

Gloria W. Heung Date

DataChem Laboratories
CHAIN-OF-CUSTODY

Earliest Sampling Date: 1-Oct-2003

Results due by: 16-Oct-2003

Project/Job/Task: P021C002 | *Split:* | **Root Set ID:** 03E-0426 * | **Reporting Group**

Account: 08001

Client: URS

Comments:

Verified: Quint Shen 10/2/03

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Customer ID 2	Analysis 03 Nitroglycerin/PETN by 8332	Analysis 04 Moisture	# Bottles
~~1-Oct-2003~~	~~375B1B~~	~~03E04117~~			~~SOIL~~	JP 10/7/03	X	X	1
1-Oct-2003	375B1C B JP 10/7/03	03E04118			SOIL		X	X	1

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

2B 38

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Walk-in/ Room/ Shelf/ Fridge R.33-1 JB	10/07/03 12:30	Norman Beale	% Moisture
Norman Beale	10/07/03 14:24		

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

Printed 10/2/2003 10:57

Check box if there is a continuation page ☐

Form: COFC1.01-SWV2.30

03E-0426

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1076

Project Number	Project Name
09601-317	RFAAP

Project Contact (Name and Phone Number): Darren Renne (804) 965-9000

Samplers: Brett Fisher / John Spaghos

LAB: Datachem

AIRBILL No:

Courier:

ANALYSES

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8332) PETN/NO3	Dioxin/Furan(8290)	TAL Metals (Including Mercury)	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	Paint Filter (9095B)	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
FSB3A	10/1/03 800	S		X	5	F	/	1						X									03E04106
FSB3B	10/1/03 815	S		X	5	F	/	1						X									07
FSB3C	10/1/03 830	S		X	5	F	/	1						X									08
46SB1A	10/1/03 1210	S		X	5	F	/	1						X									09
46SB1B	10/1/03 1220	S		X	5	F	/	1						X									10
46SB1C	10/1/03 1250	S		X	5	F	/	1						X									11
46SB2A	10/1/03 1325	S		X	5	F	/	1						X									12
46SB2B	10/1/03 1340	S		X	5	F	/	1						X									13
46SB2C	10/1/03 1350	S		X	5	F	/	1						X									14
SBD2	10/1/03 /	S		X	5	F	/	1						X									15
37SB1A	10/1/03 1530	S		X	5	F	/	1						X									16
~~37SB1B~~	~~10/1/03 1545~~	~~S~~		~~X~~	~~5~~	~~F~~	~~/~~	~~1~~						X	→ SAMPLE CANCELED								17
37SB1C	10/1/03 1600	S		X	5	F	/	1						X									18

Place on hold

10/6/03 chang 37SB1C → 37SB1B

Discard original 37SB1B

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
[signature]	10/1/03 1800	FedEx			
Relinquished by: FedEx	Date/time 10/2/03 0900	Received by: (for lab) [signature] R-33-1	Date/Time		

NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement

Fax To: URS - Andrea Sansom
(410)859-5202
Date Faxed:_____

Radford SSP

Corrective Action Log

Laboratory: DATACHEM LABORATORIES
Instrument: HPLC/UV
Method: EPA 8332

Sample Date: 10/1/03
Analysis Date: _____

Project Number/ Batch Number	Affected Samples	Excursions	Criteria Comparison	Corrective Action Proposed
09604-317	375B1B 375B1C			SAMPLE 375B1B WAS REMOVED AS PER ANDREW SANSOM'S REQUEST. SAMPLE 375B1C WAS RENAMED 375B1B AND ANALYZED. SET ID 03E-0426-03

Reviewed By: _____ Section Supervisor Date

Reviewed By: _____ QA/QC Officer Date

Reviewed By: _____ Project Supervisor Date

DataChem Laboratories Client-Related Information Report (CRIR)

Cooler or Container Information Checklist (Fill In or Circle)

Client Name: LRS

Project/Task/Site: 03E-0426

Date/Time of Receipt: 10/2/03 0900

Number of Coolers Received: 1

Condition of Coolers:	Acceptable/Unacceptable	Temperature Control:	Present/Not Included
Custody Seals:	Present/Absent/NA	Location Temp Taken:	Cntnr/Between Samples
	Intact/Broken/NA	Are all temperatures within	
Tamper Evident:	Yes/No/NA	project specific guidelines?	Yes/No/NA
Ice Present:	Yes/No/NA	Are all applicable pHs within	
	Frozen/Melted/NA	specific guidelines?	Yes/No/NA

PH Check:							
	Metals	Yes/No/NA	Total Phenolics	Yes/No/NA	NO3/NO2	Yes/No/NA	
	Cyanide	Yes/No/NA	TPH – 418.1	Yes/No/NA	Oil & Grease	Yes/No/NA	
	Sulfide	Yes/No/NA	COD	Yes/No/NA	Total Phosphorous	Yes/No/NA	
	Ammonia	Yes/No/NA	TKN	Yes/No/NA	Gross A B, Gamma Spec	Yes/No/NA	

Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.
1	C03- 0428	3 °C	4	C03-	°C	7	C03-	°C
2	C03-	°C	5	C03-	°C	8	C03-	°C
3	C03-	°C	6	C03-	°C	9	C03-	°C

Taken By: _____ (Signature) J. Pate (Printed Name) 10/2/03 (Date)

Client-Related Information

- ☐ Missing Cooler
- ☐ Cooler Conditions
- ☐ Missing Paperwork
- ☐ Missing/Incorrect Bottle labels
- ☐ Missing Samples/Bottles
- ☐ Broken/Leaking Samples
- ☐ Incorrect Bottle Type
- ☐ Cooler Temperatures Out of range
- ☐ Incorrect Preservation
- ☐ pH Criteria Not Met
- ☐ Head Space in Bottles
- ☐ Insufficient Sample
- ☐ Chain of Custody Problems
- ☐ Other:

EPA Custody Seal:

Date 10/1/03 FedEx Tracking Number 832942539013

Briefly Describe the Problem and the Action Taken:

Sender's Name Brett Fisher Phone 804 965-9000

Company DAMES & MOORE/URS/CRC

Address 5540 FALMOUTH ST STE 201 Dept/Floor/Suite/Room

Faxed to Client? Yes ☐ No ☐

City RICHMOND State VA ZIP 23230

Response Requi

Your Internal Billing Reference 09604-317

Project

Project Manager Comments:

DCL Project Manager: _____ (Printed Name) Returned to Sample Receipt by: _____ (Signature) Date: _____

SLC/CRIR.doc

Revised 6/28/01

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1067

Project Number	Project Name
07604-317	RFAAP

Project Contact (Name and Phone Number): Darren Renne (804) 965-9000

Samplers: Brad Fisher / John Spangler

LAB: Data Chem

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330) RDX/HMX	Dioxin/Furan(8290)	TAL Metals (Including Mercury)	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	Paint Filter (9095B)	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
375B1B	10/2/03 930	5		X	S	F	/	1						X		03E04124							375B2A has
375B1C	10/2/03 845	5		X	S	F	/	1						X				25					Mostly sludge. Collected
375B2A	10/2/03 930	5		X	S	F	/	1						X				26					MS/MSD because
375B2B	10/2/03 945	5		X	S	F	/	1						X				27					of matrix difference
375B2C	10/2/03 1000	5		X	S	F	/	1						X				28					Soil vs. Sludge
375B3A	10/2/03 1015	5		X	S	F	/	1						X				29					
375B3B	10/2/03 1030	5		X	S	F	/	1						X				30					
375B3BMS	10/2/03 1030	5		X	S	F	/	1						X				30MS					
375B3BMSD	10/2/03 1030	5		X	S	F	/	1						X				30MSD					
375B3C	10/2/03 1045	5		X	S	F	/	1						X				31					
375B2AMS	10/2/03 930	5		X	S	F	/	1						X				26MS					
375B2AMSD	10/2/03 930	5		X	S	F	/	1						X				26MSD					
05B1A	10/2/03 1300	5		X	S	F	/	1						X				32					
SBD3	10/2/03 —	5		X	S	F	/	1						X				33					

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
[signature] 10/2/03	1800	FedEx			
FedEx 10/3/03	0900	(for lab) R-33-1			

NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement

Earliest Sampling Date: 2-Oct-2003

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 17-Oct-2003

Project/Job/Task: P021C002	Split:	Root Set ID: 03E-0429 *	Reporting Group	02	03								#
Client: URS		Account: 08001	Analysis	Nitroglycerin/PETN by 8332	Moisture								Bottles
Comments:													
Verified: JW 10/6/03													

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Customer ID 2														
2-Oct-2003	37SB2A	03E04126			SLUDGE						X	X								1
2-Oct-2003	37SB2AMS	03E04126MS		MS	SLUDGE						X									1
2-Oct-2003	37SB2AMSD	03E04126MSD		MSD	SLUDGE						X									1
2-Oct-2003	37SB2AMD	03E04126MD		MD	SLUDGE							X								0

1C 58 ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Walk-in/ Room/ Shelf/ Fridge R.33-1 RB	10/07/03 12:30	Norman Burch	%moisture
Norman Burch	10/07/03 14:24		

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

Check box if there is a continuation page ☐

Printed 10/3/2003 12:57

Form: COFC1.01-SWV2.30

03E-0432

Radford Army Ammunition Plant
Chain Of Custody Record

No 1155

Project Number	Project Name
07604317	RFAAP

Project Contact (Name and Phone Number): Darren Penn (501) 965-7000

Samplers: Brett Fisher / John Spangler

LAB: DataChem

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, 8332), 8270N/NG	Dioxin/Furan(8290)	TAL Metals (Including Mercury)	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	Paint Filter (9095B)	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
38SB2A	10/3/03 850	5		X	S	F	/	1						X									03E04150
38SB2B	10/3/03 900	5		X	S	F	/	1						X									51
38SD4	10/3/03 —	5		X	S	F	/	1						X									52
38SB2C	10/3/03 910	5		X	S	F	/	1						X									53
38SB1A	10/3/03 1045	5		X	S	F	/	1						X									54
38SD1B	10/3/03 1100	5		X	S	F	/	1						X									55
38SB1C	10/3/03 1120	5		X	S	F	/	1						X									56
38SB3A	10/3/03 1200	5		X	S	F	/	1						X									57
38SB3B	10/3/03 1215	5		X	S	F	/	1						X									58
38SB3C	10/3/03 1230	5		X	S	F	/	1						X									59
EQB2	10/3/03 1500	5		X	W	F	/	2						X									60

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
[signature]	10/3/03 1800	FedEx			
Relinquished by: FedEx	Date/time 10/4/03 0930	Received by: (for lab) [signature]	Date/Time	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

Earliest Sampling Date: 3-Oct-2003

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 17-Oct-2003

Project/Job/Task: P021C002 | *Split:* | **Root Set ID:** 03E-0432 * | **Reporting Group** | 02 | 03

Client: URS | **Account:** 08001

Comments:

Verified: JW 10/6/03

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Customer ID 2	Analysis				02 Nitroglycin/PETN by 8332	03 Moisture								# Bottles
3-Oct-2003	38SB2A	03E04150			SOIL						X	X								1
3-Oct-2003	38SB2B	03E04151			SOIL						X	X								1
3-Oct-2003	SBD4	03E04152			SOIL						X	X								1
3-Oct-2003	38SB2C	03E04153			SOIL						X	X								1
3-Oct-2003	38SB1A	03E04154			SOIL						X	X								1
3-Oct-2003	38SB1B	03E04155			SOIL						X	X								1
3-Oct-2003	38SB1C	03E04156			SOIL						X	X								1
3-Oct-2003	38SB3A	03E04157			SOIL						X	X								1
3-Oct-2003	38SB3B	03E04158			SOIL						X	X								1
3-Oct-2003	38SB3C	03E04159			SOIL						X	X								1

16C JS

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Walk-in/Room/Shelf/Fridge	10/7/03 12:..		EXC

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

Check box if there is a continuation page ☐

Printed 10/6/2003 11:03

Form: COFC1.01-SWV2.30

DATACHEM LABORATORIES CLIENT-RELATED INFORMATION REPORT (CRIR)

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill In or Circle)

Client Name: URS

Project/Task/Site: 03E-0432

Date/Time of Receipt: 10/4/03 0930

Number of Coolers Received: 1

Condition of Coolers: ~~Acceptable~~/Unacceptable

Custody Seals: ~~Present~~/Absent/NA

~~Intact~~/Broken/NA

Tamper Evident: Yes/~~No~~/NA

Ice Present: ~~Yes~~/No/NA

~~Frozen~~/Melted/NA

Temperature Control: ~~Present~~/Not Included

Location Temp Taken: ~~Cooler~~/Between Samples

Are all temperatures within project specific guidelines? ~~Yes~~/No/NA

Are all applicable pHs within specific guidelines? Yes/No/~~NA~~

PH Check:							
	Metals	Yes/No/NA	Total Phenolics	Yes/No/NA	NO3/NO2	Yes/No/NA
	Cyanide	Yes/No/NA	TPH – 418.1	Yes/No/NA	Oil & Grease	Yes/No/NA
	Sulfide	Yes/No/NA	COD	Yes/No/NA	Total Phosphorous	Yes/No/NA
	Ammonia	Yes/No/NA	TKN	Yes/No/NA	Gross A.B, Gamma Spec	Yes/No/NA

Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.
1	C03- 0431	°C	4	C03-	°C	7	C03-	°C
2	C03-	°C	5	C03-	°C	8	C03-	°C
3	C03-	°C	6	C03-	°C	9	C03-	°C

Taken By: _____ (Signature) J. Pate (Printed Name) 10/4/03 (Date)

CLIENT-RELATED INFORMATION

- ☐ Missing Cooler
- ☐ Cooler Conditions
- ☐ Missing Paperwork
- ☐ Missing/Incorrect Bottle labels
- ☐ Missing Samples/Bottles
- ☐ Broken/Leaking Samples
- ☐ Incorrect Bottle Type
- ☐ Cooler Temperatures Out of range
- ☐ Incorrect Preservation
- ☐ pH Criteria Not Met
- ☐ Head Space in Bottles
- ☐ Insufficient Sample Volume
- ☐ Chain of Custody Problems
- ☐ Other:

EPA Custody Seal:

BRIEFLY DESCRIBE THE PROBLEM AND THE ACTION TAKEN:

Date 10/3/03 FedEx Tracking Number 832942539080

Sender's Name Brett Fisher Phone 804 965-9000

Company DAMES & MOORE/URS/CRC

Address 5540 FALMOUTH ST STE 201 Dept./Floor/Suite/Room

Faxed to Client? YES ☐ NO ☐

City RICHMOND State VA ZIP 23230

Response Requi

PROJECT Your Internal Billing Reference 09604-317

PROJECT MANAGER COMMENTS:

DCL Project Manager: _____ (Printed Name) Returned to Sample Receipt by: _____ (Signature) Date: _____

Data Qualifying Codes

Two types of data qualifying codes or flags are applied in the course of the data review. The data validation flags indicate data that are not usable for decision-making, more than normally biased and/or variable, or not representative of field conditions. These codes and their definitions are presented below in the hierarchy stipulated in the USEPA Region III Modifications to the National Functional Guidelines for Data Review (September 1994).

Data Validation Flags

Flag	Interpretation
R	Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.
U	Not detected. The associated number indicates the approximate sample concentration is necessary to be detected.
B	Not detected substantially above the level reported in laboratory or field blanks.
N	Tentative Identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.
J	Analyte present. Reported value may not be accurate or precise.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
UL	Not detected, quantitation limit is probably higher.
NT	Not tested, no analytical result provided.

The other type of code used by URS is a "Reason Code". The reason code indicates the type of quality control failure that led to the application of the data validation flag.

Reason Codes

GC/MS Organics		GC and HPLC Organics		Inorganics and Conventionals	
Code	Interpretation	Code	Interpretation	Code	Interpretation
a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence
b	Bubble found in vial >6mm	b	Instrument performance failure	c	Calibration failure
c	Calibration failure; poor or unstable response	c	Calibration failure; poor or unstable response	d	MS/MSD imprecision
d	MS/MSD imprecision	d	MS/MSD imprecision	e	LCSD imprecision
e	LCSD imprecision	e	LCSD imprecision	f	Field duplicate imprecision
f	Field duplicate imprecision	f	Field duplicate imprecision	h	Holding time violation
h	Holding time violation	g	Dual column confirmation imprecision	k	Laboratory duplicate imprecision
i	Internal standard failure	h	Holding time violation	l	LCS recovery failure
j	Tuning failure or poor mass spectrometer performance	i	Internal standard failure	m	MS/MSD recovery failure
l	LCS recovery failure	l	LCS recovery failure	n	ICS failure
m	MS/MSD recovery failure	m	MS/MSD recovery failure	o	Calibration blank contamination
p	Poor chromatography	p	Poor chromatography	p	Preparation blank contamination
q	Concentration exceeded the linear range of the instrument	q	Concentration exceeded the linear range	q	Concentration exceeded the linear range
r	Linearity failure in initial calibration	r	Linearity failure in initial calibration	r	Linearity failure in calibration or MSA
s	Surrogate failure	s	Surrogate failure	s	Serial dilution failure
t	TIC	u	No confirmation column	v	Post-digestion spike failure
w	Identification criteria failure	w	Retention time failure	w	CRDL Standard Failure
x	Field blank contamination	x	Field blank contamination	x	Field blank contamination
y	Trip blank contamination	z	Method blank contamination	z	Laboratory storage blank contamination
z	Method blank contamination				

DATA VALIDATION REPORT - Level III Review

SDG No.: 03E-0429-01 **Fraction:** PETN_&_Nitroglycerin

Lab: TriMatrix **Project Name:** Radford_SSP

Reviewer: AS **Date:** February_3,_2004

This report presents the findings of a review of the referenced data. The report consists of this summary, copies of data reports with data qualifying flags applied (as required), the completed data validation checklist, supporting documentation, and an explanation of the data qualifying flags employed. The review performed is based on the USEPA Region III Modifications to the National Functional Guidelines for Data Review as pertains to the specifics of the analytical methods employed and provisions of the approved project-specific Quality Assurance Project Plan (QAPP).

Major Anomalies: None.

Minor Anomalies: None.

Correctable Anomalies: None.

Comments: All data are usable, as qualified, for their intended purpose based on the data reviewed.

Signed: Andrea Sansom

Andrea Sansom

DATA CHEM LABORATORIES
A Sorenson Company

COVER PAGE

ANALYTICAL REPORT FOR URS Group, Inc.

G039200Q

DCL Report Group..: 03E-0429-01

Date Printed.....: 10-OCT-03 14:22

Project Protocol #: P021C002
Client Ref Number.: Subcontract DCL-09
Release Number....: 09604-317

Analysis Method(s): 8332

URS Group, Inc.
Attention: Mr. J Darren Renne
5540 Falmouth Street
Suite 201
Richmond, VA 23229

Client Sample Name	Laboratory Sample Name	Date Sampled	Date Received
Method Blank	BL-211306-1	NA	NA
LCS	QC-211306-1	NA	NA
LCS Dup	QD-211306-1	NA	NA
EQB1	03E04123	02-OCT-03	03-OCT-03

Analyst: Rodney Lemon — Date 10/12/03

Reviewer: Gloria W. Heung — Date 10/13/03

Lab Supervisor: Richard W. Wade — Date 10/15/03

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

DATA CHEM LABORATORIES
A Sorenson Company

COVER PAGE

ANALYTICAL REPORT FOR URS

Phone(410) 859-5049 Fax(410) 859-5202
E-mail: Andrea_Sansom@URScorp.com

G039500H

DCL Report Group..: **03E-0432-01**

Date Printed.....: 10-OCT-03 14:43

Project Protocol #: P021C002
Client Ref Number.: 09604-317
Release Number....: 09604-317

Analysis Method(s): 8332

URS
Attention: Andrea Sansom
849 Intermountain Dr.
Sutie 320
Linthicum, MD 21090

Client Sample Name	Laboratory Sample Name	Date Sampled	Date Received
EQB2	03E04160	03-OCT-03	04-OCT-03
Method Blank	BL-211306-1	NA	NA
LCS	QC-211306-1	NA	NA
LCS Dup	QD-211306-1	NA	NA

Analyst: Rodney Lemon — Date 10/13/03

Reviewer: Gloria W. Heung — Date 10/13/03

Lab Supervisor: Richard W. Wade — Date 10/15/03

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039200X

Date Printed.....: 10-OCT-03 17:45

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 03-OCT-03 00:00

Client Sample Name: **EQB1**
DCL Sample Name...: **03E04123**
DCL Report Group..: **03E-0429-01**

Matrix.....: WATER
Date Sampled.....: 02-OCT-03 16:20
Reporting Units...: ug/L
Report Basis.....: ☒ As Received ☐ Dried

DCL Preparation Group: G0395013
Date Prepared.....: 06-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 770mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G0395013
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC-03
Column Type.....: Ultracarb ODS
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	09-OCT-03 22:41	0.311	ND		U	1	0.970
Nitroglycerin	09-OCT-03 22:41	0.213	ND		U	1	0.970

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039500N

Date Printed.....: 10-OCT-03 14:43

Client Name.....: URS
Client Ref Number....: 09604-317
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 04-OCT-03 00:00

Client Sample Name: **EQB2**
DCL Sample Name...: **03E04160**
DCL Report Group..: **03E-0432-01**

Matrix.....: WATER
Date Sampled.....: 03-OCT-03 13:00
Reporting Units...: ug/L
Report Basis.....: ☒ As Received ☐ Dried

DCL Preparation Group: G0395013
Date Prepared.....: 06-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 770mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G0395013
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC-03
Column Type.....: ultracarb ODS
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	09-OCT-03 23:03	0.311	ND		U	1	0.970
Nitroglycerin	09-OCT-03 23:03	0.213	ND		U	1	0.970

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

DATA VALIDATION WORKSHEET

Explosives

Reviewer: AS
Date: January-04
DV Level: II III IV

Review Document:

_X_ Region III Modified for National Functional Guidelines
___ NFG for organic Data review (February 1994)
_X_ Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: DataChem
SDG No.: 03E-0429-01 & 0432-01
Test Name: Explosives
Method No.: 8332-HPLC

1.0 Laboratory Deliverables

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. % solids		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes:

2.0 Holding Times

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	Action: If the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyese, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%	x		
	For initial Calibration: for %RSD > ±20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes:

Second column was used to not confirm primary column low level hits. The second column does not have an initial calibration or bracketing continuing calibrations. The one points provided are for retention time purposes only.

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?	x		
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?			x
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.			x
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 40-150%?		x	
6.4	Are there any RPDs outside the QC limits not to exceed 60%?		x	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

7.0 Laboratory Control Sample (LCS)

		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 40-150%?		x	
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?			x
	Action: If Yes, J(+) only.			

Notes:

8.0 Field Duplicate

		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.			x
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.			x
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	x		

Notes:

10.0 Data Completeness			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		x		
	Number of samples:	2			
	Number of target compounds in each analysis:	2			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

DB 10/07/03

Date of Extraction:	10/06/03	**DataChem Laboratories Extraction Notebook**	Book # Ext 007 Page# 50
Account #(s):	8001		
DCL Set ID(s):	03E-0429-01/0432-01		Matrix: WATER
Group/Lot ID:	G0395013		Method: 8332

	DCL Sample ID	Field ID	Initial Vol. / WT	Initial pH	Adj pH		Surr. Added	Matrix Spike		Final Volume
1	BL-211306-1 DB 10/07/03	BL-211306-1	770mL	N/A	N/A	N/A	1mL	----	----	5mL
2	QC-211306-1	QC-211306-1	770mL	N/A	N/A	N/A	1mL	1mL	----	5mL
3	QD-211306-1	QD-211306-1	770mL	N/A	N/A	N/A	1mL	1mL	----	5mL
4	03E04123	EQB1	770mL	N/A	N/A	N/A	1mL	----	----	5mL
5	03E04160 DB 10/07/03	EQB2	770mL	N/A	N/A	N/A	1mL	----	----	5mL
6										
7										
8										
9										
10										
11										
12										
13										
14										
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39										
40										

DB 10/07/03

Solvents:	MeCN	CH672	Comments: Not Enough Sample
	NaCl	X25582	For MS/MSD DB 10/06/03
Surrogate Spike:	239WS3	01/30/2004 By: DB	
Matrix Spike:	239WS2	01/30/2004 By: DB	
Matrix Spike:	----------	---------- By: Na	
Extractionist:	[signature]	10/07/03	
Checker:	[signature]	10/07/03	Sonicators tunned by: NA

*=Entry Error

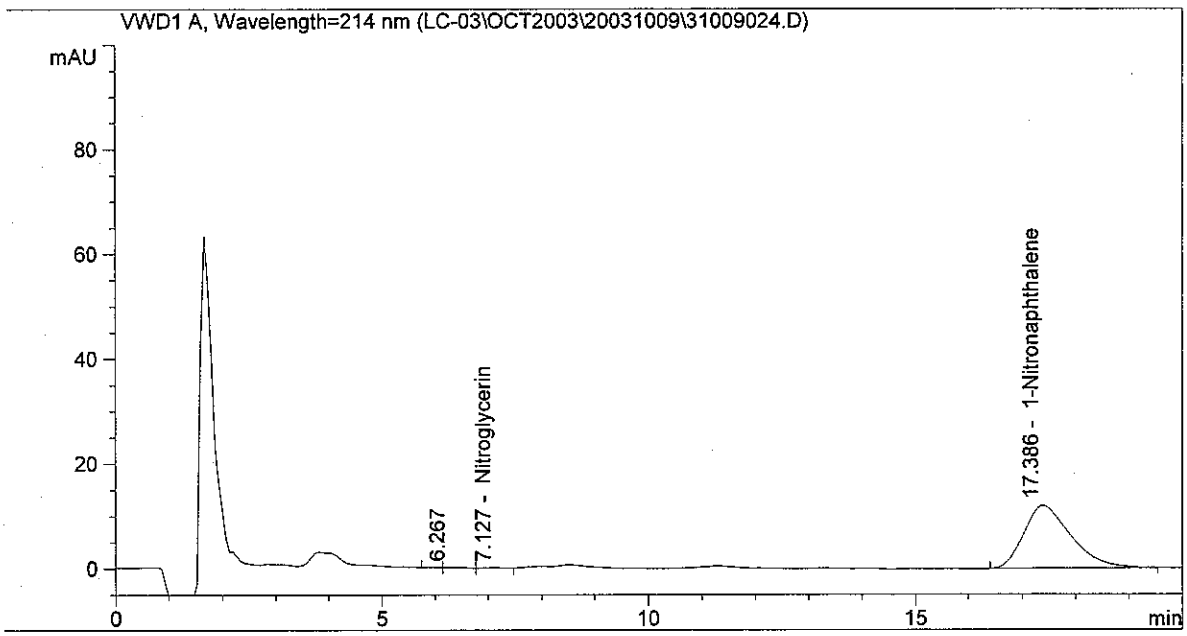
Recorded by

Data file : C:\HPCHEM\1\DATA\LC-03\OCT2003\20031009\31009024.D
Sample Name: 03E04123 1

Injection Date	: Thu, 9. Oct. 2003	Seq Line	: 24
Sample Name	: 03E04123	Vial No.	: 103
Acq Operator	: HEUNG	Inj. No.	: 1
Injection Time:	10:41:22 PM	Inj. Vol.	: -

Acq. Method : N0527LC3.M
Analysis Method : C:\HPCHEM\1\METHODS\OCT2003\N0527PR3.M
Last Changed : Fri, 10. Oct. 2003, 00:17:35 pm

SOIL/WATER BY SW-846 8332 ON LC-3. Init Cal ID:092100LC3



Sorted By		Signal
Calib. Data Modified	:	Tue, 7. Oct. 2003, 03:26:24 pm
Multiplier	:	6.490000
Dilution	:	1.000000
Uncalibrated Peaks	:	not reported

Customized Report: sampacL

Signal VWD1 A, Wavelength=214 nm

Peak #	RT [min]	Type	Width [min]	Height	Area	Amount (ug/L)	Name
1	6.067	MF	0.292	0.082	1.442	0.000	
2	6.267	FM	0.295	0.122	2.161	0.000	N.C.
3	7.127	VP	0.344	0.066	1.484	~~0.252~~	~~Nitroglycerin~~
4	0.000		0.000	0.000	0.000	0.000	PETN
5	17.386	PB	0.929	12.080	733.963	9.538	1-Nitronaphtha

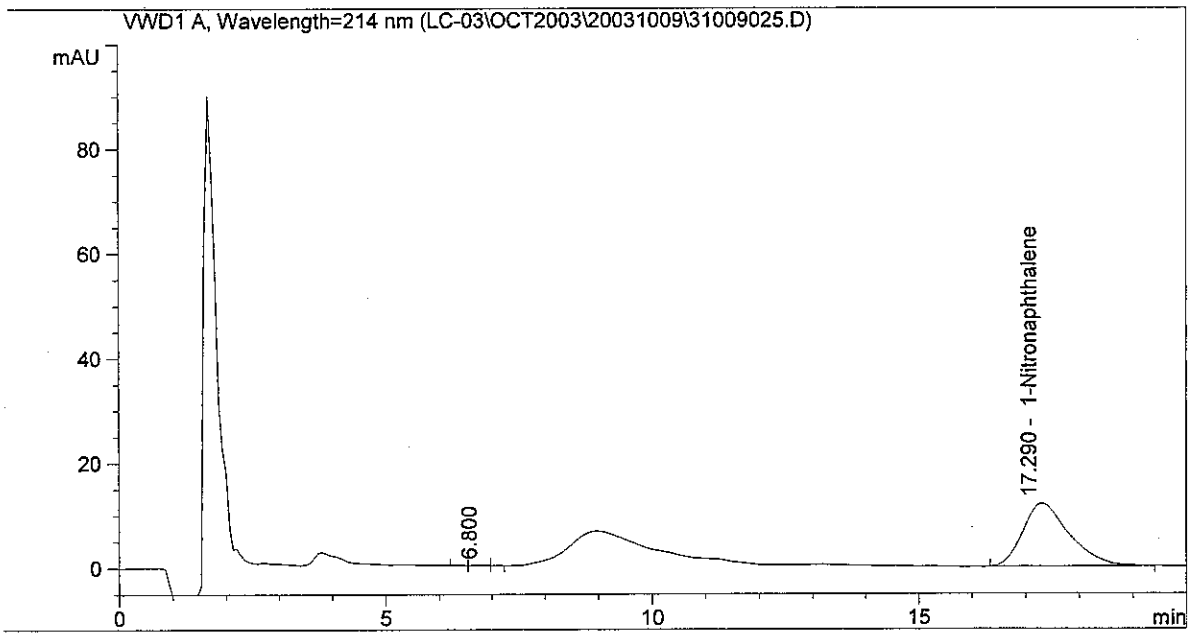
*** End of Report ***

Data file : C:\HPCHEM\1\DATA\LC-03\OCT2003\20031009\31009025.D
Sample Name: 03E04160 1

Injection Date	: Thu, 9. Oct. 2003	Seq Line	: 25
Sample Name	: 03E04160	Vial No.	: 104
Acq Operator	: HEUNG	Inj. No.	: 1
Injection Time:	11:03:51 PM	Inj. Vol.	: -

Acq. Method : N0527LC3.M
Analysis Method : C:\HPCHEM\1\METHODS\OCT2003\N0527PR3.M
Last Changed : Fri, 10. Oct. 2003, 00:17:35 pm

SOIL/WATER BY SW-846 8332 ON LC-3. Init Cal ID:092100LC3



Sorted By		Signal
Calib. Data Modified	:	Tue, 7. Oct. 2003, 03:26:24 pm
Multiplier	:	6.490000
Dilution	:	1.000000
Uncalibrated Peaks	:	not reported

Customized Report: sampacL

Signal VWD1 A, Wavelength=214 nm

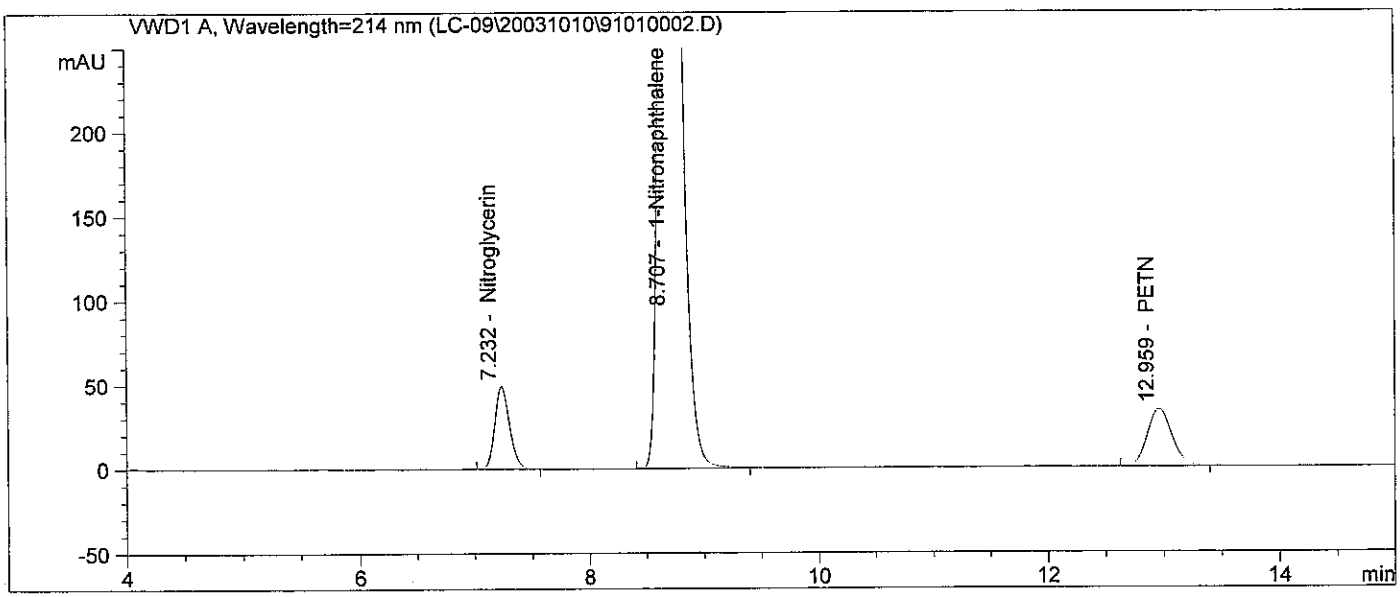
Peak #	RT [min]	Type	Width [min]	Height	Area	Amount (ug/L)	Name
1	6.368	VV	0.180	0.063	0.756	0.000	
2	6.800	MF	0.323	0.104	2.008	0.000	
3	6.974	FM	0.119	0.075	0.539	0.092	Nitroglycerin
4	0.000		0.000	0.000	0.000	0.000	PETN
5	17.290	PB	0.898	12.078	722.199	9.385	1-Nitronaphtha

*** End of Report ***

Data file :C:\HPCHEM\1\DATA\LC-09\20031010\91010002.D
Sample Name:CCV1 Info:239WS VAYO

Seq Line :2
Vial No. :2
Inj. No. :1

Injection Date :Fri, 10 Oct. 2003 03:45:21 PM
Acq. Method :8330CNEW.M
Acq Operator :HEUNG
Analysis Method :C:\HPCHEM\1\METHODS\8332CPR9.M
Last Changed->Fri, 10 Oct. 2003, 06:00:23 pm
Confirm for 8332 on LC-9, 214nm.



Sorted By Signal
Calib. Data Modified :Fri, 10 Oct. 2003, 05:10:04 pm
Multiplier :1.000000
Dilution :1.000000
Uncalibrated Peaks :not reported
Signal Description :VWD1 A, Wavelength=214 nm

Type	RT [min]	Compound	Amount [ug/ml]	Area
MM	7.232	Nitroglycerin	20.46508	445.096
MM	8.707	1-Nitronaphthalene	21.31141	9.374e3
MM	12.959	PETN	20.12280	509.420
Totals:			61.89929	

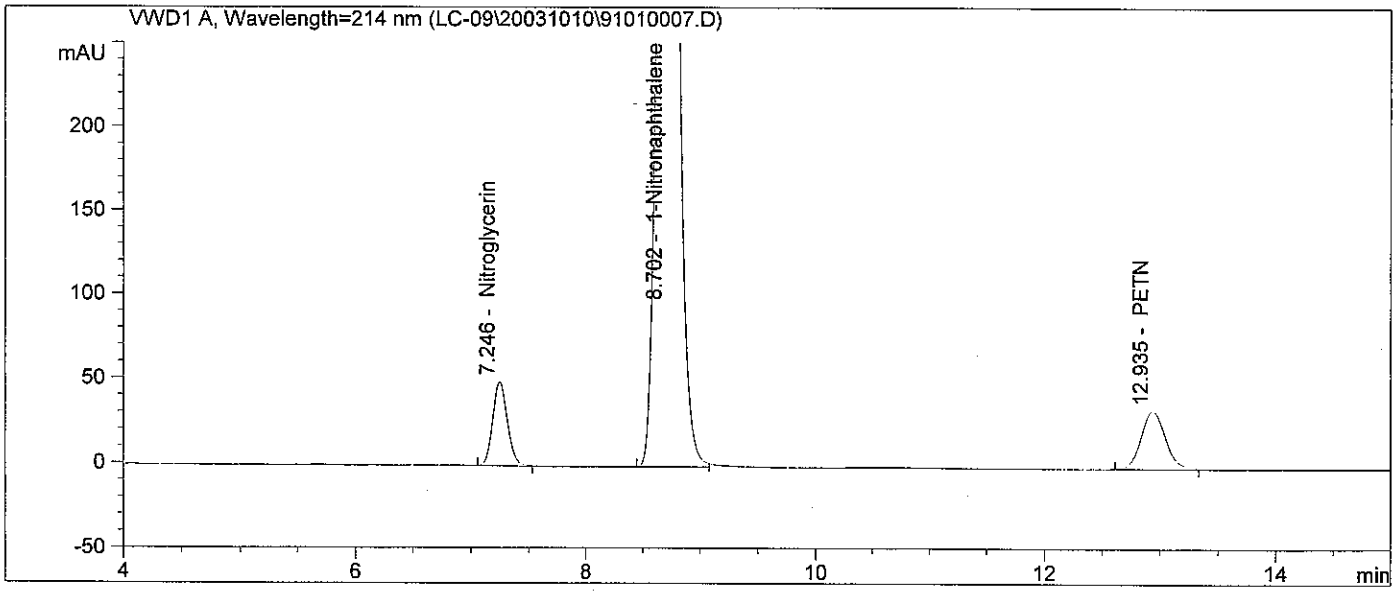
Analyst:_____

Comments:

*** End of Report ***

Data file :C:\HPCHEM\1\DATA\LC-09\20031010\91010007.D
Sample Name:CCV2 Info:239WS VAYO

Seq Line :7
Injection Date :Fri, 10 Oct. 2003 05:03:43 PM Vial No. :2
Acq. Method :8330CNEW.M Inj. No. :1
Acq Operator :HEUNG
Analysis Method :C:\HPCHEM\1\METHODS\8332CPR9.M
Last Changed->Fri, 10 Oct. 2003, 06:00:23 pm
Confirm for 8332 on LC-9, 214nm.



Sorted By Signal
Calib. Data Modified :Fri, 10 Oct. 2003, 05:10:04 pm
Multiplier :1.000000
Dilution :1.000000
Uncalibrated Peaks :not reported
Signal Description :VWD1 A, Wavelength=214 nm

Type	RT [min]	Compound	Amount [ug/ml]	Area
MM	7.246	Nitroglycerin	20.28428	441.170
MM	8.702	1-Nitronaphthalene	21.22910	9.338e3
MM	12.935	PETN	20.05942	507.820
Totals:			61.57279	

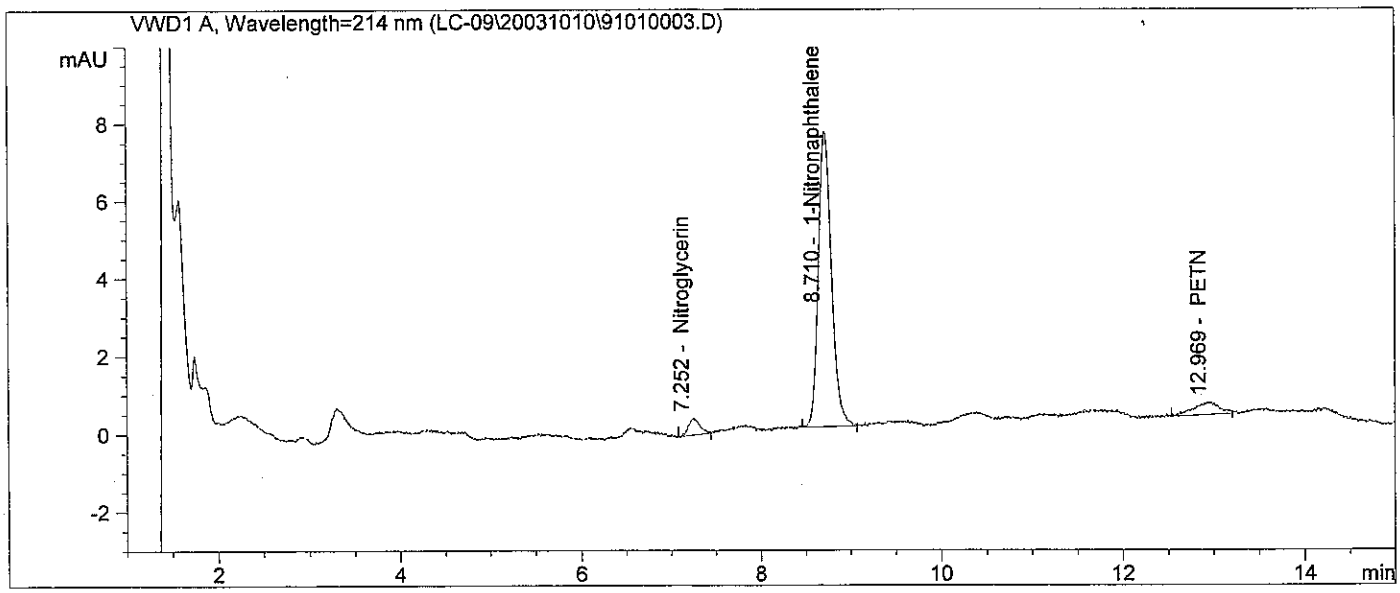
Analyst:_____

Comments:

*** End of Report ***

Data file :C:\HPCHEM\1\DATA\LC-09\20031010\91010003.D
Sample Name:CS1 Info:239WS VAYO

Seq Line :3
Injection Date :Fri, 10 Oct. 2003 04:01:01 PM Vial No. :3
Acq. Method :8330CNEW.M Inj. No. :1
Acq Operator :HEUNG
Analysis Method :C:\HPCHEM\1\METHODS\8332CPR9.M
Last Changed->Fri, 10 Oct. 2003, 06:02:21 pm(modified after loading)
Confirm for 8332 on LC-9, 214nm.



Sorted By Signal
Calib. Data Modified :Fri, 10 Oct. 2003, 05:10:04 pm
Multiplier :1.000000
Dilution :1.000000
Uncalibrated Peaks :not reported
Signal Description :VWD1 A, Wavelength=214 nm

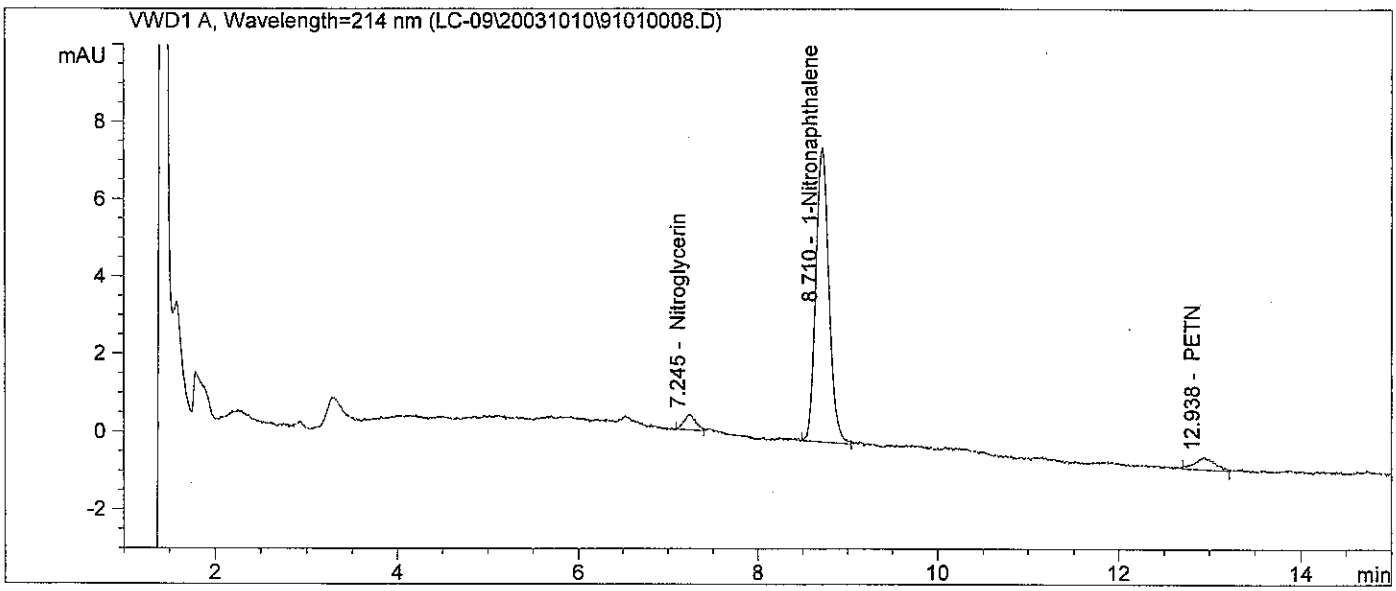
Type	RT [min]	Compound	Amount [ug/mL]	Area
MM	7.252	Nit	0.15261	3.999
MM	8.710	1-N	0.13557	78.190
MM	12.969	PET	0.19477	6.459
Totals:			0.48295	

Analyst:_____

*** End of Report ***

Data file :C:\HPCHEM\1\DATA\LC-09\20031010\91010008.D
Sample Name:CS2 Info:239WS VAYO

Seq Line :8
Injection Date :Fri, 10 Oct. 2003 05:19:23 PM Vial No. :3
Acq. Method :8330CNEW.M Inj. No. :1
Acq Operator :HEUNG
Analysis Method :C:\HPCHEM\1\METHODS\8332CPR9.M
Last Changed->Fri, 10 Oct. 2003, 06:02:21 pm(modified after loading)
Confirm for 8332 on LC-9, 214nm.



Sorted By Signal
Calib. Data Modified :Fri, 10 Oct. 2003, 05:10:04 pm
Multiplier :1.000000
Dilution :1.000000
Uncalibrated Peaks :not reported
Signal Description :VWD1 A, Wavelength=214 nm

Type	RT [min]	Compound	Amount [ug/mL]	Area
MM	7.245	Nit	0.13088	3.527
MM	8.710	1-N	0.13068	76.045
MM	12.938	PET	0.14158	5.116
Totals:			0.40314	

Analyst:_____

*** End of Report ***

DATA CHEM
LABORATORIES, INC.
A SORENSON COMPANY

RECEIVED
BY AS DATE 10/22/03

Case Narrative

Method:	SW-846 8332	**Client:**	URS
Analysis:	Nitroglycerin, PETN	**Account:**	8001
Preparation SOP #:	OL-SW-8332	**Matrix:**	Water
Analysis SOP#:	OL-SW-8332		
DCL Set ID's:	03E-0429-01		
	03E-0432-01		

General Set Information: This lot consisted of two water samples, a method blank, a laboratory control sample (LCS), and a laboratory control sample duplicate.

Method Summary: The samples were extracted using the double salting out procedure prescribed in EPA method 8330. An aliquot of 770 mL of each sample was saturated with salt and extracted twice with acetonitrile by stirring at timed intervals. The acetonitrile extracts were combined and re-extracted with fresh salt water. The final volume of the extract was adjusted to 5 mL for each sample and filtered through a 0.45 um PTFE filter. One part acetonitrile extract was mixed with one part of a 1% calcium chloride solution, and then injected into an HP1050 HPLC equipped with UV detection and a Phenomenex Ultracarb ODS column. The instrument was adjusted to the proper operating parameters and allowed to equilibrate until a stable baseline was established. Initial Calibration standards were analyzed and linear calibration curves were generated from the data. A continuing calibration standard was analyzed at the beginning of sample analysis and after each ten samples and at the end of the analysis. The response of the continuing calibration standard must be within method limits when compared to the initial calibration curve.

Samples and QCs were analyzed under identical conditions as those used for initial and continuing calibration. Quantitation was based on calibration curves using the initial calibration standards. Results were reported in units of µg/L.

Sample Preparation: No anomalies were observed during the preparation of the sample set.

Holding Times: The samples were prepared and analyzed within method required hold times.

Dilution(s): None

This report contains
25 pages

Quality Control Data:

Blank: No confirmed method analytes were detected in the method blank above half of the CRDL.

Laboratory Control Samples: All recoveries and RPDs were within method limits.

Surrogate Recovery: Surrogate recoveries were all acceptable.

MS/MSD: Matrix spiking was not performed.

Instrument QC: All initial and continuing calibration verification samples met method criteria.

Flagging Codes: The "U" flag indicates that the analyte was not detected at or above the MDL level. The "J" flag indicates that the value reported was between the MDL and CRDL.

NC/CAR: None.

Miscellaneous Comments: Any sample with a positive result above the MDL was qualitatively analyzed for confirmation on a second column. For samples requiring confirmation, one part acetonitrile extract was mixed with one part of a 1% calcium chloride solution, then injected into an HP1050 HPLC equipped with UV detection and Phenomenex Synergi Polar-RP column. The instrument was adjusted to the proper operating parameters and allowed to equilibrate until a stable baseline was established. A CCV standard was run to establish retention times and a standard at the reporting limits was run to verify low concentration sensitivity. The second column analyses were used for qualitative confirmation of analytes based on retention time. When a positive result is confirmed, the quantitative result from the primary column is reported.

Rodney R. Lemon 10/13/03

Rodney R. Lemon Date

03E-0429

Radford Army Ammunition Plant
Chain Of Custody Record

No 1157

Project Number	Project Name
97604-317	FFRAP

Project Contact (Name and Phone Number): Darren Rennie (804) 765-9003

Samplers: Brett Fiala, John Spangler

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, 8332) PETN only	Dioxin/Furan(8290)	TAL Metals (Including Mercury)	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	Paint Filter (9095B)	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
EQB1	10/2/03 1670	5		X	5	F	U	2						X									03E04123

ANALYSES

LAB:

AIRBILL No:

Courier:

Box #1			Box #2			Box #3	Box #4	
1.	Surface Water	6. Trip Blank	A.	HCl + Ice	F. Ice Only	F. Filtered	R.	Rush - 3 Day
2.	Ground Water	7. Oil	B.	HNO3 + Ice	G. Other _____	U. Unfiltered	S.	Standard 28 Day
3.	Leachate	8. Waste	C.	NaOH + Ice	H. NaHSO4 + Ice		T.	Timely 14 Day
4.	Rinsate	9. Other _____	D.	H2SO4 + Ice	I. ZnAc + NaOH + Ice		O.	Other _____
5.	Soil Sediment/Sludge		E.	Unpreserved				

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
[signature]	10/2/03 1800	FedEx			
Relinquished by: FedEx	Date/time 10/3/03 0900	Received by: (for lab) [signature]	Date/Time 1033	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

Earliest Sampling Date: 2-Oct-2003

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 17-Oct-2003

Project/Job/Task: P021C002	Split:	Root Set ID: 03E-0429*	Reporting Group	01									#
Client: URS		Account: 08001	Analysis	PETN/NG in Water by EPA 8332									Bottles
Comments:													
Verified: JW 10/6/03													

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Customer ID 2																
2-Oct-2003	EQB1	03E04123			WATER						X											2

LCSR ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Walk-in/ Room/ Shelf/ Fridge R-33-1 DR	10/06/03 1230	Dil Bil	Ext. 8332
Dil Bil			

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

Check box if there is a continuation page ☐

Printed 10/3/2003 12:57

Form: COFC1.01-SWV2.30

DATACHEM LABORATORIES CLIENT-RELATED INFORMATION REPORT (CRIR)

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill In or Circle)

Client Name: URS

Project/Task/Site: 03E-0429

Date/Time of Receipt: 10/3/03 0900

Number of Coolers Received: 1

Condition of Coolers:	(Acceptable)/Unacceptable	Temperature Control:	(Present)/Not Included
Custody Seals:	(Present)/Absent/NA	Location Temp Taken:	(Cooler)/Between Samples
	(Intact)/Broken/NA	Are all temperatures within	
Tamper Evident:	Yes/(No)/NA	project specific guidelines?	(Yes)/No/NA
Ice Present:	(Yes)/No/NA	Are all applicable pHs within	
	(Frozen)/Melted/NA	specific guidelines?	Yes/No/(NA)

PH Check:							
	Metals	Yes/No/NA	Total Phenolics	Yes/No/NA	NO3/NO2	Yes/No/NA
	Cyanide	Yes/No/NA	TPH – 418.1	Yes/No/NA	Oil & Grease	Yes/No/NA
	Sulfide	Yes/No/NA	COD	Yes/No/NA	Total Phosphorous	Yes/No/NA
	Ammonia	Yes/No/NA	TKN	Yes/No/NA	Gross A.B, Gamma Spec	Yes/No/NA

Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.
1	C03- 0429	5 °C	4	C03-	°C	7	C03-	°C
2	C03-	°C	5	C03-	°C	8	C03-	°C
3	C03-	°C	6	C03-	°C	9	C03-	°C

Taken By: _____ (Signature) _____ (Printed Name) _____ (Date)

CLIENT-RELATED INFORMATION

☐ Missing Cooler	☐ Missing Samples/Bottles	☐ Incorrect Preservation	☐ Chain of Custody Problems
☐ Cooler Conditions	☐ Broken/Leaking Samples	☐ pH Criteria Not Met	☐ Other:
☐ Missing Paperwork	☐ Incorrect Bottle Type	☐ Head Space in Bottles	EPA Custody Seal:
☐ Missing/Incorrect Bottle labels	☐ Cooler Temperatures Out of range	☐ Insufficient Sample Volume	

BRIEFLY DESCRIBE THE PROBLEM AND THE ACTION TAKEN:

Faxed to Client? YES ☐ NO ☐

Response Req

PROJE

PROJECT MANAGER COMMENTS:

DCL Project Manager: _____ (Printed Name) Returned to Sample Receipt by: _____ (Signature) Date: _____

FedEx Tracking Number 832942539024

Date 10/3/03

Sender's Name Brett Fidler Phone 804 965-9000

Company DAMES & MOORE/URS/CRC

Address 5540 FALMOUTH ST STE 201 Dept/Floor/Suite/Room

City RICHMOND State VA ZIP 23230

Your Internal Billing Reference 07604 317

03E-0432

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1155

Project Number	Project Name
07604 317	RFAAP

Project Contact (Name and Phone Number): Darren Reams (501) 965-7002

Samplers: Brett Fisher / John Spangler

LAB: DataChem

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, 8332), 2,4DNT/NG	Dioxin/Furan(8290)	TAL Metals (Including Mercury)	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	Paint Filter (9095B)	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
38SB2A	10/3/03 350	5		X	S	F	/	1						X									03E04150
38SB2B	10/3/03 700	5		X	S	F	/	1						X									51
38SB4	10/3/03 —	5		X	S	F	/	1						X									52
38SB2C	10/3/03 910	5		X	S	F	/	1						X									53
38SB1A	10/3/03 1045	5		X	S	F	/	1						X									54
38SB1B	10/3/03 1100	5		X	S	F	/	1						X									55
38SB1C	10/3/03 1120	5		X	S	F	/	1						X									56
38SB3A	10/3/03 1200	5		X	S	F	/	1						X									57
38SB3B	10/3/03 1215	5		X	S	F	/	1						X									58
38SB3C	10/3/03 1230	5		X	S	F	/	1						X									59
EQB2	10/3/03 1500	5		X	W	E	/	2						X									60

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
[signature]	10/3/03 1800	FedEx			
Relinquished by: FedEx	Date/time 10/4/03 0930	Received by: (for lab) [signature]	Date/Time	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

Earliest Sampling Date: 3-Oct-2003

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 17-Oct-2003

Project/Job/Task: P021C002 | *Split:* | **Root Set ID:** 03E-0432 * | **Reporting Group** 01

Client: URS | **Account:** 08001

Comments:

Verified: JW 10/6/03

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Customer ID 2	Analysis: PETN/NG in Water by EPA 8332	# Bottles
3-Oct-2003	EQB2	03E04160			WATER		X	2

16B

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Walk-in/ Room/ Shelf/ Fridge R-33-1 DB	10/06/03 1230	D-l B-l	Ext. 8332
D-l B-l			

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

Check box if there is a continuation page ☐

Printed 10/6/2003 11:02

Form: COFC1.01-SWV2.30

DATACHEM LABORATORIES CLIENT-RELATED INFORMATION REPORT (CRIR)

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill In or Circle)

Client Name: URS

Project/Task/Site: 03E-0432

Date/Time of Receipt: 10/4/03 0930

Number of Coolers Received: 1

Condition of Coolers: (Acceptable)/Unacceptable

Custody Seals: (Present)/Absent/NA

(Intact)/Broken/NA

Tamper Evident: Yes/(No)/NA

Ice Present: (Yes)/No/NA

(Frozen)/Melted/NA

Temperature Control: (Present)/Not Included

Location Temp Taken: (Control)/Between Samples

Are all temperatures within project specific guidelines? (Yes)/No/NA

Are all applicable pHs within specific guidelines? Yes/No/(NA)

PH Check:							
	Metals	Yes/No/NA	Total Phenolics	Yes/No/NA	NO3/NO2	Yes/No/NA
	Cyanide	Yes/No/NA	TPH – 418.1	Yes/No/NA	Oil & Grease	Yes/No/NA
	Sulfide	Yes/No/NA	COD	Yes/No/NA	Total Phosphorous	Yes/No/NA
	Ammonia	Yes/No/NA	TKN	Yes/No/NA	Gross A.B, Gamma Spec	Yes/No/NA

Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.
1	C03- 0431	3 °C	4	C03-	°C	7	C03-	°C
2	C03-	°C	5	C03-	°C	8	C03-	°C
3	C03-	°C	6	C03-	°C	9	C03-	°C

Taken By: _____ (Signature) J. Pate (Printed Name) 10/4/03 (Date)

CLIENT-RELATED INFORMATION

- ☐ Missing Cooler
- ☐ Cooler Conditions
- ☐ Missing Paperwork
- ☐ Missing/Incorrect Bottle labels
- ☐ Missing Samples/Bottles
- ☐ Broken/Leaking Samples
- ☐ Incorrect Bottle Type
- ☐ Cooler Temperatures Out of range
- ☐ Incorrect Preservation
- ☐ pH Criteria Not Met
- ☐ Head Space in Bottles
- ☐ Insufficient Sample Volume
- ☐ Chain of Custody Problems
- ☐ Other:

EPA Custody Seal:

BRIEFLY DESCRIBE THE PROBLEM AND THE ACTION TAKEN:

Date 10/3/03 FedEx Tracking Number 832942539080

Sender's Name Brett Fisher Phone 804 965-9000

Company DAMES & MOORE/URS/CRC

Address 5540 FALMOUTH ST STE 201 Dept/Floor/Suite/Room

Faxed to Client? YES ☐ NO ☐

City RICHMOND State VA ZIP 23230

Response Requi

PROJECT Your Internal Billing Reference 09604-317

PROJECT MANAGER COMMENTS:

DCL Project Manager: _____ (Printed Name) Returned to Sample Receipt by: _____ (Signature) Date: _____

Data Qualifying Codes

Two types of data qualifying codes or flags are applied in the course of the data review. The data validation flags indicate data that are not usable for decision-making, more than normally biased and/or variable, or not representative of field conditions. These codes and their definitions are presented below in the hierarchy stipulated in the USEPA Region III Modifications to the National Functional Guidelines for Data Review (September 1994).

Data Validation Flags

Flag	Interpretation
R	Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.
U	Not detected. The associated number indicates the approximate sample concentration is necessary to be detected.
B	Not detected substantially above the level reported in laboratory or field blanks.
N	Tentative Identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.
J	Analyte present. Reported value may not be accurate or precise.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
UL	Not detected, quantitation limit is probably higher.
NT	Not tested, no analytical result provided.

The other type of code used by URS is a "Reason Code". The reason code indicates the type of quality control failure that led to the application of the data validation flag.

Reason Codes

GC/MS Organics		GC and HPLC Organics		Inorganics and Conventionals	
Code	Interpretation	Code	Interpretation	Code	Interpretation
a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence
b	Bubble found in vial >6mm	b	Instrument performance failure	c	Calibration failure
c	Calibration failure; poor or unstable response	c	Calibration failure; poor or unstable response	d	MS/MSD imprecision
d	MS/MSD imprecision	d	MS/MSD imprecision	e	LCSD imprecision
e	LCSD imprecision	e	LCSD imprecision	f	Field duplicate imprecision
f	Field duplicate imprecision	f	Field duplicate imprecision	h	Holding time violation
h	Holding time violation	g	Dual column confirmation imprecision	k	Laboratory duplicate imprecision
i	Internal standard failure	h	Holding time violation	l	LCS recovery failure
j	Tuning failure or poor mass spectrometer performance	i	Internal standard failure	m	MS/MSD recovery failure
l	LCS recovery failure	l	LCS recovery failure	n	ICS failure
m	MS/MSD recovery failure	m	MS/MSD recovery failure	o	Calibration blank contamination
p	Poor chromatography	p	Poor chromatography	p	Preparation blank contamination
q	Concentration exceeded the linear range of the instrument	q	Concentration exceeded the linear range	q	Concentration exceeded the linear range
r	Linearity failure in initial calibration	r	Linearity failure in initial calibration	r	Linearity failure in calibration or MSA
s	Surrogate failure	s	Surrogate failure	s	Serial dilution failure
t	TIC	u	No confirmation column	v	Post-digestion spike failure
w	Identification criteria failure	w	Retention time failure	w	CRDL Standard Failure
x	Field blank contamination	x	Field blank contamination	x	Field blank contamination
y	Trip blank contamination	z	Method blank contamination	z	Laboratory storage blank contamination
z	Method blank contamination				

DATA VALIDATION REPORT - Level III Review

SDG No.: 03E-0429-04 **Fraction:** PETN_&_Nitroglycerin

Lab: TriMatrix **Project Name:** Radford_SSP

Reviewer: AS **Date:** February_3,_2004

This report presents the findings of a review of the referenced data. The report consists of this summary, copies of data reports with data qualifying flags applied (as required), the completed data validation checklist, supporting documentation, and an explanation of the data qualifying flags employed. The review performed is based on the USEPA Region III Modifications to the National Functional Guidelines for Data Review as pertains to the specifics of the analytical methods employed and provisions of the approved project-specific Quality Assurance Project Plan (QAPP).

Major Anomalies: None.

Minor Anomalies: None.

Correctable Anomalies: None.

Comments: All data are usable, as qualified, for their intended purpose based on the data reviewed.

Signed: Andrea Sansom

Andrea Sansom

DATA CHEM LABORATORIES
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COVER PAGE

ANALYTICAL REPORT FOR
URS Group, Inc.

Form COVER-V1.4
10090317511626
Page 1

G039200T

DCL Report Group..: **03E-0429-04**

Date Printed.....: 09-OCT-03 17:51

Project Protocol #: P021C002
Client Ref Number.: Subcontract DCL-09
Release Number....: 09604-317

Analysis Method(s): 8332

URS Group, Inc.
Attention: Mr. J Darren Renne
5540 Falmouth Street
Suite 201
Richmond, VA 23229

Client Sample Name	Laboratory Sample Name	Date Sampled	Date Received
37SB1C	03E04125	02-OCT-03	03-OCT-03
37SB2B	03E04127	02-OCT-03	03-OCT-03
37SB2C	03E04128	02-OCT-03	03-OCT-03
37SB3A	03E04129	02-OCT-03	03-OCT-03
37SB3B	03E04130	02-OCT-03	03-OCT-03
37SB3BMS	03E04130MS	02-OCT-03	03-OCT-03
37SB3BMSD	03E04130MSD	02-OCT-03	03-OCT-03
37SB3C	03E04131	02-OCT-03	03-OCT-03
QSB1A	03E04132	02-OCT-03	03-OCT-03
SBD3	03E04133	02-OCT-03	03-OCT-03
QSB1B	03E04134	02-OCT-03	03-OCT-03
QSB1C	03E04135	02-OCT-03	03-OCT-03
QSB3A	03E04136	02-OCT-03	03-OCT-03
QSB3B	03E04137	02-OCT-03	03-OCT-03
QSB3C	03E04138	02-OCT-03	03-OCT-03
QSB2A	03E04139	02-OCT-03	03-OCT-03
QSB2B	03E04140	02-OCT-03	03-OCT-03
QSB2C	03E04141	02-OCT-03	03-OCT-03
Method Blank	BL-211309-1	NA	NA
LCS	QC-211309-1	NA	NA

Analyst: Gloria W. Heung — 10-9-03 Date

Reviewer: Thomas T McKay — 10/10/03 Date

Lab Supervisor: Richard W. Wade — 10/10/03 Date

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S0392014

Date Printed.....: 09-OCT-03 17:51

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 03-OCT-03 00:00

DCL Preparation Group: G0395017
Date Prepared.....: 06-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **37SB1C**
DCL Sample Name...: **03E04125**
DCL Report Group..: **03E-0429-04**

Matrix.....: SOIL
Date Sampled.....: 02-OCT-03 08:45
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 14.3

DCL Analysis Group: G0395017
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	07-OCT-03 14:24	0.260	ND		U	1	1.17
Nitroglycerin	07-OCT-03 14:24	0.189	ND		U	1	0.583

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S0392015

Date Printed.....: 09-OCT-03 17:51

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 03-OCT-03 00:00

DCL Preparation Group: G0395017
Date Prepared.....: 06-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **37SB2B**
DCL Sample Name...: **03E04127**
DCL Report Group..: **03E-0429-04**

Matrix.....: SOIL
Date Sampled.....: 02-OCT-03 09:45
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 18.4

DCL Analysis Group: G0395017
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	07-OCT-03 14:47	0.273	ND		U	1	1.23
Nitroglycerin	07-OCT-03 14:47	0.199	ND		U	1	0.613

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S0392016

Date Printed.....: 09-OCT-03 17:51

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 03-OCT-03 00:00

DCL Preparation Group: G0395017
Date Prepared.....: 06-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **37SB2C**
DCL Sample Name...: **03E04128**
DCL Report Group..: **03E-0429-04**

Matrix.....: SOIL
Date Sampled.....: 02-OCT-03 10:00
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 21.2

DCL Analysis Group: G0395017
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	07-OCT-03 15:10	0.283	ND		U	1	1.27
Nitroglycerin	07-OCT-03 15:10	0.206	ND		U	1	0.635

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

S0392017

SAMPLE ANALYSIS DATA SHEET

Date Printed.....: 09-OCT-03 17:51

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 03-OCT-03 00:00

DCL Preparation Group: G0395017
Date Prepared.....: 06-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **37SB3A**
DCL Sample Name...: **03E04129**
DCL Report Group..: **03E-0429-04**

Matrix.....: SOIL
Date Sampled.....: 02-OCT-03 10:15
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 11.7

DCL Analysis Group: G0395017
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	07-OCT-03 15:33	0.253	ND		U	1	1.13
Nitroglycerin	07-OCT-03 15:33	0.183	ND		U	1	0.566

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

Form RLIMS63A-V1.4
10090317511626

S0392018

SAMPLE ANALYSIS DATA SHEET

Date Printed.....: 09-OCT-03 17:51

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 03-OCT-03 00:00

DCL Preparation Group: G0395017
Date Prepared.....: 06-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **37SB3B**
DCL Sample Name...: **03E04130**
DCL Report Group..: **03E-0429-04**

Matrix.....: SOIL
Date Sampled.....: 02-OCT-03 10:30
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 24.1

DCL Analysis Group: G0395017
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	07-OCT-03 17:13	0.294	ND		U	1	1.32
Nitroglycerin	07-OCT-03 17:13	0.213	ND		U	1	0.659

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039201C

Date Printed.....: 09-OCT-03 17:51

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 03-OCT-03 00:00

DCL Preparation Group: G0395017
Date Prepared.....: 06-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **37SB3C**
DCL Sample Name...: **03E04131**
DCL Report Group..: **03E-0429-04**

Matrix.....: SOIL
Date Sampled.....: 02-OCT-03 10:45
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 19.2

DCL Analysis Group: G0395017
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	07-OCT-03 18:20	0.276	ND		U	1	1.24
Nitroglycerin	07-OCT-03 18:20	0.200	ND		U	1	0.619

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039201D

Date Printed.....: 09-OCT-03 17:51

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 03-OCT-03 00:00

DCL Preparation Group: G0395017
Date Prepared.....: 06-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **QSB1A**
DCL Sample Name...: **03E04132**
DCL Report Group..: **03E-0429-04**

Matrix.....: SOIL
Date Sampled.....: 02-OCT-03 13:00
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 22.4

DCL Analysis Group: G0395017
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	07-OCT-03 18:42	0.287	ND		U	1	1.29
Nitroglycerin	07-OCT-03 18:42	0.209	ND		U	1	0.644

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

S039201F

SAMPLE ANALYSIS DATA SHEET

Date Printed.....: 09-OCT-03 17:51

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 03-OCT-03 00:00

DCL Preparation Group: G0395017
Date Prepared.....: 06-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **SBD3**
DCL Sample Name...: **03E04133**
DCL Report Group..: **03E-0429-04**

Matrix.....: SOIL
Date Sampled.....: 02-OCT-03 00:00
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 16.9

DCL Analysis Group: G0395017
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	07-OCT-03 19:04	0.268	ND		U	1	1.20
Nitroglycerin	07-OCT-03 19:04	0.195	ND		U	1	0.602

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DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039201G

Date Printed.....: 09-OCT-03 17:51

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 03-OCT-03 00:00

DCL Preparation Group: G0395017
Date Prepared.....: 06-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **QSB1B**
DCL Sample Name...: **03E04134**
DCL Report Group..: **03E-0429-04**

Matrix.....: SOIL
Date Sampled.....: 02-OCT-03 13:15
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 16.0

DCL Analysis Group: G0395017
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	07-OCT-03 19:25	0.265	ND		U	1	1.19
Nitroglycerin	07-OCT-03 19:25	0.193	ND		U	1	0.595

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DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039201H

Date Printed.....: 09-OCT-03 17:51

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 03-OCT-03 00:00

DCL Preparation Group: G0395017
Date Prepared.....: 06-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **QSB1C**
DCL Sample Name...: **03E04135**
DCL Report Group..: **03E-0429-04**

Matrix.....: SOIL
Date Sampled.....: 02-OCT-03 13:30
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 8.0

DCL Analysis Group: G0395017
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	07-OCT-03 20:09	0.242	ND		U	1	1.09
Nitroglycerin	07-OCT-03 20:09	0.176	ND		U	1	0.543

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DATA CHEM LABORATORIES
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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039201J

Date Printed.....: 09-OCT-03 17:51

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 03-OCT-03 00:00

DCL Preparation Group: G0395017
Date Prepared.....: 06-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **QSB3A**
DCL Sample Name...: **03E04136**
DCL Report Group..: **03E-0429-04**

Matrix.....: SOIL
Date Sampled.....: 02-OCT-03 14:30
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 25.0

DCL Analysis Group: G0395017
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	07-OCT-03 20:31	0.297	ND		U	1	1.33
Nitroglycerin	07-OCT-03 20:31	0.216	ND		U	1	0.667

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DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039201K

Date Printed.....: 09-OCT-03 17:51

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 03-OCT-03 00:00

DCL Preparation Group: G0395017
Date Prepared.....: 06-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **QSB3B**
DCL Sample Name...: **03E04137**
DCL Report Group..: **03E-0429-04**

Matrix.....: SOIL
Date Sampled.....: 02-OCT-03 14:45
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 14.5

DCL Analysis Group: G0395017
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	07-OCT-03 20:53	0.261	ND		U	1	1.17
Nitroglycerin	07-OCT-03 20:53	0.189	ND		U	1	0.585

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Date Printed.....: 09-OCT-03 17:51

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 03-OCT-03 00:00

DCL Preparation Group: G0395017
Date Prepared.....: 06-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **QSB3C**
DCL Sample Name...: **03E04138**
DCL Report Group..: **03E-0429-04**

Matrix.....: SOIL
Date Sampled.....: 02-OCT-03 15:00
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 7.7

DCL Analysis Group: G0395017
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	07-OCT-03 21:15	0.242	ND		U	1	1.08
Nitroglycerin	07-OCT-03 21:15	0.176	ND		U	1	0.542

DATA CHEM LABORATORIES
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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039201M

Date Printed.....: 09-OCT-03 17:51

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 03-OCT-03 00:00

DCL Preparation Group: G0395017
Date Prepared.....: 06-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **QSB2A**
DCL Sample Name...: **03E04139**
DCL Report Group..: **03E-0429-04**

Matrix.....: SOIL
Date Sampled.....: 02-OCT-03 15:10
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 14.2

DCL Analysis Group: G0395017
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	07-OCT-03 21:38	0.260	ND		U	1	1.17
Nitroglycerin	07-OCT-03 21:38	0.189	ND		U	1	0.583

DATA CHEM LABORATORIES
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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039201N

Date Printed.....: 09-OCT-03 17:51

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 03-OCT-03 00:00

DCL Preparation Group: G0395017
Date Prepared.....: 06-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **QSB2B**
DCL Sample Name...: **03E04140**
DCL Report Group..: **03E-0429-04**

Matrix.....: SOIL
Date Sampled.....: 02-OCT-03 15:20
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 15.4

DCL Analysis Group: G0395017
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	07-OCT-03 22:00	0.264	ND		U	1	1.18
Nitroglycerin	07-OCT-03 22:00	0.191	ND		U	1	0.591

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DATA CHEM LABORATORIES
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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039201P

Date Printed.....: 09-OCT-03 17:51

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 03-OCT-03 00:00

DCL Preparation Group: G0395017
Date Prepared.....: 06-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **QSB2C**
DCL Sample Name...: **03E04141**
DCL Report Group..: **03E-0429-04**

Matrix.....: SOIL
Date Sampled.....: 02-OCT-03 15:30
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 8.2

DCL Analysis Group: G0395017
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	07-OCT-03 22:23	0.243	ND		U	1	1.09
Nitroglycerin	07-OCT-03 22:23	0.176	ND		U	1	0.545

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DATA VALIDATION WORKSHEET

Reviewer: AS
Date: January-04
DV Level: II III IV
Review Document:
X Region III Modified for National Functional Guidelines
___ NFG for organic Data review (February 1994)
X Project QAPP/SAP

Explosives

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: DataChem
SDG No.: 03E-0429-04
Test Name: Explosives
Method No.: 8332-HPLC

1.0 Laboratory Deliverables

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. % solids		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes:

2.0 Holding Times

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	Action: If the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyese, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%	x		
	For initial Calibration: for %RSD > ±20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?	x		
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?			x
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.			x
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 40-150%?		x	
6.4	Are there any RPDs outside the QC limits not to exceed 60%?		x	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

7.0 Laboratory Control Sample (LCS)

		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 40-150%?		x	
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?			x
	Action: If Yes, J(+) only.			

Notes:

8.0 Field Duplicate

		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.			x
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.			x
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	x		

Notes:

	SBD3	QSB1A
PETN	ND	ND
nitroglycerin	ND	ND

10.0 Data Completeness			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		x		
	Number of samples:	16			
	Number of target compounds in each analysis:	2			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:



QUALITY CONTROL DATA SHEET
MATRIX SPIKE SAMPLE
MATRIX SPIKE DUPLICATE SAMPLE

Client Name.....: URS Group, Inc.
Release Number.....: 09604-317

Matrix.....: SOIL
Reporting Units.....: mg/Kg

DCL Preparation Group: G0395017
Date Prepared.....: 06-OCT-03 00:00
Preparation Method...: 8332

DCL Sample Name...: **03E04130MS**
Date Printed.....: 09-OCT-03 17:51

DCL Analysis Group: G0395017
Analysis Method...: OL-SW-8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

QC Limit Type.....: Method

Analytical Results

Analyte	Date Analyzed	Sample Result	Spiked Result	Spike Added	Percent Recovery	QC Limits	QC Flag
PETN	07-OCT-03 17:36	ND	16.1	20.0	80.6	65.0/125.	
Nitroglycerin	07-OCT-03 17:36	ND	15.7	20.0	78.3	65.0/125.	



DCL Sample Name...: **03E04130MSD**

Analytical Results

Analyte	Date Analyzed	Duplicate Result	Percent Recovery	Mean	Range	RPD	QC Limits	QC Flag
PETN	07-OCT-03 17:58	16.4	81.8	16.2	0.243	1.5	0.00/35.0	
Nitroglycerin	07-OCT-03 17:58	15.8	79.1	15.7	0.163	1.0	0.00/35.0	

10/6/03

Date of Extraction:	OCT 6, 2003	**DataChem** Laboratories Extraction Notebook	Book # Ext 246 Page#
Account #(s):	8001		
DCL Set ID(s):	03E-0429-04		Matrix: SOIL
Group/Lot ID:	G0395017 10/6/03		Method: 8332

	DCL Sample ID	Field ID	Initial Vol. / WT	Initial pH	Adj pH		Surr. Added	Matrix Spike		Final Volume
1	BL-211309-1	BL-211309-1	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
2	QC-211309-1	QC-211309-1	1.0gm	N/A	N/A	N/A	1mL	1mL	----	2mL
3	03E04124	37SB1B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
4	03E04125	37SB1C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
5	03E04127	37SB2B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
6	03E04128	37SB2C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
7	03E04129	37SB3A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
8	03E04130	37SB3B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
9	03E04130MS	37SB3BMS	1.0gm	N/A	N/A	N/A	1mL	1mL	----	2mL
10	03E04130MSD	37SB3BMSD	1.0gm	N/A	N/A	N/A	1mL	1mL	----	2mL
11	03E04131	37SB3C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
12	03E04132	QSB1A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
13	03E04133	SBD3	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
14	03E04134	QSB1B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
15	03E04135	QSB1C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
16	03E04136	QSB3A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
17	03E04137	QSB3B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
18	03E04138	QSB3C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
19	03E04139	QSB2A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
20	03E04140	QSB2B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
21	03E04141	QSB2C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
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10/5/03

Solvents:	MeCN	CH016	Comments:
Surrogate Spike:	239ws3	1/30/04 By:	
Matrix Spike:	239ws2	1/30/04 By:	
Matrix Spike:	----------	---------- By:	
Extractionist:		10/6/03	
Checker:		10/7/03	Sonicators tunned by:

*=Entry Error

DATA CHEM
LABORATORIES, INC.
A SORENSON COMPANY

37, Q

Case Narrative

RECEIVED
BY
DATE 10/15/03

Method:	SW-846 8332	**Client:**	URS
Analysis:	Nitroglycerin, PETN	**Account:**	8001
Preparation SOP #:	OL-SW-8332	**Matrix:**	Soil
Analysis SOP#:	OL-SW-8332		
DCL Set ID's:	03E-0429-04		

General Set Information: This set contained sixteen soil samples, a method blank, a laboratory control sample (LCS), a matrix spiked sample (MS) and a matrix spike duplicate.

Method Summary: A 1.0 gram portion of the soil samples was weighed, transferred into a suitable container, and 2 ml of acetonitrile was added. The samples were placed in an ultrasonic bath for a minimum of one hour. The samples were allowed to settle and the supernatant was filtered through a 0.45µ PTFE filter. One part acetonitrile extract was mixed with one part of a 1% calcium chloride solution, then injected into an HP1050 HPLC equipped with UV detection and a Phenomenex Ultracarb ODS C18 column. The instrument was adjusted to the proper operating parameters and allowed to equilibrate until a stable baseline was established. Initial calibration standards were analyzed and linear calibration curves were generated from the data. A continuing calibration standard was analyzed at the beginning of sample analysis, after each ten samples, and at the end of the analysis. The response of the continuing calibration standard must be within method limits when compared to the initial calibration curve.

Samples and QCs were analyzed under identical conditions as those used for initial and continuing calibration. Quantitation was based on calibration curves using the initial calibration standards. Results were reported in units of µg/g.

Sample Preparation: No anomalies were observed during the preparation of the samples.

Holding Times: The samples were prepared and analyzed within method required hold times.

Dilution(s): None.

This report contains
39 pages

Quality Control Data:

Blank: No confirmed method analytes were detected in the method blank above half of the CRDL.

Laboratory Control Samples: All recoveries met the method limits.

Surrogate Recovery: Surrogate recoveries were acceptable.

MS/MSD: Matrix spiking was performed on sample 03E04130. All percent recoveries and RPDs were within method limits.

Instrument QC: All initial and continuing calibration verification samples met method criteria.

Flagging Codes: The "U" flag indicates that the analyte was not detected at or above the MDL level. The "J" flag indicates that a value reported between the MDL and CRDL.

NC/CAR: None.

Miscellaneous Comments: None.

Confirmation Analyses: Any sample with a positive result above the MDL was qualitatively analyzed for confirmation on a second column. For samples requiring confirmation, one part acetonitrile extract was mixed with one part of a 1% calcium chloride solution, then injected into an HP1050 HPLC equipped with UV detection and a Phenomenex Synergi Polar-RP column. The instrument was adjusted to the proper operating parameters and allowed to equilibrate until a stable baseline was established. A CCV standard was run to establish retention times and a standard at a level near the reporting limits was run to verify low level sensitivity. The second column analyses were used for qualitative confirmation of analytes based on retention time. If a positive result is confirmed, the quantitative result from the primary column is reported.

Gloria W. Heung 10-9-03
Gloria W. Heung Date

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1067

Project Number	Project Name
07604-317	RFAAP

Project Contact (Name and Phone Number): Darren Renne (804) 965-9000

Samplers: Brett Fisher / John Spangler

LAB: Data Chem

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8332) PETN/ALK	Dioxin/Furan(8290)	TAL Metals (Including Mercury)	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	Paint Filter (9095B)	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
37SB1B	10/2/03 830	S		X	5	F	/	1						X		03E04124							37SB2A has
37SB1C	10/2/03 845	S		X	5	F	/	1						X				25					mostly sludge. Collected
37SB2A	10/2/03 930	S		X	5	F	/	1						X				26					MS/MSD because
37SB2B	10/2/03 945	S		X	5	F	/	1						X				27					of matrix difference
37SB2C	10/2/03 1000	S		X	5	F	/	1						X				28					soil vs sludge
37SB3A	10/2/03 1015	S		X	5	F	/	1						X				29					
37SB3B	10/2/03 1030	S		X	5	F	/	1						X				30					
37SB3B MS	10/2/03 1030	S		X	5	F	/	1						X				30 MS					
37SB3B MSD	10/2/03 1030	S		X	5	F	/	1						X				30 MSD					
37SB3C	10/2/03 1045	S		X	5	F	/	1						X				31					
37SB2A MS	10/2/03 930	S		X	5	F	/	1						X				26 MS					
37SB2A MSD	10/2/03 930	S		X	5	F	/	1						X				26 MSD					
QSB1A	10/2/03 1300	S		X	5	F	/	1						X				32					
SBD3	10/2/03 —	S		X	5	F	/	1						X				33					

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
[signature]	10/2/03 1800	FedEx			
Relinquished by: FedEx	Date/time 10/3/03 0900	Received by: (for lab) [signature] R-33-1	Date/Time	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

Earliest Sampling Date: 2-Oct-2003

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 17-Oct-2003

Project/Job/Task: P021C002 | Split: | Root Set ID: 03E-0429 * | Reporting Group | Analysis

Client: URS | Account: 08001

Comments:

Verified: JW 10/6/03

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Customer ID 2	04 Nitroglycein/PETN by 8332	05 Moisture	# Bottles
2-Oct-2003	37SB1B	03E04124			SOIL		X	X	1
2-Oct-2003	37SB1C	03E04125			SOIL		X	X	1
2-Oct-2003	37SB2B	03E04127			SOIL		X	X	1
2-Oct-2003	37SB2C	03E04128			SOIL		X	X	1
2-Oct-2003	37SB3A	03E04129			SOIL		X	X	1
2-Oct-2003	37SB3B	03E04130			SOIL		X	X	1
2-Oct-2003	37SB3BMS	03E04130MS		MS	SOIL		X		1
2-Oct-2003	37SB3BMSD	03E04130MSD		MSD	SOIL		X		1
2-Oct-2003	37SB3C	03E04131			SOIL		X	X	1
2-Oct-2003	QSB1A	03E04132			SOIL		X	X	1

1C JR ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Walk-in/ Room/ Shelf/ Fridge R-33-1 VB	10/06/03 12:00	Norman Breese	% moistures
Norman Breese	10/06/03 15:33	[signature]	[signature]

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

Check box if there is a continuation page ☐

Printed 10/3/2003 12:57

Form: COFC1.01-SWV2.30

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1068

Project Number	Project Name
07604 317	RFAAP

Project Contact (Name and Phone Number): Darren Fenne (804) 765 9000

Samplers: Brett Fisher / John Spangler

LAB: Data Chem

AIRBILL No:

Courier:

ANALYSES

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives ([redacted], 8332) PETN/NG	Dioxin/Furan(8290)	TAL Metals (Including Mercury)	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	Paint Filter (9095B)	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
QSB1 B	10/2/03 1315	S		X	S	F	/	1						X									03E04134
QSB1 C	10/2/03 1330	S		X	S	F	/	1						X									35
QSB3 A	10/2/03 1430	S		X	S	F	/	1						X									36
QSB3 B	10/2/03 1445	S		X	S	F	/	1						X									37
QSB3 C	10/2/03 1500	S		X	S	F	/	1						X									38
QSB2 A	10/2/03 1510	S		X	S	F	/	1						X									39
QSB2 B	10/2/03 1520	S		X	S	F	/	1						X									40
QSB2 C	10/2/03 1530	S		X	S	F	/	1						X									41

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
[signature] 10/2/03	1800	FedEx			
Relinquished by: FedEx 10/3/03	Date/time 0900	Received by: (for lab) [signature] R-33-1	Date/Time		

NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement

arliest Sampling Date: 2-Oct-2003

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 17-Oct-2003

Project/Job/Task: P021C002 | Split: | Root Set ID: 03E-0429 * | Reporting Group | Analysis

Client: URS | Account: 08001

Comments:

Verified: JW 10/6/03

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Customer ID 2					04 Nitroglycein/PETN by 8332	05 Moisture								# Bottles
2-Oct-2003	SBD3	03E04133			SOIL						X	X								1
2-Oct-2003	QSB1B	03E04134			SOIL						X	X								1
2-Oct-2003	QSB1C	03E04135			SOIL						X	X								1
2-Oct-2003	QSB3A	03E04136			SOIL						X	X								1
2-Oct-2003	QSB3B	03E04137			SOIL						X	X								1
2-Oct-2003	QSB3C	03E04138			SOIL						X	X								1
2-Oct-2003	QSB2A	03E04139			SOIL						X	X								1
2-Oct-2003	QSB2B	03E04140			SOIL						X	X								1
2-Oct-2003	QSB2C	03E04141			SOIL						X	X								1
2-Oct-2003	37SB3BMD	03E04130MD		MD	SOIL							X								0

ICSP ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Walk-in/ Room/ Shelf/ Fridge R-33-1 NB	10/06/03 12:00	Norman Breese	% moistures
Norman Breese	10/06/03 15:33	[signature]	[signature]

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

Check box if there is a continuation page ☐

Printed 10/3/2003 12:58

Form: COFC1.01-SWV2.30

DATACHEM LABORATORIES CLIENT-RELATED INFORMATION REPORT (CRIR)

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill In or Circle)

Client Name: URS

Project/Task/Site: 03E-0429

Date/Time of Receipt: 10/3/03 0900

Number of Coolers Received: 1

Condition of Coolers:	Acceptable/Unacceptable	Temperature Control:	Present/Not Included
Custody Seals:	Present/Absent/NA	Location Temp Taken:	Control/Between Samples
	Intact/Broken/NA	Are all temperatures within	
Tamper Evident:	Yes/No/NA	project specific guidelines?	Yes/No/NA
Ice Present:	Yes/No/NA	Are all applicable pHs within	
	Frozen/Melted/NA	specific guidelines?	Yes/No/NA

PH Check:							
	Metals	Yes/No/NA	Total Phenolics	Yes/No/NA	NO3/NO2	Yes/No/NA
	Cyanide	Yes/No/NA	TPH – 418.1	Yes/No/NA	Oil & Grease	Yes/No/NA
	Sulfide	Yes/No/NA	COD	Yes/No/NA	Total Phosphorous	Yes/No/NA
	Ammonia	Yes/No/NA	TKN	Yes/No/NA	Gross A.B, Gamma Spec	Yes/No/NA

Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.
1	C03- 0429	5 °C	4	C03-	°C	7	C03-	°C
2	C03-	°C	5	C03-	°C	8	C03-	°C
3	C03-	°C	6	C03-	°C	9	C03-	°C

Taken By: _____ (Signature) _____ (Printed Name) _____ (Date)

CLIENT-RELATED INFORMATION

☐ Missing Cooler	☐ Missing Samples/Bottles	☐ Incorrect Preservation	☐ Chain of Custody Problems
☐ Cooler Conditions	☐ Broken/Leaking Samples	☐ pH Criteria Not Met	☐ Other:
☐ Missing Paperwork	☐ Incorrect Bottle Type	☐ Head Space in Bottles	EPA Custody Seal:
☐ Missing/Incorrect Bottle labels	☐ Cooler Temperatures Out of range	☐ Insufficient Sample Volume	

BRIEFLY DESCRIBE THE PROBLEM AND THE ACTION TAKEN:

Date 10/3/03 FedEx Tracking Number 832942539024

Sender's Name Brett Fisher Phone 804 965-9000

Company DAMES & MOORE/URS/CRC

Address 5540 FALMOUTH ST STE 201 Dept/Floor/Suite/Room

City RICHMOND State VA ZIP 23230

Faxed to Client? YES ☐ NO ☐

Response Req

PROJE Your Internal Billing Reference 09604 317

PROJECT MANAGER COMMENTS:

DCL Project Manager: _____ (Printed Name) Returned to Sample Receipt by: _____ (Signature) Date: _____

Data Qualifying Codes

Two types of data qualifying codes or flags are applied in the course of the data review. The data validation flags indicate data that are not usable for decision-making, more than normally biased and/or variable, or not representative of field conditions. These codes and their definitions are presented below in the hierarchy stipulated in the USEPA Region III Modifications to the National Functional Guidelines for Data Review (September 1994).

Data Validation Flags

Flag	Interpretation
R	Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.
U	Not detected. The associated number indicates the approximate sample concentration is necessary to be detected.
B	Not detected substantially above the level reported in laboratory or field blanks.
N	Tentative Identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.
J	Analyte present. Reported value may not be accurate or precise.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
UL	Not detected, quantitation limit is probably higher.
NT	Not tested, no analytical result provided.

The other type of code used by URS is a "Reason Code". The reason code indicates the type of quality control failure that led to the application of the data validation flag.

Reason Codes

GC/MS Organics		GC and HPLC Organics		Inorganics and Conventionals	
Code	Interpretation	Code	Interpretation	Code	Interpretation
a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence
b	Bubble found in vial >6mm	b	Instrument performance failure	c	Calibration failure
c	Calibration failure; poor or unstable response	c	Calibration failure; poor or unstable response	d	MS/MSD imprecision
d	MS/MSD imprecision	d	MS/MSD imprecision	e	LCSD imprecision
e	LCSD imprecision	e	LCSD imprecision	f	Field duplicate imprecision
f	Field duplicate imprecision	f	Field duplicate imprecision	h	Holding time violation
h	Holding time violation	g	Dual column confirmation imprecision	k	Laboratory duplicate imprecision
i	Internal standard failure	h	Holding time violation	l	LCS recovery failure
j	Tuning failure or poor mass spectrometer performance	i	Internal standard failure	m	MS/MSD recovery failure
l	LCS recovery failure	l	LCS recovery failure	n	ICS failure
m	MS/MSD recovery failure	m	MS/MSD recovery failure	o	Calibration blank contamination
p	Poor chromatography	p	Poor chromatography	p	Preparation blank contamination
q	Concentration exceeded the linear range of the instrument	q	Concentration exceeded the linear range	q	Concentration exceeded the linear range
r	Linearity failure in initial calibration	r	Linearity failure in initial calibration	r	Linearity failure in calibration or MSA
s	Surrogate failure	s	Surrogate failure	s	Serial dilution failure
t	TIC	u	No confirmation column	v	Post-digestion spike failure
w	Identification criteria failure	w	Retention time failure	w	CRDL Standard Failure
x	Field blank contamination	x	Field blank contamination	x	Field blank contamination
y	Trip blank contamination	z	Method blank contamination	z	Laboratory storage blank contamination
z	Method blank contamination				

DATA VALIDATION REPORT - Level III Review

SDG No.: 03E-0433-01 **Fraction:** PETN_&_Nitroglycerin

Lab: TriMatrix **Project Name:** Radford_SSP

Reviewer: AS **Date:** February_3,_2004

This report presents the findings of a review of the referenced data. The report consists of this summary, copies of data reports with data qualifying flags applied (as required), the completed data validation checklist, supporting documentation, and an explanation of the data qualifying flags employed. The review performed is based on the USEPA Region III Modifications to the National Functional Guidelines for Data Review as pertains to the specifics of the analytical methods employed and provisions of the approved project-specific Quality Assurance Project Plan (QAPP).

Major Anomalies: None.

Minor Anomalies: None.

Correctable Anomalies: None.

Comments: All data are usable, as qualified, for their intended purpose based on the data reviewed.

Signed: Andrea Sansom

Andrea Sansom

DATA CHEM LABORATORIES
A Sorenson Company

COVER PAGE

ANALYTICAL REPORT FOR
URS Group, Inc.

Form COVER-V1.4
10160317392028
Page 1

G039600N

DCL Report Group..: **03E-0433-01**

Date Printed.....: 16-OCT-03 17:39

Project Protocol #: P021C002
Client Ref Number.: subcontract DCL-09
Release Number....: URS#01

Analysis Method(s): 8332

URS Group, Inc.
Attention: Mr. J Darren Renne
5540 Falmouth Street
Suite 201
Richmond, VA 23229

Client Sample Name	Laboratory Sample Name	Date Sampled	Date Received
Method Blank	BL-211379-1	NA	NA
LCS	QC-211379-1	NA	NA
68SB2A	03E04161	06-OCT-03	07-OCT-03
68SB2AMS	03E04161MS	06-OCT-03	07-OCT-03
68SB2AMSD	03E04161MSD	06-OCT-03	07-OCT-03
68SB2B	03E04162	06-OCT-03	07-OCT-03
68SB2C	03E04163	06-OCT-03	07-OCT-03
SBD5	03E04164	06-OCT-03	07-OCT-03
68SB1A	03E04165	06-OCT-03	07-OCT-03
68SB1B	03E04166	06-OCT-03	07-OCT-03
68SB1C	03E04167	06-OCT-03	07-OCT-03

Analyst: Gloria W. Heung — Date: 10/16/03

Reviewer: Thomas T McKay — Date: 10/20/03

Lab Supervisor: Richard W. Wade — Date: 10/20/03

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

Date Printed.....: 16-OCT-03 17:39

Client Name.....: URS Group, Inc.
Client Ref Number....: subcontract DCL-09292003
Sampling Site.....: RFAAP 09604-317
Release Number.....: URS#01

Date Received.....: 07-OCT-03 00:00

DCL Preparation Group: G039701D
Date Prepared.....: 08-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **68SB2A**
DCL Sample Name...: **03E04161**
DCL Report Group..: **03E-0433-01**

Matrix.....: SOIL
Date Sampled.....: 06-OCT-03 13:15
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 28.8

DCL Analysis Group: G039701D
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	15-OCT-03 18:45	0.313	ND		U	1	1.40
Nitroglycerin	15-OCT-03 18:45	0.228	ND		U	1	0.702



Date Printed.....: 16-OCT-03 17:39

Client Name.....: URS Group, Inc.
Client Ref Number....: subcontract DCL-09292003
Sampling Site.....: RFAAP 09604-317
Release Number.....: URS#01

Date Received.....: 07-OCT-03 00:00

DCL Preparation Group: G039701D
Date Prepared.....: 08-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **68SB2B**
DCL Sample Name...: **03E04162**
DCL Report Group..: **03E-0433-01**

Matrix.....: SOIL
Date Sampled.....: 06-OCT-03 18:30
Reporting Units...: mg/kg
Report Basis.....: ☐As Received ☒Dried
Percent Moisture..: 25.3

DCL Analysis Group: G039701D
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒Primary
☐Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	15-OCT-03 19:50	0.299	ND		U	1	1.34
Nitroglycerin	15-OCT-03 19:50	0.217	ND		U	1	0.669



SAMPLE ANALYSIS DATA SHEET

Date Printed.....: 16-OCT-03 17:39

Client Name.....: URS Group, Inc.
Client Ref Number....: subcontract DCL-09292003
Sampling Site.....: RFAAP 09604-317
Release Number.....: URS#01

Date Received.....: 07-OCT-03 00:00

DCL Preparation Group: G039701D
Date Prepared.....: 08-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **68SB2C**
DCL Sample Name...: **03E04163**
DCL Report Group..: **03E-0433-01**

Matrix.....: SOIL
Date Sampled.....: 06-OCT-03 13:45
Reporting Units...: mg/kg
Report Basis.....: ☐As Received ☒Dried
Percent Moisture..: 23.9

DCL Analysis Group: G039701D
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒Primary
☐Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	15-OCT-03 20:34	0.293	ND		U	1	1.31
Nitroglycerin	15-OCT-03 20:34	0.213	ND		U	1	0.657

DATA CHEM LABORATORIES
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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039601B

Date Printed.....: 16-OCT-03 17:39

Client Name.....: URS Group, Inc.
Client Ref Number....: subcontract DCL-09292003
Sampling Site.....: RFAAP 09604-317
Release Number.....: URS#01

Date Received.....: 07-OCT-03 00:00

DCL Preparation Group: G039701D
Date Prepared.....: 08-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **SBD5**
DCL Sample Name...: **03E04164**
DCL Report Group..: **03E-0433-01**

Matrix.....: SOIL
Date Sampled.....: 06-OCT-03 00:00
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 31.3

DCL Analysis Group: G039701D
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	15-OCT-03 20:56	0.325	ND		U	1	1.46
Nitroglycerin	15-OCT-03 20:56	0.236	ND		U	1	0.728

Date Printed.....: 16-OCT-03 17:39

Client Name.....: URS Group, Inc.
Client Ref Number....: subcontract DCL-09292003
Sampling Site.....: RFAAP 09604-317
Release Number.....: URS#01

Date Received.....: 07-OCT-03 00:00

DCL Preparation Group: G039701D
Date Prepared.....: 08-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **68SB1A**
DCL Sample Name...: **03E04165**
DCL Report Group..: **03E-0433-01**

Matrix.....: SOIL
Date Sampled.....: 06-OCT-03 00:00
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 22.8

DCL Analysis Group: G039701D
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	15-OCT-03 21:18	0.289	ND		U	1	1.30
Nitroglycerin	15-OCT-03 21:18	0.210	ND		U	1	0.648

Date Printed.....: 16-OCT-03 17:39

Client Name.....: URS Group, Inc.
Client Ref Number....: subcontract DCL-09292003
Sampling Site.....: RFAAP 09604-317
Release Number.....: URS#01

Date Received.....: 07-OCT-03 00:00

DCL Preparation Group: G039701D
Date Prepared.....: 08-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **68SB1B**
DCL Sample Name...: **03E04166**
DCL Report Group..: **03E-0433-01**

Matrix.....: SOIL
Date Sampled.....: 06-OCT-03 00:00
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 27.2

DCL Analysis Group: G039701D
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	15-OCT-03 21:39	0.306	ND		U	1	1.37
Nitroglycerin	15-OCT-03 21:39	0.223	ND		U	1	0.687



SAMPLE ANALYSIS DATA SHEET

Date Printed.....: 16-OCT-03 17:39

Client Name.....: URS Group, Inc.
Client Ref Number....: subcontract DCL-09292003
Sampling Site.....: RFAAP 09604-317
Release Number.....: URS#01

Date Received.....: 07-OCT-03 00:00

DCL Preparation Group: G039701D
Date Prepared.....: 08-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **68SB1C**
DCL Sample Name...: **03E04167**
DCL Report Group..: **03E-0433-01**

Matrix.....: SOIL
Date Sampled.....: 06-OCT-03 00:00
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 27.5

DCL Analysis Group: G039701D
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	15-OCT-03 22:01	0.308	ND		U	1	1.38
Nitroglycerin	15-OCT-03 22:01	0.223	ND		U	1	0.690

DATA VALIDATION WORKSHEET

Reviewer: AS
Date: January-04
DV Level: II III IV
Review Document:
_X_ Region III Modified for National Functional Guidelines
___ NFG for organic Data review (February 1994)
_X_ Project QAPP/SAP

Explosives

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: DataChem
SDG No.: 03E-0433-01
Test Name: Explosives
Method No.: 8332-HPLC

1.0 Laboratory Deliverables

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. % solids		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes:

2.0 Holding Times

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	Action: If the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyese, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%	x		
	For initial Calibration: for %RSD > ±20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?	x		
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?			x
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.			x
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 40-150%?		x	
6.4	Are there any RPDs outside the QC limits not to exceed 60%? Are there any RPDs outside the QC limits not to exceed 60%?		x	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

7.0 Laboratory Control Sample (LCS)

		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 40-150%?		x	
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?			x
	Action: If Yes, J(+) only.			

Notes:

8.0 Field Duplicate

		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

	SBD5	68SB2C	RPD	Delta	RL	5XRL	4XRL
PETN	ND	ND			1.31	6.55	5.24
nitroglycerin	ND	ND			0.657	3.285	2.628

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.			x
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.			x
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	x		

Notes:

10.0 Data Completeness			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		x		
	Number of samples:	7			
	Number of target compounds in each analysis:	2			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

DATA CHEM LABORATORIES
A Sorenson Company

FORM F (TYPE I)
SINGLE METHOD ANALYSES

QUALITY CONTROL DATA SHEET
MATRIX SPIKE SAMPLE
MATRIX SPIKE DUPLICATE SAMPLE


S0396016

Client Name.....: URS Group, Inc.
Release Number.....: URS#01

Matrix.....: SOIL
Reporting Units.....: mg/Kg

DCL Preparation Group: G039701D
Date Prepared.....: 08-OCT-03 00:00
Preparation Method...: 8332

DCL Sample Name...: **03E04161MS**
Date Printed.....: 16-OCT-03 17:58

DCL Analysis Group: G039701D
Analysis Method...: OL-SW-8332
Instrument Type...: HPLC
Instrument ID.....: 1c03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

QC Limit Type.....: Method

Analytical Results

Analyte	Date Analyzed	Sample Result	Spiked Result	Spike Added	Percent Recovery	QC Limits	QC Flag
PETN	15-OCT-03 19:07	ND	13.1	20.0	65.3	65.0/125.	
Nitroglycerin	15-OCT-03 19:07	ND	13.1	20.0	65.3	65.0/125.	


S0396017

DCL Sample Name...: **03E04161MSD**

Analytical Results

Analyte	Date Analyzed	Duplicate Result	Percent Recovery	Mean	Range	RPD	QC Limits	QC Flag
PETN	15-OCT-03 19:29	15.3	76.5	14.2	2.26	17.	0.00/35.0	
Nitroglycerin	15-OCT-03 19:29	14.1	70.6	13.6	1.05	7.7	0.00/35.0	

10/8/03

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Date of Extraction:	OCT 8, 2003
Account #(s):	8001
DCL Set ID(s):	03E-0433-01
Group/Lot ID:	G039701D 10/8/03

DataChem Laboratories Extraction Notebook

Book #	Ext 246	Page#
Matrix:	SOIL	
Method:	8332	

	DCL Sample ID	Field ID	Initial Vol. / WT	Initial pH	Adj pH			Surr. Added	Matrix Spike		Final Volume
1	BL-211379-1	BL-211379-1	1.0gm	N/A	N/A	N/A		1mL	----	----	2mL
2	QC-211379-1	QC-211379-1	1.0gm	N/A	N/A	N/A		1mL	1mL	----	2mL
3	03E04161	68SB2A	1.0gm	N/A	N/A	N/A		1mL	----	----	2mL
4	03E04161MS	68SB2AMS	1.0gm	N/A	N/A	N/A		1mL	1mL	----	2mL
5	03E04161MSD	68SB2AMSD	1.0gm	N/A	N/A	N/A		1mL	1mL	----	2mL
6	03E04162	68SB2B	1.0gm	N/A	N/A	N/A		1mL	----	----	2mL
7	03E04163	68SB2C	1.0gm	N/A	N/A	N/A		1mL	----	----	2mL
8	03E04164	SBD5	1.0gm	N/A	N/A	N/A		1mL	----	----	2mL
9	03E04165	68SB1A	1.0gm	N/A	N/A	N/A		1mL	----	----	2mL
10	03E04166	68SB1B	1.0gm	N/A	N/A	N/A		1mL	----	----	2mL
11	03E04167	68SB1C	1.0gm	N/A	N/A	N/A		1mL	----	----	2mL
12											
13											
14											
15											
16											
17											
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40											

Solvents:	MeCN	CH016	Comments:
Surrogate Spike:	239 ws 3	1/30/04 By:	
Matrix Spike:	239 ws 2	1/30/04 By:	
Matrix Spike:	----------	---------- By:	
Extractionist:	Boming Yan	10/8/03	
Checker:	Wen Y	10/08/03	Sonicators tunned by:

*=Entry Error

10/8/03

DATA CHEM LABORATORIES
A Sorenson Company

ANALYTICAL REPORT

10090311585339X

Date _____
Laboratory Group Name 03E-0433-02
Account No. 08001 URSO1

URS
Attention: Andrea Sansom
849 Intermountain Dr.
Sutie 320
Linthicum, MD 21090

FAX (410) 859-5202
Telephone (410) 859-5049
E-mail Andrea_Sansom@URScorp.com

Sampling Collection and Shipment

Sampling Site RFAAP 09604-317 Date of Collection October 06, 2003

Date Samples Received at Laboratory October 07, 2003

Analysis

Method of Analysis XX-EP-800

Date(s) of Analysis October 09, 2003

Analytical Results

Field Sample Number	Laboratory Number	Sample Type	MOISTURE %							
68SB2A	03E04161	SOIL	28.8							
68SB2AMD	03E04161MD	SOIL	24.3							
68SB2B	03E04162	SOIL	25.3							
68SB2C	03E04163	SOIL	23.9							
SBD5	03E04164	SOIL	31.3							
68SB1A	03E04165	SOIL	22.8							
68SB1B	03E04166	SOIL	27.2							
68SB1C	03E04167	SOIL	27.5							
Limit of Detection										

† See comment on last page.
ND Parameter not detected above LOD.
NR Parameter not requested.
NA Parameter not applicable.

** See comment on last page.
( ) Parameter between LOD and LOQ.

Norman Breese
Analyst: Norman Breese

Jon Yonk
Reviewer: Johnathan M. Yonk

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

DATA CHEM LABORATORIES
A Sorenson Company

ANALYTICAL REPORT

10090312271813X

Date _____
Laboratory Group Name 03E-0435-03
Account No. 08001

URS
Attention: Andrea Sansom
849 Intermountain Dr.
Sutie 320
Linthicum, MD 21090

FAX (410) 859-5202
Telephone (410) 859-5049
E-mail Andrea_Sansom@URScorp.com

Sampling Collection and Shipment

Sampling Site RFAAP/09292003 Date of Collection October 07, 2003

Date Samples Received at Laboratory October 08, 2003

Analysis

Method of Analysis XX-EP-800

Date(s) of Analysis October 09, 2003

Analytical Results

Field Sample Number	Laboratory Number	Sample Type	MOISTURE %								
68SB3A	03E04173	SOIL	13.4								
68SB3B	03E04174	SOIL	27.1								
68SB3C	03E04175	SOIL	42.2								
57SB1A	03E04176	SOIL	13.9								
57SB1B	03E04177	SOIL	29.1								
57SB1C	03E04178	SOIL	35.7								
57SB3A	03E04179	SOIL	30.3								
SBD6	03E04180	SOIL	24.8								
57SB3B	03E04181	SOIL	37.5								
57SB3C	03E04182	SOIL	29.6								
57SB2A	03E04183	SOIL	10.4								
57SB2B	03E04184	SOIL	20.0								
57SB2BMD	03E04184MD	SOIL	19.6								

† See comment on last page.
ND Parameter not detected above LOD.
NR Parameter not requested.
NA Parameter not applicable.

** See comment on last page.
( ) Parameter between LOD and LOQ.

Norman Breese
Analyst: Norman Breese

Jon Yonk
Reviewer: Johnathan M. Yonk

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

DATA CHEM LABORATORIES
A Sorenson Company

ANALYTICAL REPORT

10090312271813X

Date _____

Laboratory Group Name 03E-0435-03

Analytical Results

Field Sample Number	Laboratory Number	Sample Type	MOISTURE %							
57SB2C	03E04185	SOIL	3.0							
Limit of Detection										

† See comment on last page.
ND Parameter not detected above LOD.
NR Parameter not requested.
NA Parameter not applicable.

** See comment on last page.
( ) Parameter between LOD and LOQ.

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

Project No. X

TITLE Data Chem Laboratories % moisture & solids Book No. 4146

From Page No. X

Insert of preparatory report for sets: 03E-0433-02, 0435-03 & 0436-02
RB 10/09/03

%Moistures & Solids

Start Time: 21:54 08-Oct-03
Finish Time: 11:29 09-Oct-03

Set ID #	Dish #	Sample #	Dish (g)	Dish + Soil (g)	Soil weight(g)	Dish + Dry Soil (g)	Dry Soil (g)	% Solids	% Moistures
03E-0433-02	1	03E04161	1.47	6.72	5.25	5.21	3.74	71.2%	28.8%
03E-0433-02	2	03E04161MD	1.24	6.02	4.78	4.86	3.62	75.7%	24.3%
03E-0433-02	3	03E04162	1.45	5.08	3.63	4.16	2.71	74.7%	25.3%
03E-0433-02	4	03E04163	1.45	5.71	4.26	4.69	3.24	76.1%	23.9%
03E-0433-02	5	03E04164	1.46	5.68	4.22	4.36	2.90	68.7%	31.3%
03E-0433-02	6	03E04165	1.24	5.10	3.86	4.22	2.98	77.2%	22.8%
03E-0433-02	7	03E04166	1.25	5.26	4.01	4.17	2.92	72.8%	27.2%
03E-0433-02	8	03E04167	1.25	5.22	3.97	4.13	2.88	72.5%	27.5%
03E-0435-03	9	03E04173	1.25	5.29	4.04	4.75	3.50	86.6%	13.4%
03E-0435-03	10	03E04174	1.24	5.15	3.91	4.09	2.85	72.9%	27.1%
03E-0435-03	11	03E04175	1.26	5.19	3.93	3.53	2.27	57.8%	42.2%
03E-0435-03	12	03E04176	1.24	5.13	3.89	4.59	3.35	86.1%	13.9%
03E-0435-03	13	03E04177	1.24	5.30	4.06	4.12	2.88	70.9%	29.1%
03E-0435-03	14	03E04178	1.26	5.21	3.95	3.80	2.54	64.3%	35.7%
03E-0435-03	15	03E04179	1.25	6.80	5.55	5.12	3.87	69.7%	30.3%
03E-0435-03	16	03E04180	1.25	5.57	4.32	4.50	3.25	75.2%	24.8%
03E-0435-03	17	03E04181	1.25	5.41	4.16	3.85	2.60	62.5%	37.5%
03E-0435-03	18	03E04182	1.26	5.45	4.19	4.21	2.95	70.4%	29.6%
03E-0435-03	19	03E04183	1.25	5.01	3.76	4.62	3.37	89.6%	10.4%
03E-0435-03	20	03E04184	1.24	6.30	5.06	5.29	4.05	80.0%	20.0%
03E-0435-03	21	03E04184MD	1.24	6.29	5.05	5.30	4.06	80.4%	19.6%
03E-0435-03	22	03E04185	1.24	5.23	3.99	5.11	3.87	97.0%	3.0%
03E-0436-02	23	03E04187	1.25	7.97	6.72	7.16	5.91	87.9%	12.1%
03E-0436-02	24	03E04187MD	1.24	7.05	5.81	6.26	5.02	86.4%	13.6%
03E-0436-02	25	03E04188	1.24	6.34	5.10	6.13	4.89	95.9%	4.1%
03E-0436-02	26	03E04189	1.24	6.01	4.77	5.89	4.65	97.5%	2.5%
03E-0436-02	27	03E04190	1.25	5.05	3.80	4.96	3.71	97.6%	2.4%

RB 10/09/03

RB 10/09/03

To Page No. X

Witnessed & Understood by me,	Date	Invented by NA	Date
Lon York	10/9/03	Recorded by Norman Braque	10/09/03

DATA CHEM
LABORATORIES, INC.
A SORENSON COMPANY

Case Narrative

Method:	SW-846 8332	**Client:**	URS
Analysis:	Nitroglycerin, PETN	**Account:**	8001
Preparation SOP #:	OL-SW-8332	**Matrix:**	Solid
Analysis SOP#:	OL-SW-8332		
DCL Set ID's:	03E-0433-01		

General Set Information: This lot contained seven solid samples, a method blank, a laboratory control sample (LCS), a matrix spiked sample (MS) and a matrix spike duplicate.

Method Summary: A 1.0 gram portion of the soil samples was weighed, transferred into a suitable container, and 2 ml of acetonitrile was added. The samples were placed in an ultrasonic bath for a minimum of one hour. The samples were allowed to settle and the supernatant was filtered through a 0.45µ PTFE filter. One part acetonitrile extract was mixed with one part of a 1% calcium chloride solution, then injected into an HP1050 HPLC equipped with UV detection and a Phenomenex Ultracarb ODS C18 column. The instrument was adjusted to the proper operating parameters and allowed to equilibrate until a stable baseline was established. Initial calibration standards were analyzed and linear calibration curves were generated from the data. A continuing calibration standard was analyzed at the beginning of sample analysis, after each ten samples, and at the end of the analysis. The response of the continuing calibration standard must be within method limits when compared to the initial calibration curve.

Samples and QCs were analyzed under identical conditions as those used for initial and continuing calibration. Quantitation was based on calibration curves using the initial calibration standards. Results were reported in units of mg/Kg.

Sample Preparation: No anomalies were observed during the preparation of the samples.

Holding Times: The samples were prepared and analyzed within method required hold times.

Dilution(s): None.

Quality Control Data:

Blank: No confirmed method analytes were detected in the method blank above half of the CRDL.

Laboratory Control Samples: All recoveries met the method limits.

Surrogate Recovery: Surrogate recoveries were acceptable.

MS/MSD: Matrix spiking was performed on sample 03E04161. All percent recoveries and RPDs were within method limits.

Instrument QC: All initial and continuing calibration verification samples met method criteria.

Flagging Codes: The "U" flag indicates that the analyte was not detected at or above the MDL level. The "J" flag indicates that a value reported between the MDL and CRDL.

NC/CAR: None.

Miscellaneous Comments: None.

Confirmation Analyses: Any sample with a positive result above the MDL was qualitatively analyzed for confirmation on a second column. For samples requiring confirmation, one part acetonitrile extract was mixed with one part of a 1% calcium chloride solution, then injected into an HP1050 HPLC equipped with UV detection and a Phenomenex Synergi Polar-RP column. The instrument was adjusted to the proper operating parameters and allowed to equilibrate until a stable baseline was established. A CCV standard was run to establish retention times and a standard at a level near the reporting limits was run to verify low concentration sensitivity. The second column analyses were used for qualitative confirmation of analytes based on retention time. If a positive result is confirmed, the quantitative result from the primary column is reported.

Gloria W. Heung 10/17/03

Gloria W. Heung Date

SDG# URS#01 03E-0433

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1106

Project Number	Project Name
07604517	RFRAP

Project Contact (Name and Phone Number): Darren Rowe (804) 765 7060

Samplers: Brett Fisher / John Sparacino

LAB: Datachem

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330) PETN/NG	Dioxin/Furan(8290)	TAL Metals (Including Mercury)	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	Paint Filter (9095B)	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
685B24	10/6/03 1315	5		X	S	F	/	4						X									03E04161
685B24MS	10/6/03 1315	5		X	S	F	/	1						X									6/MS
685B24MSD	10/6/03 1315	5		X	S	F	/	1						X									6/MSD
685B25	10/6/03 1330	5		X	S	F	/	1						X									62
685B26	10/6/03 1345	5		X	S	F	/	1						X									63
5BD5	10/6/03	5		X	S	F	/	1						X									64
685B1A	10/6/03	5		X	S	F	/	1						X									65
685B1B	10/6/03	5		X	S	F	/	1						X									66
685B1C	10/6/03	5		X	S	F	/	1						X									67

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
Brett Fisher	10/6/03 1800	FedEx			
Relinquished by: FedEx	Date/time 10/7/03 0930	Received by: (for lab) R-33-1	Date/Time	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

Earliest Sampling Date: 6-Oct-2003

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 21-Oct-2003

Project/Job/Task: P021C002 | Split: | Root Set ID: 03E-0433 * | Reporting Group | 01 | 02 | # |

Client: URS | Account: 08001

Comments:

Verified: JW 10/7/03

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Customer ID 2			Analysis		Nitroglycein/PETN by 8332	Moisture							Bottles
6-Oct-2003	68SB2A	03E04161			SOIL						X	X							1
6-Oct-2003	68SB2AMS	03E04161MS		MS	SOIL						X								1
6-Oct-2003	68SB2AMSD	03E04161MSD		MSD	SOIL						X								1
6-Oct-2003	68SB2B	03E04162			SOIL						X	X							1
6-Oct-2003	68SB2C	03E04163			SOIL						X	X							1
6-Oct-2003	SBD5	03E04164			SOIL						X	X							1
6-Oct-2003	68SB1A	03E04165			SOIL						X	X							1
6-Oct-2003	68SB1B	03E04166			SOIL						X	X							1
6-Oct-2003	68SB1C	03E04167			SOIL						X	X							1
6-Oct-2003	68SB2AMD	03E04161MD		MD	SOIL							X							0

16B
JP

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Walk-in/Room/Shelf/Fridge R-33	10/8/03	[signature]	[signature]
[signature]	10/08/03 19:00	Norman Breese	% moistures
Norman Breese	10/08/03 20:27	R-319-1 NB	storage

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

255

Check box if there is a continuation page ☐

Printed 10/7/2003 12:30

Form: COFC1.01-SWV2.30

DATACHEM LABORATORIES CLIENT-RELATED INFORMATION REPORT (CRIR)

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill In or Circle)

Client Name: URS

Project/Task/Site: 03E-0433

Date/Time of Receipt: 10/7/03 0930

Number of Coolers Received: 1

Condition of Coolers:	(Acceptable)/Unacceptable	Temperature Control:	(Present)/Not Included
Custody Seals:	(Present)/Absent/NA	Location Temp Taken:	(Control)/Between Samples
	(Intact)/Broken/NA	Are all temperatures within	
Tamper Evident:	Yes/(No)/NA	project specific guidelines?	(Yes)/No/NA
Ice Present:	(Yes)/No/NA	Are all applicable pHs within	
	(Frozen)/Melted/NA	specific guidelines?	Yes/No/(NA)

PH Check:							
	Metals	Yes/No/NA	Total Phenolics	Yes/No/NA	NO3/NO2	Yes/No/NA
	Cyanide	Yes/No/NA	TPH – 418.1	Yes/No/NA	Oil & Grease	Yes/No/NA
	Sulfide	Yes/No/NA	COD	Yes/No/NA	Total Phosphorous	Yes/No/NA
	Ammonia	Yes/No/NA	TKN	Yes/No/NA	Gross A.B, Gamma Spec	Yes/No/NA

Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.
1	C03- 6433	2°C	4	C03-	°C	7	C03-	°C
2	C03-	°C	5	C03-	°C	8	C03-	°C
3	C03-	°C	6	C03-	°C	9	C03-	°C

Taken By: [signature] (Signature) J. Pate (Printed Name) 10/7/03 (Date)

CLIENT-RELATED INFORMATION

☐ Missing Cooler	☐ Missing Samples/Bottles	☐ Incorrect Preservation	☐ Chain of Custody Problems
☐ Cooler Conditions	☐ Broken/Leaking Samples	☐ pH Criteria Not Met	☐ Other:
☐ Missing Paperwork	☐ Incorrect Bottle Type	☐ Head Space in Bottles	EPA Custody Seal:
☐ Missing/Incorrect Bottle labels	☐ Cooler Temperatures Out of range	☐ Insufficient Sample Volume	

BRIEFLY DESCRIBE THE PROBLEM AND THE ACTION TAKEN:

Date 10/6/03 FedEx Tracking Number 832942539057

Sender's Name Brett Fisher Phone 804 965-9000

Company DAMES & MOORE/URS/CRC

Address 5540 FALMOUTH ST STE 201 Dept/Floor/Suite/Room

City RICHMOND State VA ZIP 23230

Faxed to Client? YES ☐ No ☐

Response Requi

PROJECT Your Internal Billing Reference 09604 317

PROJECT MANAGER COMMENTS:

DCL Project Manager: _____ (Printed Name) Returned to Sample Receipt by: _____ (Signature) Date: _____

SLC/CRIR.doc Revised 6/28/01

Data Qualifying Codes

Two types of data qualifying codes or flags are applied in the course of the data review. The data validation flags indicate data that are not usable for decision-making, more than normally biased and/or variable, or not representative of field conditions. These codes and their definitions are presented below in the hierarchy stipulated in the USEPA Region III Modifications to the National Functional Guidelines for Data Review (September 1994).

Data Validation Flags

Flag	Interpretation
R	Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.
U	Not detected. The associated number indicates the approximate sample concentration is necessary to be detected.
B	Not detected substantially above the level reported in laboratory or field blanks.
N	Tentative Identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.
J	Analyte present. Reported value may not be accurate or precise.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
UL	Not detected, quantitation limit is probably higher.
NT	Not tested, no analytical result provided.

The other type of code used by URS is a "Reason Code". The reason code indicates the type of quality control failure that led to the application of the data validation flag.

Reason Codes

GC/MS Organics		GC and HPLC Organics		Inorganics and Conventionals	
Code	Interpretation	Code	Interpretation	Code	Interpretation
a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence
b	Bubble found in vial >6mm	b	Instrument performance failure	c	Calibration failure
c	Calibration failure; poor or unstable response	c	Calibration failure; poor or unstable response	d	MS/MSD imprecision
d	MS/MSD imprecision	d	MS/MSD imprecision	e	LCSD imprecision
e	LCSD imprecision	e	LCSD imprecision	f	Field duplicate imprecision
f	Field duplicate imprecision	f	Field duplicate imprecision	h	Holding time violation
h	Holding time violation	g	Dual column confirmation imprecision	k	Laboratory duplicate imprecision
i	Internal standard failure	h	Holding time violation	l	LCS recovery failure
j	Tuning failure or poor mass spectrometer performance	i	Internal standard failure	m	MS/MSD recovery failure
l	LCS recovery failure	l	LCS recovery failure	n	ICS failure
m	MS/MSD recovery failure	m	MS/MSD recovery failure	o	Calibration blank contamination
p	Poor chromatography	p	Poor chromatography	p	Preparation blank contamination
q	Concentration exceeded the linear range of the instrument	q	Concentration exceeded the linear range	q	Concentration exceeded the linear range
r	Linearity failure in initial calibration	r	Linearity failure in initial calibration	r	Linearity failure in calibration or MSA
s	Surrogate failure	s	Surrogate failure	s	Serial dilution failure
t	TIC	u	No confirmation column	v	Post-digestion spike failure
w	Identification criteria failure	w	Retention time failure	w	CRDL Standard Failure
x	Field blank contamination	x	Field blank contamination	x	Field blank contamination
y	Trip blank contamination	z	Method blank contamination	z	Laboratory storage blank contamination
z	Method blank contamination				

DATA VALIDATION REPORT - Level III Review

SDG No.: 03E-0435-01 **Fraction:** PETN_&_Nitroglycerin

Lab: TriMatrix **Project Name:** Radford_SSP

Reviewer: AS **Date:** February_3,_2004

This report presents the findings of a review of the referenced data. The report consists of this summary, copies of data reports with data qualifying flags applied (as required), the completed data validation checklist, supporting documentation, and an explanation of the data qualifying flags employed. The review performed is based on the USEPA Region III Modifications to the National Functional Guidelines for Data Review as pertains to the specifics of the analytical methods employed and provisions of the approved project-specific Quality Assurance Project Plan (QAPP).

Major Anomalies: None.

Minor Anomalies: None.

Correctable Anomalies: None.

Comments: All data are usable, as qualified, for their intended purpose based on the data reviewed.

Signed: Andrea Sansom

Andrea Sansom

DATA CHEM LABORATORIES
A Sorenson Company

COVER PAGE

ANALYTICAL REPORT FOR
URS Group, Inc.

Form COVER-V1.4
10170315471281
Page 1

G0397006

DCL Report Group..: **03E-0435-01**

Date Printed.....: 17-OCT-03 15:47

Project Protocol #: P021C002
Client Ref Number.: Subcontract DCL-09
Release Number....: URS#01

Analysis Method(s): 8332

URS Group, Inc.
Attention: Mr. J Darren Renne
5540 Falmouth Street
Suite 201
Richmond, VA 23229

Client Sample Name	Laboratory Sample Name	Date Sampled	Date Received
Method Blank	BL-211423-1	NA	NA
LCS	QC-211423-1	NA	NA
LCS Dup	QD-211423-1	NA	NA
EQB3	03E04186	07-OCT-03	08-OCT-03

Analyst: Gloria W. Heung — 10/17/03 Date

Reviewer: Thomas T McKay — 10/20/03 Date

Lab Supervisor: Richard W. Wade — 10/21/03 Date

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

Date Printed.....: 17-OCT-03 15:47

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09292003
Release Number.....: URS#01

Date Received.....: 08-OCT-03 00:00

Client Sample Name: **EQB3**
DCL Sample Name...: **03E04186**
DCL Report Group..: **03E-0435-01**

Matrix.....: WATER
Date Sampled.....: 07-OCT-03 16:00
Reporting Units...: ug/L
Report Basis.....: ☒ As Received ☐ Dried

DCL Preparation Group: G039D01R
Date Prepared.....: 13-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 770 mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G039D01R
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	16-OCT-03 20:32	0.311	ND		U	1	0.970
Nitroglycerin	16-OCT-03 20:32	0.213	ND		U	1	0.970

DATA VALIDATION WORKSHEET

Reviewer: AS
Date: January-04
DV Level: II III IV
Review Document:
_X_ Region III Modified for National Functional Guidelines
____ NFG for organic Data review (February 1994)
_X_ Project QAPP/SAP

Explosives

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: DataChem
SDG No.: 03E-0435-01
Test Name: Explosives
Method No.: 8332-HPLC

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. % solids		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes:

2.0 Holding Times		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	Action: If the temperature of the cooler was elevated (> 10 ^{O}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyese, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%	x		
	For initial Calibration: for %RSD > ±20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?	x		
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?			x
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.			x
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 40-150%?		x	
6.4	Are there any RPDs outside the QC limits not to exceed 60%?		x	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

7.0 Laboratory Control Sample (LCS)		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 40-150%?		x	
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?			x
	Action: If Yes, J(+) only.			

Notes:

8.0 Field Duplicate		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.			x
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.			x
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	x		

Notes:

10.0 Data Completeness			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		x		
	Number of samples:	1			
	Number of target compounds in each analysis:	2			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

LB 10/13/03

Date of Extraction:	10/13/03	**DataChem Laboratories Extraction Notebook**	Book # Ext 007 Page# 55
Account #(s):	8001		
DCL Set ID(s):	03E-0435-01		Matrix: WATER
Group/Lot ID:	G039D01R		Method: 8332

	DCL Sample ID	Field ID	Initial Vol. / WT	Initial pH	Adj pH		Surr. Added	Matrix Spike		Final Volume
1	BL-211423-1	BL-211423-1	770mL	N/A	N/A	N/A	1mL	----	----	5mL
2	QC-211423-1	QC-211423-1	770mL	N/A	N/A	N/A	1mL	1mL	----	5mL
3	QD-211423-1	QD-211423-1	770mL	N/A	N/A	N/A	1mL	1mL	----	5mL
4	03E04186	EQB3	770mL	N/A	N/A	N/A	1mL	----	----	5mL
5										
6										
7										
8										
9										
10										
11										
12										
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40										

Solvents:	MeCN	C1946	Comments: Not enough Sample for MS/MSD LB 10/13/03
Surrogate Spike:	239WS3 #2	01/30/2004 By: LB	
Matrix Spike:	239WS99	04/12/2004 By: LB	
Matrix Spike:	----------	---------- By: NA	
Extractionist:	DJB	10/13/03	
Checker:		10/13/03	Sonicators tunned by: NA

*=Entry Error

LB 10/13/03

DATA CHEM
LABORATORIES, INC.
A SORENSON COMPANY

Case Narrative

Method:	SW-846 8332	**Client:**	URS
Analysis:	Nitroglycerin, PETN	**Account:**	8001
Preparation SOP #:	OL-SW-8332	**Matrix:**	Water
Analysis SOP#:	OL-SW-8332	**SDG#:**	URS#01
DCL Set ID's:	03E-0435-01		

General Set Information: This set consisted of one water sample, a method blank, a laboratory control sample (LCS), and a laboratory control sample duplicate.

Method Summary: The samples were extracted using the double salting out procedure prescribed in EPA method 8332. An aliquot of 770 mL of each sample was saturated with salt and extracted twice with acetonitrile by stirring at timed intervals. The acetonitrile extracts were combined and re-extracted with fresh salt water. The final volume of the extract was adjusted to 5 mL for each sample and filtered through a 0.45 um PTFE filter. One part acetonitrile extract was mixed with one part of a 1% calcium chloride solution, and then injected into an HP1050 HPLC equipped with UV detection and a Phenomenex Ultracarb ODS column. The instrument was adjusted to the proper operating parameters and allowed to equilibrate until a stable baseline was established. Initial Calibration standards were analyzed and linear calibration curves were generated from the data. A continuing calibration standard was analyzed at the beginning of sample analysis and after each ten samples and at the end of the analysis. The response of the continuing calibration standard must be within method limits when compared to the initial calibration curve.

Samples and QCs were analyzed under identical conditions as those used for initial and continuing calibration. Quantitation was based on calibration curves using the initial calibration standards. Results were reported in units of µg/L.

Sample Preparation: No anomalies were observed during the preparation of the sample set.

Holding Times: The samples were prepared and analyzed within method required hold times.

Dilution(s): None

Quality Control Data:

Blank: No confirmed method analytes were detected in the method blank above half of the CRDL.

Laboratory Control Samples: All recoveries and RPDs were within method limits.

Surrogate Recovery: Surrogate recoveries were all acceptable.

MS/MSD: Matrix spiking was not performed due to insufficient amount of sample.

Instrument QC: All initial and continuing calibration verification samples met method criteria.

Flagging Codes: The "U" flag indicates that the analyte was not detected at or above the MDL level. The "J" flag indicates that the value reported was between the MDL and CRDL.

NC/CAR: None.

Miscellaneous Comments: Any sample with a positive result above the MDL was qualitatively analyzed for confirmation on a second column. For samples requiring confirmation, one part acetonitrile extract was mixed with one part of a 1% calcium chloride solution, then injected into an HP1050 HPLC equipped with UV detection and Phenomenex Synergi Polar-RP column. The instrument was adjusted to the proper operating parameters and allowed to equilibrate until a stable baseline was established. A CCV standard was run to establish retention times and a standard at the reporting limits was run to verify low concentration sensitivity. The second column analyses were used for qualitative confirmation of analytes based on retention time. When a positive result is confirmed, the quantitative result from the primary column is reported.

Gloria W. Heung 10-20-03

Gloria W. Heung Date

SDG# 01 03E-0435
URS# ~~02~~ 10/8/03

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1108

Project Number	Project Name
09604317	RFAAP

Project Contact (Name and Phone Number): Darren Renne (804) 965 9000

Samplers: Brett Fisher / John Spangler

LAB: Data Chem

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives ([redacted], 8332) PETN/NG	Dioxin/Furan(8290)	TAL Metals (Including Mercury)	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	Paint Filter (9095B)	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
EQB3	10/8/03 1600	5		X	4	F	/	2						X									03E04186

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
[signature]	10/8/03 1800	FedEx			
Relinquished by: FedEx	Date/time 10/8/03 0845	Received by: (for lab) [signature] R-33-1	Date/Time	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

Earliest Sampling Date: 7-Oct-2003

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 22-Oct-2003

Project/Job/Task: P021C002	Split:	Root Set ID: 03E-0435 *	Reporting Group	01									#
Client: URS		Account: 08001	Analysis	PETN/NG in Water by EPA 8332									Bottles
Comments:													
Verified: JW 10/8/03													

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Customer ID 2															
7-Oct-2003	EQB3	03E04186			WATER						X										2

15 SR ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Walk-in/ Room/ Shelf/ Fridge R-33-1 dlb	10/13/03 1030	D-L B-L	Ext. 8332
D-L B-L			

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

Check box if there is a continuation page ☐

Printed 10/8/2003 11:43

Form: COFC1.01-SWV2.30

DATACHEM LABORATORIES CLIENT-RELATED INFORMATION REPORT (CRIR)

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill In or Circle)

Client Name: URS

Project/Task/Site: 03E-0435

Date/Time of Receipt: 10/8/03 0845

Number of Coolers Received: 1

Condition of Coolers: (Acceptable)/Unacceptable

Custody Seals: (Present)/Absent/NA

(Intact)/Broken/NA

Tamper Evident: Yes/(No)/NA

Ice Present: (Yes)/No/NA

(Frozen)/Melted/NA

Temperature Control: (Present)/Not Included

Location Temp Taken: (Control)/Between Samples

Are all temperatures within project specific guidelines? (Yes)/No/NA

Are all applicable pHs within specific guidelines? Yes/No/(NA)

pH Check Performed:						
	Metals	Yes/No/NA	Total Phenolics	Yes/No/NA	NO3/NO2	Yes/No/NA
	Cyanide	Yes/No/NA	TPH – 418.1	Yes/No/NA	Oil & Grease	Yes/No/NA
	Sulfide	Yes/No/NA	COD	Yes/No/NA	Total Phosphorous	Yes/No/NA
	Ammonia	Yes/No/NA	TKN	Yes/No/NA	Gross A.B, Gamma Spec	Yes/No/NA
Residual Chlorine Check Performed:	8270	Yes/No/NA	8310	Yes/No/NA	8330	Yes/No/(NA)
	8081	Yes/No/NA	8151	Yes/No/NA		

Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.
1	C03-0434	3°C	4	C03-	°C	7	C03-	°C
2	C03-	°C	5	C03-	°C	8	C03-	°C
3	C03-	°C	6	C03-	°C	9	C03-	°C

Taken By: [signature] (Signature) J. Pate (Printed Name) 10/8/03 (Date)

CLIENT-RELATED INFORMATION

☐ Missing Cooler	☐ Missing Samples/Bottles	☐ Incorrect Preservation	☐ Insufficient Sample Volume
☐ Cooler Conditions	☐ Broken/Leaking Samples	☐ pH Criteria Not Met	☐ Chain of Custody Problems
☐ Missing Paperwork	☐ Incorrect Bottle Type	☐ Residual Chlorine Present	☐ Other:
☐ Missing/Incorrect Bottle Labels	☐ Cooler Temperatures Out of Range	☐ Head Space in Bottles	EPA Custody Seal:

BRIEFLY DESCRIBE THE PROBLEM AND THE ACTION TAKEN:

Date 10/7/03 FedEx Tracking Number 832942539079

Sender's Name Brett Fisher Phone 804 965-9000

Company DAMES & MOORE/URS/CRC

Address 5540 FALMOUTH ST STE 201 Dept/Floor/Suite/Room

City RICHMOND State VA ZIP 23230

Faxed to Client? YES ☐ NO ☐

Your Internal Billing Reference 09604 317

Response Requir

PROJECT MANAGEMENT

PROJECT MANAGER COMMENTS:

DCL Project Manager: _____ (Printed Name) Returned to Sample Receipt by: _____ (Signature) Date: _____

SLC/CRIR.doc Revised 1/01/03

Data Qualifying Codes

Two types of data qualifying codes or flags are applied in the course of the data review. The data validation flags indicate data that are not usable for decision-making, more than normally biased and/or variable, or not representative of field conditions. These codes and their definitions are presented below in the hierarchy stipulated in the USEPA Region III Modifications to the National Functional Guidelines for Data Review (September 1994).

Data Validation Flags

Flag	Interpretation
R	Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.
U	Not detected. The associated number indicates the approximate sample concentration is necessary to be detected.
B	Not detected substantially above the level reported in laboratory or field blanks.
N	Tentative Identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.
J	Analyte present. Reported value may not be accurate or precise.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
UL	Not detected, quantitation limit is probably higher.
NT	Not tested, no analytical result provided.

The other type of code used by URS is a "Reason Code". The reason code indicates the type of quality control failure that led to the application of the data validation flag.

Reason Codes

GC/MS Organics		GC and HPLC Organics		Inorganics and Conventionals	
Code	Interpretation	Code	Interpretation	Code	Interpretation
a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence
b	Bubble found in vial >6mm	b	Instrument performance failure	c	Calibration failure
c	Calibration failure; poor or unstable response	c	Calibration failure; poor or unstable response	d	MS/MSD imprecision
d	MS/MSD imprecision	d	MS/MSD imprecision	e	LCSD imprecision
e	LCSD imprecision	e	LCSD imprecision	f	Field duplicate imprecision
f	Field duplicate imprecision	f	Field duplicate imprecision	h	Holding time violation
h	Holding time violation	g	Dual column confirmation imprecision	k	Laboratory duplicate imprecision
i	Internal standard failure	h	Holding time violation	l	LCS recovery failure
j	Tuning failure or poor mass spectrometer performance	i	Internal standard failure	m	MS/MSD recovery failure
l	LCS recovery failure	l	LCS recovery failure	n	ICS failure
m	MS/MSD recovery failure	m	MS/MSD recovery failure	o	Calibration blank contamination
p	Poor chromatography	p	Poor chromatography	p	Preparation blank contamination
q	Concentration exceeded the linear range of the instrument	q	Concentration exceeded the linear range	q	Concentration exceeded the linear range
r	Linearity failure in initial calibration	r	Linearity failure in initial calibration	r	Linearity failure in calibration or MSA
s	Surrogate failure	s	Surrogate failure	s	Serial dilution failure
t	TIC	u	No confirmation column	v	Post-digestion spike failure
w	Identification criteria failure	w	Retention time failure	w	CRDL Standard Failure
x	Field blank contamination	x	Field blank contamination	x	Field blank contamination
y	Trip blank contamination	z	Method blank contamination	z	Laboratory storage blank contamination
z	Method blank contamination				

DATA VALIDATION REPORT - Level III Review

SDG No.: 03E-0435-02 **Fraction:** PETN_&_Nitroglycerin

Lab: TriMatrix **Project Name:** Radford_SSP

Reviewer: AS **Date:** February_3,_2004

This report presents the findings of a review of the referenced data. The report consists of this summary, copies of data reports with data qualifying flags applied (as required), the completed data validation checklist, supporting documentation, and an explanation of the data qualifying flags employed. The review performed is based on the USEPA Region III Modifications to the National Functional Guidelines for Data Review as pertains to the specifics of the analytical methods employed and provisions of the approved project-specific Quality Assurance Project Plan (QAPP).

Major Anomalies: None.

Minor Anomalies: None.

Correctable Anomalies: None.

Comments: All data are usable, as qualified, for their intended purpose based on the data reviewed.

Signed: Andrea Sansom

Andrea Sansom

DATA CHEM LABORATORIES
A Sorenson Company

COVER PAGE

ANALYTICAL REPORT FOR
URS Group, Inc.

G0397007

DCL Report Group..: **03E-0435-02**

Date Printed.....: 17-OCT-03 15:47

Project Protocol #: P021C002
Client Ref Number.: Subcontract DCL-09
Release Number....: URS#01

Analysis Method(s): 8332

URS Group, Inc.
Attention: Mr. J Darren Renne
5540 Falmouth Street
Suite 201
Richmond, VA 23229

Client Sample Name	Laboratory Sample Name	Date Sampled	Date Received
Method Blank	BL-211424-1	NA	NA
LCS	QC-211424-1	NA	NA
68SB3A	03E04173	07-OCT-03	08-OCT-03
68SB3B	03E04174	07-OCT-03	08-OCT-03
68SB3C	03E04175	07-OCT-03	08-OCT-03
57SB1A	03E04176	07-OCT-03	08-OCT-03
57SB1B	03E04177	07-OCT-03	08-OCT-03
57SB1C	03E04178	07-OCT-03	08-OCT-03
57SB3A	03E04179	07-OCT-03	08-OCT-03
SBD6	03E04180	07-OCT-03	08-OCT-03
57SB3B	03E04181	07-OCT-03	08-OCT-03
57SB3C	03E04182	07-OCT-03	08-OCT-03
57SB2A	03E04183	07-OCT-03	08-OCT-03
57SB2B	03E04184	07-OCT-03	08-OCT-03
57SB2BMS	03E04184MS	07-OCT-03	08-OCT-03
57SB2BMSD	03E04184MSD	07-OCT-03	08-OCT-03
57SB2C	03E04185	07-OCT-03	08-OCT-03

Analyst: Gloria W. Heung — Date 10/17/03

Reviewer: Thomas T McKay — Date 10/21/03

Lab Supervisor: Richard W. Wade — Date 10/24/03

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S0397018

Date Printed.....: 17-OCT-03 15:47

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09292003
Release Number.....: URS#01

Date Received.....: 08-OCT-03 00:00

DCL Preparation Group: G039B001
Date Prepared.....: 11-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **68SB3A**
DCL Sample Name...: **03E04173**
DCL Report Group..: **03E-0435-02**

Matrix.....: SOIL
Date Sampled.....: 07-OCT-03 08:10
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 13.4

DCL Analysis Group: G039B001
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	16-OCT-03 21:38	0.258	ND		U	1	1.15
Nitroglycerin	16-OCT-03 21:38	0.187	ND		U	1	0.577

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S0397019

Date Printed.....: 17-OCT-03 15:47

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09292003
Release Number.....: URS#01

Date Received.....: 08-OCT-03 00:00

DCL Preparation Group: G039B001
Date Prepared.....: 11-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **68SB3B**
DCL Sample Name...: **03E04174**
DCL Report Group..: **03E-0435-02**

Matrix.....: SOIL
Date Sampled.....: 07-OCT-03 08:30
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 27.1

DCL Analysis Group: G039B001
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	16-OCT-03 22:21	0.306	ND		U	1	1.37
Nitroglycerin	16-OCT-03 22:21	0.222	ND		U	1	0.686

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039701B

Date Printed.....: 17-OCT-03 15:47

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09292003
Release Number.....: URS#01

Date Received.....: 08-OCT-03 00:00

DCL Preparation Group: G039B001
Date Prepared.....: 11-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **68SB3C**
DCL Sample Name...: **03E04175**
DCL Report Group..: **03E-0435-02**

Matrix.....: SOIL
Date Sampled.....: 07-OCT-03 08:50
Reporting Units...: mg/kg
Report Basis.....: ☐As Received ☒Dried
Percent Moisture..: 42.2

DCL Analysis Group: G039B001
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒Primary
☐Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	16-OCT-03 22:43	0.386	ND		U	1	1.73
Nitroglycerin	16-OCT-03 22:43	0.280	ND		U	1	0.865

Date Printed.....: 17-OCT-03 15:47

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09292003
Release Number.....: URS#01

Date Received.....: 08-OCT-03 00:00

DCL Preparation Group: G039B001
Date Prepared.....: 11-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **57SB1A**
DCL Sample Name...: **03E04176**
DCL Report Group..: **03E-0435-02**

Matrix.....: SOIL
Date Sampled.....: 07-OCT-03 10:00
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 13.9

DCL Analysis Group: G039B001
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	16-OCT-03 23:05	0.259	ND		U	1	1.16
Nitroglycerin	16-OCT-03 23:05	0.188	ND		U	1	0.581

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039701D

Date Printed.....: 17-OCT-03 16:14

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09292003
Release Number.....: URS#01

Date Received.....: 08-OCT-03 00:00

DCL Preparation Group: G039B001
Date Prepared.....: 11-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **57SB1B**
DCL Sample Name...: **03E04177**
DCL Report Group..: **03E-0435-02**

Matrix.....: SOIL
Date Sampled.....: 07-OCT-03 10:15
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 29.1

DCL Analysis Group: G039B001
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	16-OCT-03 23:27	0.315	ND		U	1	1.41
Nitroglycerin	16-OCT-03 23:27	0.228	ND		U	1	0.705

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A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039701F

Date Printed.....: 17-OCT-03 15:47

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09292003
Release Number.....: URS#01

Date Received.....: 08-OCT-03 00:00

DCL Preparation Group: G039B001
Date Prepared.....: 11-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **57SB1C**
DCL Sample Name...: **03E04178**
DCL Report Group..: **03E-0435-02**

Matrix.....: SOIL
Date Sampled.....: 07-OCT-03 10:30
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 35.7

DCL Analysis Group: G039B001
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	16-OCT-03 23:48	0.347	ND		U	1	1.56
Nitroglycerin	16-OCT-03 23:48	0.252	ND		U	1	0.778



SAMPLE ANALYSIS DATA SHEET

Date Printed.....: 17-OCT-03 15:47

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09292003
Release Number.....: URS#01

Date Received.....: 08-OCT-03 00:00

DCL Preparation Group: G039B001
Date Prepared.....: 11-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **57SB3A**
DCL Sample Name...: **03E04179**
DCL Report Group..: **03E-0435-02**

Matrix.....: SOIL
Date Sampled.....: 07-OCT-03 11:00
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 30.3

DCL Analysis Group: G039B001
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	17-OCT-03 00:10	0.320	ND		U	1	1.43
Nitroglycerin	17-OCT-03 00:10	0.232	ND		U	1	0.717

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039701H

Date Printed.....: 17-OCT-03 15:47

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09292003
Release Number.....: URS#01

Date Received.....: 08-OCT-03 00:00

DCL Preparation Group: G039B001
Date Prepared.....: 11-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **SBD6**
DCL Sample Name...: **03E04180**
DCL Report Group..: **03E-0435-02**

Matrix.....: SOIL
Date Sampled.....: 07-OCT-03 00:00
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 24.8

DCL Analysis Group: G039B001
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	17-OCT-03 00:32	0.297	ND		U	1	1.33
Nitroglycerin	17-OCT-03 00:32	0.215	ND		U	1	0.665

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039701J

Date Printed.....: 17-OCT-03 15:47

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09292003
Release Number.....: URS#01

Date Received.....: 08-OCT-03 00:00

DCL Preparation Group: G039B001
Date Prepared.....: 11-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **57SB3B**
DCL Sample Name...: **03E04181**
DCL Report Group..: **03E-0435-02**

Matrix.....: SOIL
Date Sampled.....: 07-OCT-03 11:15
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 37.5

DCL Analysis Group: G039B001
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	17-OCT-03 01:16	0.357	ND		U	1	1.60
Nitroglycerin	17-OCT-03 01:16	0.259	ND		U	1	0.800

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FAX (801) 268-9992 E-mail: lab@datachem.com

Date Printed.....: 17-OCT-03 15:47

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09292003
Release Number.....: URS#01

Date Received.....: 08-OCT-03 00:00

DCL Preparation Group: G039B001
Date Prepared.....: 11-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **57SB3C**
DCL Sample Name...: **03E04182**
DCL Report Group..: **03E-0435-02**

Matrix.....: SOIL
Date Sampled.....: 07-OCT-03 11:30
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 29.6

DCL Analysis Group: G039B001
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	17-OCT-03 01:38	0.317	ND		U	1	1.42
Nitroglycerin	17-OCT-03 01:38	0.230	ND		U	1	0.710

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

Form RLIMS63A-V1.4
10170315473321
Page 13

S039701L

Date Printed.....: 17-OCT-03 15:47

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09292003
Release Number.....: URS#01

Date Received.....: 08-OCT-03 00:00

DCL Preparation Group: G039B001
Date Prepared.....: 11-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **57SB2A**
DCL Sample Name...: **03E04183**
DCL Report Group..: **03E-0435-02**

Matrix.....: SOIL
Date Sampled.....: 07-OCT-03 14:00
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 10.4

DCL Analysis Group: G039B001
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	17-OCT-03 01:59	0.249	ND		U	1	1.12
Nitroglycerin	17-OCT-03 01:59	0.181	ND		U	1	0.558

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039701M

Date Printed.....: 17-OCT-03 15:47

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09292003
Release Number.....: URS#01

Date Received.....: 08-OCT-03 00:00

DCL Preparation Group: G039B001
Date Prepared.....: 11-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **57SB2B**
DCL Sample Name...: **03E04184**
DCL Report Group..: **03E-0435-02**

Matrix.....: SOIL
Date Sampled.....: 07-OCT-03 14:20
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 20.0

DCL Analysis Group: G039B001
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: 1c03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	17-OCT-03 02:22	0.279	ND		U	1	1.25
Nitroglycerin	17-OCT-03 02:22	0.203	ND		U	1	0.625

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Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

Date Printed.....: 17-OCT-03 15:47

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09292003
Release Number.....: URS#01

Date Received.....: 08-OCT-03 00:00

DCL Preparation Group: G039B001
Date Prepared.....: 11-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **57SB2C**
DCL Sample Name...: **03E04185**
DCL Report Group..: **03E-0435-02**

Matrix.....: SOIL
Date Sampled.....: 07-OCT-03 14:30
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 3.0

DCL Analysis Group: G039B001
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	17-OCT-03 03:29	0.230	ND		U	1	1.03
Nitroglycerin	17-OCT-03 03:29	0.167	ND		U	1	0.515

DATA VALIDATION WORKSHEET

Explosives

Reviewer: AS
Date: January-04
DV Level: II III IV

Review Document:

_X_ Region III Modified for National Functional Guidelines
___ NFG for organic Data review (February 1994)
_X_ Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: DataChem
SDG No.: 03E-0435-02
Test Name: Explosives
Method No.: 8332-HPLC

1.0 Laboratory Deliverables

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. % solids		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes:

2.0 Holding Times

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	Action: If the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyese, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%	x		
	For initial Calibration: for %RSD > ±20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?	x		
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?			x
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.			x
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 40-150%?		x	
6.4	Are there any RPDs outside the QC limits not to exceed 60%?		x	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

7.0 Laboratory Control Sample (LCS)

		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 40-150%?		x	
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?			x
	Action: If Yes, J(+) only.			

Notes:

8.0 Field Duplicate

		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

	SBD6	57SB3A
PETN	ND	ND
nitroglycerin	ND	ND

9.0 Compound Identification and Detection Limit Verification

		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.			x
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.			x
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	x		

Notes:

10.0 Data Completeness

			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		x		
	Number of samples:	13			
	Number of target compounds in each analysis:	2			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

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FORM F (TYPE I)
SINGLE METHOD ANALYSES

QUALITY CONTROL DATA SHEET
MATRIX SPIKE SAMPLE
MATRIX SPIKE DUPLICATE SAMPLE


S039701N

Client Name.....: URS Group, Inc.
Release Number.....: URS#01

Matrix.....: SOIL
Reporting Units.....: mg/Kg

DCL Preparation Group: G039B001
Date Prepared.....: 11-OCT-03 00:00
Preparation Method...: 8332

DCL Sample Name...: **03E04184MS**
Date Printed.....: 17-OCT-03 15:47

DCL Analysis Group: G039B001
Analysis Method...: OL-SW-8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

QC Limit Type.....: Method

Analytical Results

Analyte	Date Analyzed	Sample Result	Spiked Result	Spike Added	Percent Recovery	QC Limits	QC Flag
PETN	17-OCT-03 02:44	ND	17.8	20.0	89.0	65.0/125.	
Nitroglycerin	17-OCT-03 02:44	ND	16.9	20.0	84.5	65.0/125.	


S039701P

DCL Sample Name...: **03E04184MSD**

Analytical Results

Analyte	Date Analyzed	Duplicate Result	Percent Recovery	Mean	Range	RPD	QC Limits	QC Flag
PETN	17-OCT-03 03:07	18.0	90.1	17.9	0.218	1.2	0.00/35.0	
Nitroglycerin	17-OCT-03 03:07	16.2	81.0	16.6	0.696	4.2	0.00/35.0	

Bm 10/12/03

Date of Extraction:	OCT 12, 2003	**DataChem** Laboratories Extraction Notebook	Book # Ext 246 Page#
Account #(s):	8001		
DCL Set ID(s):	03E-0435-02		Matrix: SOIL
Group/Lot ID:	G039B001		Method: 8332

	DCL Sample ID	Field ID	Initial Vol. / WT	Initial pH	Adj pH		Surr. Added	Matrix Spike		Final Volume
1	BL-211424-1	BL-211424-1	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
2	QC-211424-1	QC-211424-1	1.0gm	N/A	N/A	N/A	1mL	1mL	----	2mL
3	03E04173	68SB3A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
4	03E04174	68SB3B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
5	03E04175	68SB3C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
6	03E04176	57SB1A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
7	03E04177	57SB1B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
8	03E04178	57SB1C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
9	03E04179	57SB3A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
10	03E04180	SBD6	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
11	03E04181	57SB3B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
12	03E04182	57SB3C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
13	03E04183	57SB2A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
14	03E04184	57SB2B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
15	03E04184MS	57SB2BMS	1.0gm	N/A	N/A	N/A	1mL	1mL	----	2mL
16	03E04184MSD	57SB2BMSD	1.0gm	N/A	N/A	N/A	1mL	1mL	----	2mL
17	03E04185	57SB2C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
18										
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Bm 10/12/03

Bm 10/12/03

Solvents:	MeCN	CH016	Comments:
Surrogate Spike:	239 ws 3	1/30/04 By: Bm	
Matrix Spike:	239 ws 2	1/30/04 By: Bm	
Matrix Spike:	----------	----------By:	
Extractionist:	Bomin Yang	10/12/03	
Checker:	Vicki Tsai	10/12/03	Sonicators tunned by:

*=Entry Error

DATA CHEM
LABORATORIES, INC.
A SORENSON COMPANY

Case Narrative

Method:	SW-846 8332	**Client:**	URS
Analysis:	Nitroglycerin, PETN	**Account:**	8001
Preparation SOP #:	OL-SW-8332	**Matrix:**	Solid
Analysis SOP#:	OL-SW-8332	**SDG#:**	URS#01
DCL Set ID's:	03E-0435-02		

General Set Information: This lot contained thirteen solid samples, a method blank, a laboratory control sample (LCS), a matrix spiked sample (MS) and a matrix spike duplicate.

Method Summary: A 1.0 gram portion of the soil samples was weighed, transferred into a suitable container, and 2 ml of acetonitrile was added. The samples were placed in an ultrasonic bath for a minimum of one hour. The samples were allowed to settle and the supernatant was filtered through a 0.45µ PTFE filter. One part acetonitrile extract was mixed with one part of a 1% calcium chloride solution, then injected into an HP1050 HPLC equipped with UV detection and a Phenomenex Ultracarb ODS C18 column. The instrument was adjusted to the proper operating parameters and allowed to equilibrate until a stable baseline was established. Initial calibration standards were analyzed and linear calibration curves were generated from the data. A continuing calibration standard was analyzed at the beginning of sample analysis, after each ten samples, and at the end of the analysis. The response of the continuing calibration standard must be within method limits when compared to the initial calibration curve.

Samples and QCs were analyzed under identical conditions as those used for initial and continuing calibration. Quantitation was based on calibration curves using the initial calibration standards. Results were reported in units of mg/Kg.

Sample Preparation: No anomalies were observed during the preparation of the samples.

Holding Times: The samples were prepared and analyzed within method required hold times.

Dilution(s): None.

Quality Control Data:

Blank: No confirmed method analytes were detected in the method blank above half of the CRDL.

Laboratory Control Samples: All recoveries met the method limits.

Surrogate Recovery: Surrogate recoveries were acceptable.

MS/MSD: Matrix spiking was performed on sample 03E04184. All percent recoveries and RPDs were within method limits.

Instrument QC: All initial and continuing calibration verification samples met method criteria.

Flagging Codes: The "U" flag indicates that the analyte was not detected at or above the MDL level. The "J" flag indicates that a value reported between the MDL and CRDL.

NC/CAR: None.

Miscellaneous Comments: None.

Confirmation Analyses: Any sample with a positive result above the MDL was qualitatively analyzed for confirmation on a second column. For samples requiring confirmation, one part acetonitrile extract was mixed with one part of a 1% calcium chloride solution, then injected into an HP1050 HPLC equipped with UV detection and a Phenomenex Synergi Polar-RP column. The instrument was adjusted to the proper operating parameters and allowed to equilibrate until a stable baseline was established. A CCV standard was run to establish retention times and a standard at a level near the reporting limits was run to verify low concentration sensitivity. The second column analyses were used for qualitative confirmation of analytes based on retention time. If a positive result is confirmed, the quantitative result from the primary column is reported.

Gloria W. Heung 10/20/03
Gloria W. Heung Date

SDG# 01 03E-0435
URS#02 JP 10/8/03

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1153

Project Number	Project Name
89604 317	RFAAP

Project Contact (Name and Phone Number): Darren Tarina (804) 765 7000

Samplers: Brent Fisher / John Spangler

LAB: Data Chem

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, 8332) RDX/HMX	Dioxin/Furan(8290)	TAL Metals (Including Mercury)	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	Paint Filter (9095B)	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
0563 A	10/7/03 810	5		X	S	F	/	1						X									03E04173
0563 B	10/7/03 830	5		X	S	F	/	1						X									74
0563 C	10/7/03 850	5		X	S	F	/	1						X									75
575B1A	10/7/03 1000	5		X	S	F	/	1						X									76
575B1B	10/7/03 1015	5		X	S	F	/	1						X									77
5756 1 C	10/7/03 1030	5		X	S	F	/	1						X									78
5755 A	10/7/03 1100	5		X	S	F	/	1						X									79
5606	10/7/03 —	5		X	S	F	/	1						X									80
575B3 B	10/7/03 1115	5		X	S	F	/	1						X									81
575B3 C	10/7/03 1130	5		X	S	F	/	1						X									82
575B2A	10/7/03 1400	5		X	S	F	/	1						X									83
575B2B	10/7/03 1420	5		X	S	F	/	1						X									84
575B2B MS/MSD	10/7/03 1420	5		X	S	F	/	2						X									84 ms/msd
575B2C	10/7/03 1430	5		X	S	F	/	1						X									85

Box #1			Box #2			Box #3	Box #4	
1. Surface Water	6. Trip Blank		A. HCl + Ice	F. Ice Only		F. Filtered	R. Rush - 3 Day	
2. Ground Water	7. Oil		B. HNO3 + Ice	G. Other _____		U. Unfiltered	S. Standard 28 Day	
3. Leachate	8. Waste		C. NaOH + Ice	H. NaHSO4 + Ice			T. Timely 14 Day	
4. Rinsate	9. Other _____		D. H2SO4 + Ice	I. ZnAc + NaOH + Ice			O. Other _____	
5. Soil Sediment/Sludge			E. Unpreserved					

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
[signature]	10/7/03 1800	FedEx			
Relinquished by: FedEx	Date/time 10/8/03 0845	Received by: (for lab) R-33-1	Date/Time	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

Earliest Sampling Date: 7-Oct-2003

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 22-Oct-2003

Project/Job/Task: P021C002	Split:	Root Set ID: 03E-0435 *	Reporting Group	02	03								#
Client: URS		Account: 08001	Analysis	Nitroglycerin/PETN by 8332	Moisture								Bottles
Comments:													
Verified: KW 10/8/03													

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Customer ID 2														
7-Oct-2003	68SB3A	03E04173			SOIL						X	X								1
7-Oct-2003	68SB3B	03E04174			SOIL						X	X								1
7-Oct-2003	68SB3C	03E04175			SOIL						X	X								1
7-Oct-2003	57SB1A	03E04176			SOIL						X	X								1
7-Oct-2003	57SB1B	03E04177			SOIL						X	X								1
7-Oct-2003	57SB1C	03E04178			SOIL						X	X								1
7-Oct-2003	57SB3A	03E04179			SOIL						X	X								1
7-Oct-2003	SBD6	03E04180			SOIL						X	X								1
7-Oct-2003	57SB3B	03E04181			SOIL						X	X								1
7-Oct-2003	57SB3C	03E04182			SOIL						X	X								1

15C SQ ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Walk-in/ Room/ Shelf/ Fridge R-33-1 NB	10/8/03 20:00	Norman Burpe	D/O moisture
Norman Burpe R-33-1 NB	10/8/03 22:00	R-33-1 NB	%storage
	10/9/03 12:11		

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

Check box if there is a continuation page ☐

Printed 10/8/2003 11:44

Form: COPC1.01-SWV2.30

Earliest Sampling Date: 7-Oct-2003

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 22-Oct-2003

Project/Job/Task: P021C002 | Split: | Root Set ID: 03E-0435 * | Reporting Group

Client: URS | Account: 08001

Comments:

Verified: JW 10/8/03

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Customer ID 2	Analysis: 02 Nitroglycein/PETN by 8332	03 Moisture	# Bottles
7-Oct-2003	57SB2A	03E04183			SOIL		X	X	1
7-Oct-2003	57SB2B	03E04184			SOIL		X	X	1
7-Oct-2003	57SB2BMS	03E04184MS		MS	SOIL		X		1
7-Oct-2003	57SB2BMSD	03E04184MSD		MSD	SOIL		X		1
7-Oct-2003	57SB2C	03E04185			SOIL		X	X	1
7-Oct-2003	57SB2BMD	03E04184MD		MD	SOIL			X	0

15C JP ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Walk-in/ Room/ Shelf/ Fridge R-33-1 NB	10/8/03 20:00	Norman Breese	% moisture
Norman Breese R-33-1 NB	10/8/03 22:00	R-33-1 NB	storage
R-33-1 NB	10/11/03 12:..	[signature]	[signature]

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

Check box if there is a continuation page ☐

Printed 10/8/2003 11:44

Form: COFC1.01-SWV2.30

DATACHEM LABORATORIES CLIENT-RELATED INFORMATION REPORT (CRIR)

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill In or Circle)

Client Name: URS

Project/Task/Site: 03E-0435

Date/Time of Receipt: 10/8/03 0845

Number of Coolers Received: 1

Condition of Coolers: Acceptable/Unacceptable
Custody Seals: Present/Absent/NA
Intact/Broken/NA
Tamper Evident: Yes/No/NA
Ice Present: Yes/No/NA
Frozen/Melted/NA

Temperature Control: Present/Not Included
Location Temp Taken: Cooler/Between Samples
Are all temperatures within project specific guidelines? Yes/No/NA
Are all applicable pHs within specific guidelines? Yes/No/NA

pH Check Performed:							
	Metals	Yes/No/NA	Total Phenolics	Yes/No/NA	NO3/NO2	Yes/No/NA
	Cyanide	Yes/No/NA	TPH – 418.1	Yes/No/NA	Oil & Grease	Yes/No/NA
	Sulfide	Yes/No/NA	COD	Yes/No/NA	Total Phosphorous	Yes/No/NA
	Ammonia	Yes/No/NA	TKN	Yes/No/NA	Gross A.B, Gamma Spec	Yes/No/NA
Residual Chlorine Check Performed:	8270	Yes/No/NA	8310	Yes/No/NA	8330	Yes/No/NA
	8081	Yes/No/NA	8151	Yes/No/NA		

Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.
1	C03-0434	3°C	4	C03-	°C	7	C03 -	°C
2	C03-	°C	5	C03-	°C	8	C03-	°C
3	C03-	°C	6	C03-	°C	9	C03-	°C

Taken By: _____ (Signature) J. Pate (Printed Name) 10/8/03 (Date)

CLIENT-RELATED INFORMATION

- ☐ Missing Cooler
- ☐ Cooler Conditions
- ☐ Missing Paperwork
- ☐ Missing/Incorrect Bottle Labels
- ☐ Missing Samples/Bottles
- ☐ Broken/Leaking Samples
- ☐ Incorrect Bottle Type
- ☐ Cooler Temperatures Out of Range
- ☐ Incorrect Preservation
- ☐ pH Criteria Not Met
- ☐ Residual Chlorine Present
- ☐ Head Space in Bottles
- ☐ Insufficient Sample Volume
- ☐ Chain of Custody Problems
- ☐ Other:

EPA Custody Seal:

BRIEFLY DESCRIBE THE PROBLEM AND THE ACTION TAKEN:

ite 10/9/03 FedEx Tracking Number 832942539079

nder's ime Brett Fisher Phone 804 965-9000

Company DAMES & MOORE/URS/CRC

Address 5540 FALMOUTH ST STE 201 Dept./Floor/Suite/Room

y RICHMOND State VA ZIP 23230

Faxed to Client? YES ☐ NO ☐

ur Internal Billing Reference 09604 317

Response Requir

PROJECT MANAGEMENT

PROJECT MANAGER COMMENTS:

DCL Project Manager: _____ (Printed Name) Returned to Sample Receipt by: _____ (Signature) Date: _____

Data Qualifying Codes

Two types of data qualifying codes or flags are applied in the course of the data review. The data validation flags indicate data that are not usable for decision-making, more than normally biased and/or variable, or not representative of field conditions. These codes and their definitions are presented below in the hierarchy stipulated in the USEPA Region III Modifications to the National Functional Guidelines for Data Review (September 1994).

Data Validation Flags

Flag	Interpretation
R	Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.
U	Not detected. The associated number indicates the approximate sample concentration is necessary to be detected.
B	Not detected substantially above the level reported in laboratory or field blanks.
N	Tentative Identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.
J	Analyte present. Reported value may not be accurate or precise.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
UL	Not detected, quantitation limit is probably higher.
NT	Not tested, no analytical result provided.

The other type of code used by URS is a "Reason Code". The reason code indicates the type of quality control failure that led to the application of the data validation flag.

Reason Codes

GC/MS Organics		GC and HPLC Organics		Inorganics and Conventionals	
Code	Interpretation	Code	Interpretation	Code	Interpretation
a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence
b	Bubble found in vial >6mm	b	Instrument performance failure	c	Calibration failure
c	Calibration failure; poor or unstable response	c	Calibration failure; poor or unstable response	d	MS/MSD imprecision
d	MS/MSD imprecision	d	MS/MSD imprecision	e	LCSD imprecision
e	LCSD imprecision	e	LCSD imprecision	f	Field duplicate imprecision
f	Field duplicate imprecision	f	Field duplicate imprecision	h	Holding time violation
h	Holding time violation	g	Dual column confirmation imprecision	k	Laboratory duplicate imprecision
i	Internal standard failure	h	Holding time violation	l	LCS recovery failure
j	Tuning failure or poor mass spectrometer performance	i	Internal standard failure	m	MS/MSD recovery failure
l	LCS recovery failure	l	LCS recovery failure	n	ICS failure
m	MS/MSD recovery failure	m	MS/MSD recovery failure	o	Calibration blank contamination
p	Poor chromatography	p	Poor chromatography	p	Preparation blank contamination
q	Concentration exceeded the linear range of the instrument	q	Concentration exceeded the linear range	q	Concentration exceeded the linear range
r	Linearity failure in initial calibration	r	Linearity failure in initial calibration	r	Linearity failure in calibration or MSA
s	Surrogate failure	s	Surrogate failure	s	Serial dilution failure
t	TIC	u	No confirmation column	v	Post-digestion spike failure
w	Identification criteria failure	w	Retention time failure	w	CRDL Standard Failure
x	Field blank contamination	x	Field blank contamination	x	Field blank contamination
y	Trip blank contamination	z	Method blank contamination	z	Laboratory storage blank contamination
z	Method blank contamination				

DATA VALIDATION REPORT - Level III Review

SDG No.: 03E-0441-01 **Fraction:** PETN_&_Nitroglycerin

Lab: TriMatrix **Project Name:** Radford_SSP

Reviewer: AS **Date:** February_3,_2004

This report presents the findings of a review of the referenced data. The report consists of this summary, copies of data reports with data qualifying flags applied (as required), the completed data validation checklist, supporting documentation, and an explanation of the data qualifying flags employed. The review performed is based on the USEPA Region III Modifications to the National Functional Guidelines for Data Review as pertains to the specifics of the analytical methods employed and provisions of the approved project-specific Quality Assurance Project Plan (QAPP).

Major Anomalies: None.

Minor Anomalies: The matrix spike pair for sample 57SB4A displayed recoveries less than the lower control limit (i.e., 65.0%) for nitroglycerin (60.7%/62.3%). The associated parent sample result was non-detect and was flagged "UJ,m".

Correctable Anomalies: None.

Comments: All data are usable, as qualified, for their intended purpose based on the data reviewed.

Signed: Andrea Sansom

Andrea Sansom

DATA CHEM LABORATORIES
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COVER PAGE

ANALYTICAL REPORT FOR
URS Group, Inc.

E-mail: Darren_Renne@URScorp.com

Form COVER-V1.4
10210316414163
Page 1

G039801B

DCL Report Group..: **03E-0441-01**

Date Printed.....: 21-OCT-03 16:41

Project Protocol #: P021C002
Client Ref Number.: Subcontract DCL-09
Release Number....: URS#02

Analysis Method(s): 8332

URS Group, Inc.
Attention: Mr. J Darren Renne
5540 Falmouth Street
Suite 201
Richmond, VA 23229

Client Sample Name	Laboratory Sample Name	Date Sampled	Date Received
Method Blank	BL-211483-1	NA	NA
LCS	QC-211483-1	NA	NA
57SB4A	03E04239	08-OCT-03	09-OCT-03
57SB4A	03E04239MS	08-OCT-03	09-OCT-03
57SB4A	03E04239MSD	08-OCT-03	09-OCT-03
69SB1A	03E04240	08-OCT-03	09-OCT-03
69SB1B	03E04241	08-OCT-03	09-OCT-03
69SB1C	03E04242	08-OCT-03	09-OCT-03
69SB3A	03E04243	08-OCT-03	09-OCT-03
SBD7	03E04244	08-OCT-03	09-OCT-03
69SB3B	03E04245	08-OCT-03	09-OCT-03
69SB3C	03E04246	08-OCT-03	09-OCT-03
69SB2A	03E04247	08-OCT-03	09-OCT-03
69SB2B	03E04248	08-OCT-03	09-OCT-03
69SB2C	03E04249	08-OCT-03	09-OCT-03
57SB4B	03E04250	08-OCT-03	09-OCT-03

Gloria W. Heung — 10/21/03
Analyst: Gloria W. Heung — Date

Thomas T McKay — 10/22/03
Reviewer: Thomas T McKay — Date

Richard W. Wade — 10/22/03
Lab Supervisor: Richard W. Wade — Date

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FAX (801) 268-9992 E-mail: lab@datachem.com

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039804Q

Date Printed.....: 21-OCT-03 16:41

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#02

Date Received.....: 09-OCT-03 00:00

DCL Preparation Group: G039B002
Date Prepared.....: 11-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **57SB4A**
DCL Sample Name...: **03E04239**
DCL Report Group..: **03E-0441-01**

Matrix.....: SOIL
Date Sampled.....: 08-OCT-03 09:15
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 34.3

DCL Analysis Group: G039B002
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	20-OCT-03 16:04	0.339	ND		U	1	1.52
Nitroglycerin	20-OCT-03 16:04	0.247	ND		U	1	0.761

UJ/M

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FAX (801) 268-9992 E-mail: lab@datachem.com

DATA CHEM LABORATORIES
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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

Form RLIMS63A-V1.4
10210316414163

S039804R

Date Printed.....: 21-OCT-03 16:41

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#02

Date Received.....: 09-OCT-03 00:00

DCL Preparation Group: G039B002
Date Prepared.....: 11-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **69SB1A**
DCL Sample Name...: **03E04240**
DCL Report Group..: **03E-0441-01**

Matrix.....: SOIL
Date Sampled.....: 08-OCT-03 11:30
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 27.2

DCL Analysis Group: G039B002
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	20-OCT-03 17:09	0.306	ND		U	1	1.37
Nitroglycerin	20-OCT-03 17:09	0.223	ND		U	1	0.687

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039804S

Date Printed.....: 21-OCT-03 16:41

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#02

Date Received.....: 09-OCT-03 00:00

DCL Preparation Group: G039B002
Date Prepared.....: 11-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **69SB1B**
DCL Sample Name...: **03E04241**
DCL Report Group..: **03E-0441-01**

Matrix.....: SOIL
Date Sampled.....: 08-OCT-03 11:45
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 20.5

DCL Analysis Group: G039B002
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	20-OCT-03 17:31	0.281	ND		U	1	1.26
Nitroglycerin	20-OCT-03 17:31	0.204	ND		U	1	0.629

DATA CHEM LABORATORIES
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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039804T

Date Printed.....: 21-OCT-03 16:41

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#02

Date Received.....: 09-OCT-03 00:00

DCL Preparation Group: G039B002
Date Prepared.....: 11-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **69SB1C**
DCL Sample Name...: **03E04242**
DCL Report Group..: **03E-0441-01**

Matrix.....: SOIL
Date Sampled.....: 08-OCT-03 12:00
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 23.7

DCL Analysis Group: G039B002
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	20-OCT-03 17:53	0.292	ND		U	1	1.31
Nitroglycerin	20-OCT-03 17:53	0.212	ND		U	1	0.655

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039804V

Date Printed.....: 21-OCT-03 16:41

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#02

Date Received.....: 09-OCT-03 00:00

DCL Preparation Group: G039B002
Date Prepared.....: 11-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **69SB3A**
DCL Sample Name...: **03E04243**
DCL Report Group..: **03E-0441-01**

Matrix.....: SOIL
Date Sampled.....: 08-OCT-03 14:15
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 24.1

DCL Analysis Group: G039B002
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	20-OCT-03 18:15	0.294	ND		U	1	1.32
Nitroglycerin	20-OCT-03 18:15	0.213	ND		U	1	0.659



SAMPLE ANALYSIS DATA SHEET

Date Printed.....: 21-OCT-03 16:41

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#02

Date Received.....: 09-OCT-03 00:00

DCL Preparation Group: G039B002
Date Prepared.....: 11-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **SBD7**
DCL Sample Name...: **03E04244**
DCL Report Group..: **03E-0441-01**

Matrix.....: SOIL
Date Sampled.....: 08-OCT-03 00:00
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 16.2

DCL Analysis Group: G039B002
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	20-OCT-03 18:37	0.266	ND		U	1	1.19
Nitroglycerin	20-OCT-03 18:37	0.193	ND		U	1	0.597

SAMPLE ANALYSIS DATA SHEET



Date Printed.....: 21-OCT-03 16:41

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#02

Date Received.....: 09-OCT-03 00:00

DCL Preparation Group: G039B002
Date Prepared.....: 11-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **69SB3B**
DCL Sample Name...: **03E04245**
DCL Report Group..: **03E-0441-01**

Matrix.....: SOIL
Date Sampled.....: 08-OCT-03 14:30
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 16.3

DCL Analysis Group: G039B002
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	20-OCT-03 19:20	0.266	ND		U	1	1.19
Nitroglycerin	20-OCT-03 19:20	0.194	ND		U	1	0.597



SAMPLE ANALYSIS DATA SHEET

Date Printed.....: 21-OCT-03 16:41

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#02

Date Received.....: 09-OCT-03 00:00

DCL Preparation Group: G039B002
Date Prepared.....: 11-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **69SB3C**
DCL Sample Name...: **03E04246**
DCL Report Group..: **03E-0441-01**

Matrix.....: SOIL
Date Sampled.....: 08-OCT-03 14:45
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 7.9

DCL Analysis Group: G039B002
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	20-OCT-03 19:42	0.242	ND		U	1	1.09
Nitroglycerin	20-OCT-03 19:42	0.176	ND		U	1	0.543

DATA CHEM LABORATORIES
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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039804Z

Date Printed.....: 21-OCT-03 16:41

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#02

Date Received.....: 09-OCT-03 00:00

DCL Preparation Group: G039B002
Date Prepared.....: 11-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **69SB2A**
DCL Sample Name...: **03E04247**
DCL Report Group..: **03E-0441-01**

Matrix.....: SOIL
Date Sampled.....: 08-OCT-03 15:00
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 26.0

DCL Analysis Group: G039B002
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	20-OCT-03 20:04	0.301	ND		U	1	1.35
Nitroglycerin	20-OCT-03 20:04	0.219	ND		U	1	0.676

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Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

DATA CHEM LABORATORIES
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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S0398050

Date Printed.....: 21-OCT-03 16:41

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#02

Date Received.....: 09-OCT-03 00:00

DCL Preparation Group: G039B002
Date Prepared.....: 11-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **69SB2B**
DCL Sample Name...: **03E04248**
DCL Report Group..: **03E-0441-01**

Matrix.....: SOIL
Date Sampled.....: 08-OCT-03 15:15
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 27.9

DCL Analysis Group: G039B002
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	20-OCT-03 20:26	0.309	ND		U	1	1.39
Nitroglycerin	20-OCT-03 20:26	0.225	ND		U	1	0.693

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S0398051

Date Printed.....: 21-OCT-03 16:41

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#02

Date Received.....: 09-OCT-03 00:00

DCL Preparation Group: G039B002
Date Prepared.....: 11-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **69SB2C**
DCL Sample Name...: **03E04249**
DCL Report Group..: **03E-0441-01**

Matrix.....: SOIL
Date Sampled.....: 08-OCT-03 15:30
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 31.1

DCL Analysis Group: G039B002
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: 1c03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	20-OCT-03 20:48	0.324	ND		U	1	1.45
Nitroglycerin	20-OCT-03 20:48	0.235	ND		U	1	0.726

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S0398052

Date Printed.....: 21-OCT-03 16:41

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#02

Date Received.....: 09-OCT-03 00:00

DCL Preparation Group: G039B002
Date Prepared.....: 11-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **57SB4B**
DCL Sample Name...: **03E04250**
DCL Report Group..: **03E-0441-01**

Matrix.....: SOIL
Date Sampled.....: 08-OCT-03 16:00
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 26.6

DCL Analysis Group: G039B002
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	20-OCT-03 21:09	0.304	ND		U	1	1.36
Nitroglycerin	20-OCT-03 21:09	0.221	ND		U	1	0.681

DATA VALIDATION WORKSHEET

Explosives

Reviewer: AS
Date: January-04
DV Level: II III IV

Review Document:

_X_ Region III Modified for National Functional Guidelines
___ NFG for organic Data review (February 1994)
_X_ Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: DataChem
SDG No.: 03E-0441-01
Test Name: Explosives
Method No.: 8332-HPLC

1.0 Laboratory Deliverables

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. % solids		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes:

2.0 Holding Times

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	Action: If the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyese, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%	x		
	For initial Calibration: for %RSD > ±20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?	x		
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?			x
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.			x
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 40-150%?	x		
6.4	Are there any RPDs outside the QC limits not to exceed 60%? Are there any RPDs outside the QC limits not to exceed 60%?		x	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

7.0 Laboratory Control Sample (LCS)

		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 40-150%?		x	
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?			x
	Action: If Yes, J(+) only.			

Notes:

8.0 Field Duplicate

		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

	SBD7	69SB3A	RPD	Delta	RL	5XRL	4XRL
PETN	ND	ND			1.32	6.6	5.28
nitroglycerin	ND	ND			0.659	3.295	2.636

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.			x
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.			x
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	x		

Notes:

10.0 Data Completeness			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		x		
	Number of samples:	14			
	Number of target compounds in each analysis:	2			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

DATA CHEM LABORATORIES
A Sorenson Company

FORM F (TYPE I)
SINGLE METHOD ANALYSES

QUALITY CONTROL DATA SHEET
MATRIX SPIKE SAMPLE
MATRIX SPIKE DUPLICATE SAMPLE


S039B005

Client Name.....: URS Group, Inc.
Release Number.....: URS#02

Matrix.....: SOIL
Reporting Units.....: mg/Kg

DCL Preparation Group: G039B002
Date Prepared.....: 11-OCT-03 00:00
Preparation Method...: 8332

DCL Sample Name...: **03E04239MS**
Date Printed.....: 21-OCT-03 16:41

DCL Analysis Group: G039B002
Analysis Method...: OL-SW-8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

QC Limit Type.....: Method

Analytical Results

Analyte	Date Analyzed	Sample Result	Spiked Result	Spike Added	Percent Recovery	QC Limits	QC Flag
PETN	20-OCT-03 16:26	ND	13.4	20.0	67.1	65.0/125.	
Nitroglycerin	20-OCT-03 16:26	ND	12.1	20.0	60.7	65.0/125.	*


S039B006

DCL Sample Name...: **03E04239MSD**

Analytical Results

Analyte	Date Analyzed	Duplicate Result	Percent Recovery	Mean	Range	RPD	QC Limits	QC Flag
PETN	20-OCT-03 16:47	13.1	65.3	13.2	0.355	2.7	0.00/35.0	
Nitroglycerin	20-OCT-03 16:47	12.5	62.3	12.3	0.331	2.7	0.00/35.0	

within QAPP limits of 40-150%

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

Bm 10/12/03

Date of Extraction:	OCT 12, 2003	**DataChem** Laboratories Extraction Notebook	Book # Ext 246 Page#
Account #(s):	8001		
DCL Set ID(s):	03E-0441-01		Matrix: SOIL
Group/Lot ID:	G039B002 10/12/03		Method: 8332

	DCL Sample ID	Field ID	Initial Vol. / WT	Initial pH	Adj pH		Surr. Added	Matrix Spike		Final Volume
1	BL-211483-1	BL-211483-1	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
2	QC-211483-1	QC-211483-1	1.0gm	N/A	N/A	N/A	1mL	1mL	----	2mL
3	03E04239	57SB4A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
4	03E04239MS	57SB4A	1.0gm	N/A	N/A	N/A	1mL	1mL	----	2mL
5	03E04239MSD	57SB4A	1.0gm	N/A	N/A	N/A	1mL	1mL	----	2mL
6	03E04240	69SB1A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
7	03E04241	69SB1B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
8	03E04242	69SB1C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
9	03E04243	69SB3A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
10	03E04244	SBD7	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
11	03E04245	69SB3B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
12	03E04246	69SB3C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
13	03E04247	69SB2A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
14	03E04248	69SB2B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
15	03E04249	69SB2C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
16	03E04250	57SB4B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
17										
18										
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40										

Bm 10/12/03

Bm 10/12/03

Solvents:	MeCN	CH016	Comments:
Surrogate Spike:	239 ws 3	1/30/04 By: Bm	
Matrix Spike:	239 ws 2	1/30/04 By: Bm	
Matrix Spike:	----------	---------- By:	
Extractionist:	Bomin Yao	10/12/03	
Checker:	Vicki Tsai	10/12/03	Sonicators tunned by:

*=Entry Error

From Page No. — Insert of preparatory report for sets: 03U-0098-02 & 03E-0441-02
IB 10/10/03

%Moistures & Solids

Start Time: 14:40 09-Oct-03
Finish Time: 8:37 10-Oct-03

Set ID #	Dish #	Sample #	Dish (g)	Dish + Soil (g)	Soil weight(g)	Dish + Dry Soil (g)	Dry Soil (g)	% Solids	% Moistures
03U-0098-02	1	03U00891	1.24	5.50	4.26	5.09	3.85	90.4%	9.6%
03U-0098-02	2	03U00891MD	1.25	5.24	3.99	4.85	3.60	90.2%	9.8%
03U-0098-02	3	03U00892	1.25	5.01	3.76	4.77	3.52	93.6%	6.4%
03U-0098-02	4	03U00893	1.25	6.12	4.87	5.81	4.56	93.6%	6.4%
03U-0098-02	5	03U00894	1.25	5.13	3.88	4.92	3.67	94.6%	5.4%
03U-0098-02	6	03U00895	1.23	5.51	4.28	5.08	3.85	90.0%	10.0%
03U-0098-02	7	03U00896	1.24	5.28	4.04	4.99	3.75	92.8%	7.2%
03E-0441-02	8	03E04239	1.23	5.23	4.00	3.86	2.63	65.8%	34.3%
03E-0441-02	9	03E04239MD	1.24	5.44	4.20	4.00	2.76	65.7%	34.3%
03E-0441-02	10	03E04240	1.24	5.43	4.19	4.29	3.05	72.8%	27.2%
03E-0441-02	11	03E04241	1.24	5.19	3.95	4.38	3.14	79.5%	20.5%
03E-0441-02	12	03E04242	1.24	5.20	3.96	4.26	3.02	76.3%	23.7%
03E-0441-02	13	03E04243	1.24	5.14	3.90	4.20	2.96	75.9%	24.1%
03E-0441-02	14	03E04244	1.24	5.94	4.70	5.18	3.94	83.8%	16.2%
03E-0441-02	15	03E04245	1.23	5.23	4.00	4.58	3.35	83.8%	16.3%
03E-0441-02	16	03E04246	1.23	5.16	3.93	4.85	3.62	92.1%	7.9%
03E-0441-02	17	03E04247	1.24	5.62	4.38	4.48	3.24	74.0%	26.0%
03E-0441-02	18	03E04248	1.23	7.14	5.91	5.49	4.26	72.1%	27.9%
03E-0441-02	19	03E04249	1.25	6.17	4.92	4.64	3.39	68.9%	31.1%
03E-0441-02	20	03E04250	1.25	5.61	4.36	4.45	3.20	73.4%	26.6%

IB 10/10/03

IB 10/10/03

To Page No. X

Witnessed & Understood by me,	Date	Invented by	Date
Jon Yonke	10/10/03	NA	10/10/03
		Recorded by Norman Brooke	

DATA CHEM LABORATORIES
A Sorenson Company

ANALYTICAL REPORT

10100309171481X

Date _____
Laboratory Group Name 03E-0441-02
Account No. 08001 URSD2

URS
Attention: Andrea Sansom
849 Intermountain Dr.
Sutie 320
Linthicum, MD 21090

FAX (410) 859-5202
Telephone (410) 859-5049
E-mail Andrea_Sansom@URScorp.com

Sampling Collection and Shipment

Sampling Site RFAAP/09604-317 Date of Collection October 08, 2003

Date Samples Received at Laboratory October 09, 2003

Analysis

Method of Analysis XX-EP-800

Date(s) of Analysis October 10, 2003

Analytical Results

Field Sample Number	Laboratory Number	Sample Type	MOISTURE %							
57SB4A	03E04239	SOIL	34.3							
57SB4A	03E04239MD	SOIL	34.3							
69SB1A	03E04240	SOIL	27.2							
69SB1B	03E04241	SOIL	20.5							
69SB1C	03E04242	SOIL	23.7							
69SB3A	03E04243	SOIL	24.1							
SBD7	03E04244	SOIL	16.2							
69SB3B	03E04245	SOIL	16.3							
69SB3C	03E04246	SOIL	7.9							
69SB2A	03E04247	SOIL	26.0							
69SB2B	03E04248	SOIL	27.9							
69SB2C	03E04249	SOIL	31.1							
57SB4B	03E04250	SOIL	26.6							

† See comment on last page.
ND Parameter not detected above LOD.
NR Parameter not requested.
NA Parameter not applicable.

** See comment on last page.
( ) Parameter between LOD and LOQ.

Norman Breese
Analyst: Norman Breese

Jon Yonk
Reviewer: Johnathan M. Yonk

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

DATA CHEM
LABORATORIES, INC.
A SORENSON COMPANY

Case Narrative

Method:	SW-846 8332	**Client:**	URS
Analysis:	Nitroglycerin, PETN	**Account:**	8001
Preparation SOP #:	OL-SW-8332	**Matrix:**	Solid
Analysis SOP#:	OL-SW-8332	**SDG#:**	URS#02
DCL Set ID's:	03E-0441-01		

General Set Information: This lot contained twelve solid samples, a method blank, a laboratory control sample (LCS), a matrix spiked sample (MS) and a matrix spike duplicate.

Method Summary: A 1.0 gram portion of the soil samples was weighed, transferred into a suitable container, and 2 ml of acetonitrile was added. The samples were placed in an ultrasonic bath for a minimum of one hour. The samples were allowed to settle and the supernatant was filtered through a 0.45µ PTFE filter. One part acetonitrile extract was mixed with one part of a 1% calcium chloride solution, then injected into an HP1050 HPLC equipped with UV detection and a Phenomenex Ultracarb ODS C18 column. The instrument was adjusted to the proper operating parameters and allowed to equilibrate until a stable baseline was established. Initial calibration standards were analyzed and linear calibration curves were generated from the data. A continuing calibration standard was analyzed at the beginning of sample analysis, after each ten samples, and at the end of the analysis. The response of the continuing calibration standard must be within method limits when compared to the initial calibration curve.

Samples and QCs were analyzed under identical conditions as those used for initial and continuing calibration. Quantitation was based on calibration curves using the initial calibration standards. Results were reported in units of mg/Kg.

Sample Preparation: No anomalies were observed during the preparation of the samples.

Holding Times: The samples were prepared and analyzed within method required hold times.

Dilution(s): None.

Quality Control Data:

Blank: No confirmed method analytes were detected in the method blank above half of the CRDL.

Laboratory Control Samples: All recoveries met the method limits.

Surrogate Recovery: Surrogate recoveries were acceptable.

MS/MSD: Matrix spiking was performed on sample 03E04239. All percent recoveries and RPDs were within method limits with one exception. The percent recovery for Nitroglycerin in 03E04239MS was outside of method limits, this could be the result of matrix effects.

Instrument QC: All initial and continuing calibration verification samples met method criteria.

Flagging Codes: The "U" flag indicates that the analyte was not detected at or above the MDL level. The "J" flag indicates that a value reported between the MDL and CRDL.

NC/CAR: None.

Miscellaneous Comments: None.

Confirmation Analyses: Any sample with a positive result above the MDL was qualitatively analyzed for confirmation on a second column. For samples requiring confirmation, one part acetonitrile extract was mixed with one part of a 1% calcium chloride solution, then injected into an HP1050 HPLC equipped with UV detection and a Phenomenex Synergi Polar-RP column. The instrument was adjusted to the proper operating parameters and allowed to equilibrate until a stable baseline was established. A CCV standard was run to establish retention times and a standard at a level near the reporting limits was run to verify low concentration sensitivity. The second column analyses were used for qualitative confirmation of analytes based on retention time. If a positive result is confirmed, the quantitative result from the primary column is reported.

Gloria W. Heung 9/24/03

Gloria W. Heung Date

SDG# URS#02 03E-0441 SDG# URS#02

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1151

Project Number	Project Name
09604317	RFAAP

Project Contact (Name and Phone Number): Darren Renne (804) 965-9000

Samplers: Brett Fisher / John Spangler

LAB: Data Chem

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8332) PETN/NG	Dioxin/Furan(8290)	TAL Metals (Including Mercury)	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	Paint Filter (9095B)	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
57SB4A	10/8/03 915	S		X	5	F	/	1						X									03E04239
69SB1A	10/8/03 1130	S		X	5	F	/	1						X									40
69SB1B	10/8/03 1145	S		X	5	F	/	1						X									41
69SB1C	10/8/03 1260	S		X	5	F	/	1						X									42
69SB3A	10/8/03 1415	S		X	5	F	/	1						X									43
SBD7	10/8/03 —	S		X	5	F	/	1						X									44
69SB3B	10/8/03 1430	S		X	5	F	/	1						X									45
69SB3C	10/8/03 1445	S		X	5	F	/	1						X									46
69SB2A	10/8/03 1500	S		X	5	F	/	1						X									47
69SB2B	10/8/03 1515	S		X	5	F	/	1						X									48
69SB2C	10/8/03 1530	S		X	5	F	/	1						X									49
57SB4B	10/8/03 1600	S		X	5	F	/	1						X									50

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
Brett Fisher	10/8/03 1800	FedEx			
Relinquished by: FedEx	Date/time 10/9/03 0830	Received by: (for lab) R-33-1	Date/Time	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

03E-0443
SDG# URS#02

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1143

Project Number	Project Name
09604 317	RFAAP

Project Contact (Name and Phone Number): Darren Rowan (804) 965 7000

Samplers: Brett Fisher / John Spangler

LAB: Data Chem

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, 8332) RETAINING	Dioxin/Furan(8290)	TAL Metals (Including Mercury)	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	Paint Filter (9095B)	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
135B10C	10/9/03 1350	5		X	S	F	/	1						X				03E0425		53			
135B9A	10/9/03 1400	5		X	S	F	/	1						X						54			
SBD9	10/9/03 —	5		X	S	F	/	1						X						55			
135B9B	10/9/03 1415	5		X	S	F	/	1						X						56			
135B9C	10/9/03 1430	5		X	S	F	/	1						X						57			
135B8A	10/9/03 1515	5		X	S	F	/	1						X						58			
135B8B	10/9/03 1530	5		X	S	F	/	1						X						59			
~~135B8C~~	~~10/9/03 1545~~	~~5~~		~~X~~	~~S~~	~~F~~	~~/~~	~~1~~						~~X~~									NO C for 135B8
															BF								

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
[illegible] 10/9/03	1800	FedEx			
Relinquished by: FedEx 10/10/03	0900	Received by: (for lab) R-33-1	Date/Time	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

2

Data Qualifying Codes

Two types of data qualifying codes or flags are applied in the course of the data review. The data validation flags indicate data that are not usable for decision-making, more than normally biased and/or variable, or not representative of field conditions. These codes and their definitions are presented below in the hierarchy stipulated in the USEPA Region III Modifications to the National Functional Guidelines for Data Review (September 1994).

Data Validation Flags

Flag	Interpretation
R	Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.
U	Not detected. The associated number indicates the approximate sample concentration is necessary to be detected.
B	Not detected substantially above the level reported in laboratory or field blanks.
N	Tentative Identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.
J	Analyte present. Reported value may not be accurate or precise.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
UL	Not detected, quantitation limit is probably higher.
NT	Not tested, no analytical result provided.

The other type of code used by URS is a "Reason Code". The reason code indicates the type of quality control failure that led to the application of the data validation flag.

Reason Codes

GC/MS Organics		GC and HPLC Organics		Inorganics and Conventionals	
Code	Interpretation	Code	Interpretation	Code	Interpretation
a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence
b	Bubble found in vial >6mm	b	Instrument performance failure	c	Calibration failure
c	Calibration failure; poor or unstable response	c	Calibration failure; poor or unstable response	d	MS/MSD imprecision
d	MS/MSD imprecision	d	MS/MSD imprecision	e	LCSD imprecision
e	LCSD imprecision	e	LCSD imprecision	f	Field duplicate imprecision
f	Field duplicate imprecision	f	Field duplicate imprecision	h	Holding time violation
h	Holding time violation	g	Dual column confirmation imprecision	k	Laboratory duplicate imprecision
i	Internal standard failure	h	Holding time violation	l	LCS recovery failure
j	Tuning failure or poor mass spectrometer performance	i	Internal standard failure	m	MS/MSD recovery failure
l	LCS recovery failure	l	LCS recovery failure	n	ICS failure
m	MS/MSD recovery failure	m	MS/MSD recovery failure	o	Calibration blank contamination
p	Poor chromatography	p	Poor chromatography	p	Preparation blank contamination
q	Concentration exceeded the linear range of the instrument	q	Concentration exceeded the linear range	q	Concentration exceeded the linear range
r	Linearity failure in initial calibration	r	Linearity failure in initial calibration	r	Linearity failure in calibration or MSA
s	Surrogate failure	s	Surrogate failure	s	Serial dilution failure
t	TIC	u	No confirmation column	v	Post-digestion spike failure
w	Identification criteria failure	w	Retention time failure	w	CRDL Standard Failure
x	Field blank contamination	x	Field blank contamination	x	Field blank contamination
y	Trip blank contamination	z	Method blank contamination	z	Laboratory storage blank contamination
z	Method blank contamination				

DATA VALIDATION REPORT - Level III Review

SDG No.: 03E-0443-01 **Fraction:** PETN_&_Nitroglycerin

Lab: TriMatrix **Project Name:** Radford_SSP

Reviewer: AS **Date:** February_3,_2004

This report presents the findings of a review of the referenced data. The report consists of this summary, copies of data reports with data qualifying flags applied (as required), the completed data validation checklist, supporting documentation, and an explanation of the data qualifying flags employed. The review performed is based on the USEPA Region III Modifications to the National Functional Guidelines for Data Review as pertains to the specifics of the analytical methods employed and provisions of the approved project-specific Quality Assurance Project Plan (QAPP).

Major Anomalies: None.

Minor Anomalies: The relative percent difference between the two analytical column concentrations for nitroglycerin was greater than the control limit (i.e., 40%) for samples 13SB10C at 58.4% and 13SB9B at 52.0%. The higher of the two concentrations was reported from the primary calibrated column. These results were flagged "J,g".

Correctable Anomalies: None.

Comments: Positive field sample results from the primary column were analyzed to confirm on an alternate column. Mid-point standards and standards at levels approximate to the method detection limit were analyzed concurrently to qualitatively identify positive detections by retention time responses only.

All data are usable, as qualified, for their intended purpose based on the data reviewed.

Signed: Andrea Sansom

Andrea Sansom

DATA CHEM LABORATORIES
A Sorenson Company

COVER PAGE

ANALYTICAL REPORT FOR URS Group, Inc.

E-mail: Darren_Renne@URScorp.com

G039900Z

DCL Report Group..: **03E-0443-01**

Date Printed.....: 22-OCT-03 17:39

Project Protocol #: P021C002
Client Ref Number.: Subcontract DCL-09
Release Number....: URS#02

Analysis Method(s): 8332

URS Group, Inc.
Attention: Mr. J Darren Renne
5540 Falmouth Street
Suite 201
Richmond, VA 23229

Client Sample Name	Laboratory Sample Name	Date Sampled	Date Received
Method Blank	BL-211507-1	NA	NA
LCS	QC-211507-1	NA	NA
13SB10C	03E04253	09-OCT-03	10-OCT-03
13SB9A	03E04254	09-OCT-03	10-OCT-03
SBD9	03E04255	09-OCT-03	10-OCT-03
13SB9B	03E04256	09-OCT-03	10-OCT-03
13SB9C	03E04257	09-OCT-03	10-OCT-03
13SB8A	03E04258	09-OCT-03	10-OCT-03
13SB8B	03E04259	09-OCT-03	10-OCT-03

Analyst: Gloria W. Heung — Date 10/23/03

Reviewer: Thomas T McKay — Date 10/23/03

Lab Supervisor: Richard W. Wade — Date 10/23/03

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FAX (801) 268-9992 E-mail: lab@datachem.com

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039902Q

Date Printed.....: 22-OCT-03 17:39

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#02

Date Received.....: 10-OCT-03 00:00

DCL Preparation Group: G039C001
Date Prepared.....: 13-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **13SB10C**
DCL Sample Name...: **03E04253**
DCL Report Group..: **03E-0443-01**

Matrix.....: SOIL
Date Sampled.....: 09-OCT-03 13:30
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 27.9

DCL Analysis Group: G039C001
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	21-OCT-03 19:58	0.309	ND		U	1	1.39
Nitroglycerin	21-OCT-03 19:58	0.225	2.46			1	0.693

JG

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DATA CHEM LABORATORIES
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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039902R

Date Printed.....: 23-OCT-03 15:57

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#02

Date Received.....: 10-OCT-03 00:00

DCL Preparation Group: G039C001
Date Prepared.....: 13-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **13SB9A**
DCL Sample Name...: **03E04254**
DCL Report Group..: **03E-0443-01**

Matrix.....: SOIL
Date Sampled.....: 09-OCT-03 14:00
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 26.7

DCL Analysis Group: G039C001
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	21-OCT-03 20:20	0.304	ND		U	1	1.36
Nitroglycerin	21-OCT-03 20:20	0.221	ND		U	1	0.682

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039902S

Date Printed.....: 22-OCT-03 17:39

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#02

Date Received.....: 10-OCT-03 00:00

DCL Preparation Group: G039C001
Date Prepared.....: 13-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **SBD9**
DCL Sample Name...: **03E04255**
DCL Report Group..: **03E-0443-01**

Matrix.....: SOIL
Date Sampled.....: 09-OCT-03 00:00
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 31.8

DCL Analysis Group: G039C001
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: 1c03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	21-OCT-03 20:42	0.327	ND		U	1	1.47
Nitroglycerin	21-OCT-03 20:42	0.238	0.793			1	0.733

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039902T

Date Printed.....: 22-OCT-03 17:39

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#02

Date Received.....: 10-OCT-03 00:00

DCL Preparation Group: G039C001
Date Prepared.....: 13-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **13SB9B**
DCL Sample Name...: **03E04256**
DCL Report Group..: **03E-0443-01**

Matrix.....: SOIL
Date Sampled.....: 09-OCT-03 14:15
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 24.2

DCL Analysis Group: G039C001
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: 1c03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	21-OCT-03 21:03	0.294	ND		U	1	1.32
Nitroglycerin	21-OCT-03 21:03	0.214	0.954			1	0.660

JG

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FAX (801) 268-9992 E-mail: lab@datachem.com

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

Form RLIMS63A-V1.4
10220317394875

SAMPLE ANALYSIS DATA SHEET

S039902V

Date Printed.....: 22-OCT-03 17:39

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#02

Date Received.....: 10-OCT-03 00:00

DCL Preparation Group: G039C001
Date Prepared.....: 13-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **13SB9C**
DCL Sample Name...: **03E04257**
DCL Report Group..: **03E-0443-01**

Matrix.....: SOIL
Date Sampled.....: 09-OCT-03 14:30
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 24.8

DCL Analysis Group: G039C001
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	21-OCT-03 21:25	0.297	ND		U	1	1.33
Nitroglycerin	21-OCT-03 21:25	0.215	ND		U	1	0.665

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SAMPLE ANALYSIS DATA SHEET

Date Printed.....: 22-OCT-03 17:39

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#02

Date Received.....: 10-OCT-03 00:00

DCL Preparation Group: G039C001
Date Prepared.....: 13-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **13SB8A**
DCL Sample Name...: **03E04258**
DCL Report Group..: **03E-0443-01**

Matrix.....: SOIL
Date Sampled.....: 09-OCT-03 15:15
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 26.7

DCL Analysis Group: G039C001
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	21-OCT-03 21:47	0.304	ND		U	1	1.36
Nitroglycerin	21-OCT-03 21:47	0.221	ND		U	1	0.682

SAMPLE ANALYSIS DATA SHEET



Date Printed.....: 22-OCT-03 17:39

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#02

Date Received.....: 10-OCT-03 00:00

DCL Preparation Group: G039C001
Date Prepared.....: 13-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **13SB8B**
DCL Sample Name...: **03E04259**
DCL Report Group..: **03E-0443-01**

Matrix.....: SOIL
Date Sampled.....: 09-OCT-03 15:30
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 22.2

DCL Analysis Group: G039C001
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	21-OCT-03 22:32	0.287	ND		U	1	1.29
Nitroglycerin	21-OCT-03 22:32	0.208	ND		U	1	0.643

DATA VALIDATION WORKSHEET

Reviewer: AS
Date: January-04
DV Level: II III IV

Explosives

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: DataChem
SDG No.: 03E-0443-01
Test Name: Explosives
Method No.: 8332-HPLC

Review Document:

_X_ Region III Modified for National Functional Guidelines
___ NFG for organic Data review (February 1994)
_X_ Project QAPP/SAP

1.0 Laboratory Deliverables

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. % solids		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes:

2.0 Holding Times

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	Action: If the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyese, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%	x		
	For initial Calibration: for %RSD > ±20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes:

Second column was used to not confirm primary column low level hits. The second column does not have an initial calibration or bracketing continuing calibrations. The one points provided are for retention time purposes only.

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?	x		
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?			x
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.			x
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 40-150%?		x	
6.4	Are there any RPDs outside the QC limits not to exceed 60%?		x	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

7.0 Laboratory Control Sample (LCS)

		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 40-150%?		x	
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?			x
	Action: If Yes, J(+) only.			

Notes:

8.0 Field Duplicate

		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

	SBD9	13SB9A		RPD	Delta	RL	5XRL	4XRL
PETN	ND	ND				1.58	7.9	6.32
nitroglycerin	0.793	0.682	U	15%	0.111	0.79	3.95	3.16

9.0 Compound Identification and Detection Limit Verification

		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.	x		
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.		x	
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	x		

Notes:

10.0 Data Completeness

			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		x		
	Number of samples:	7			
	Number of target compounds in each analysis:	2			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

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FORM F (TYPE I)
SINGLE METHOD ANALYSES

QUALITY CONTROL DATA SHEET
MATRIX SPIKE SAMPLE
MATRIX SPIKE DUPLICATE SAMPLE


S039903D

Client Name.....: URS Group, Inc.
Release Number.....: URS#02

Matrix.....: SOIL
Reporting Units.....: mg/Kg

DCL Preparation Group: G039C001
Date Prepared.....: 13-OCT-03 00:00
Preparation Method...: 8332

DCL Sample Name...: **03E04262MS**
Date Printed.....: 22-OCT-03 17:39

DCL Analysis Group: G039C001
Analysis Method...: OL-SW-8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

QC Limit Type.....: Method

Analytical Results

Analyte	Date Analyzed	Sample Result	Spiked Result	Spike Added	Percent Recovery	QC Limits	QC Flag
PETN	22-OCT-03 00:01	ND	16.7	20.0	83.4	65.0/125.	
Nitroglycerin	22-OCT-03 00:01	ND	19.8	20.0	99.0	65.0/125.	


S039903F

DCL Sample Name...: **03E04262MSD**

Analytical Results

Analyte	Date Analyzed	Duplicate Result	Percent Recovery	Mean	Range	RPD	QC Limits	QC Flag
PETN	22-OCT-03 00:24	17.5	87.6	17.1	0.839	4.9	0.00/35.0	
Nitroglycerin	22-OCT-03 00:24	18.6	92.8	19.2	1.24	6.5	0.00/35.0	

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Sample No.		Primary Column Result (mg/Kg)	Secondary Column Result (mg/Kg)	RPD
03E04253	13SB10C	1.77	3.23	58.4%
03E04255	SB09	0.541	0.716	27.8%
03E04256	13SB9B	0.724	0.425	52.6%

Results were not moisture corrected.

Gloria W. Heung 10/23/03

Gloria W. Heung

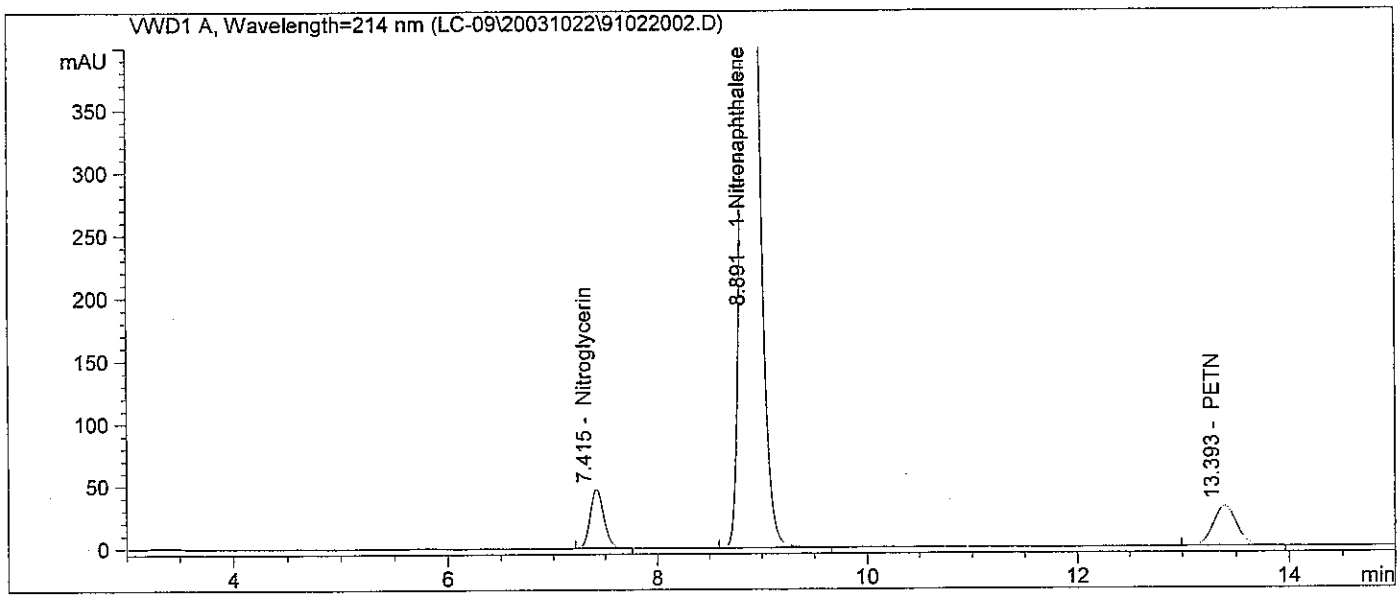
Thomas T. McKay 10/23/07

Thomas T. McKay

Data file :C:\HPCHEM\1\DATA\LC-09\20031022\91022002.D
Sample Name:CCV1 Info:239WS VAYO

Injection Date :Wed, 22 Oct. 2003 01:14:05 PM
Acq. Method :8330CNEW.M
Acq Operator :HEUNG
Analysis Method :C:\HPCHEM\1\METHODS\8332CPR9.M
Last Changed->Wed, 22 Oct. 2003, 02:31:04 pm
Confirm for 8332 on LC-9, 214nm.

Seq Line :2
Vial No. :2
Inj. No. :1



Sorted By Signal
Calib. Data Modified :Wed, 22 Oct. 2003, 02:24:25 pm
Multiplier :1.000000
Dilution :1.000000
Uncalibrated Peaks :not reported
Signal Description :VWD1 A, Wavelength=214 nm

Type	Exp. RT [min]	RT [min]	Compound	Amount [ug/L]	Area
MM	7.415	7.415	Nitroglycerin	19.81958	431.079
MM	8.891	8.891	1-Nitronaphthalene	20.77540	9.139e3
PV	13.393	13.393	PETN	19.51716	494.135
		Totals:		60.11214	

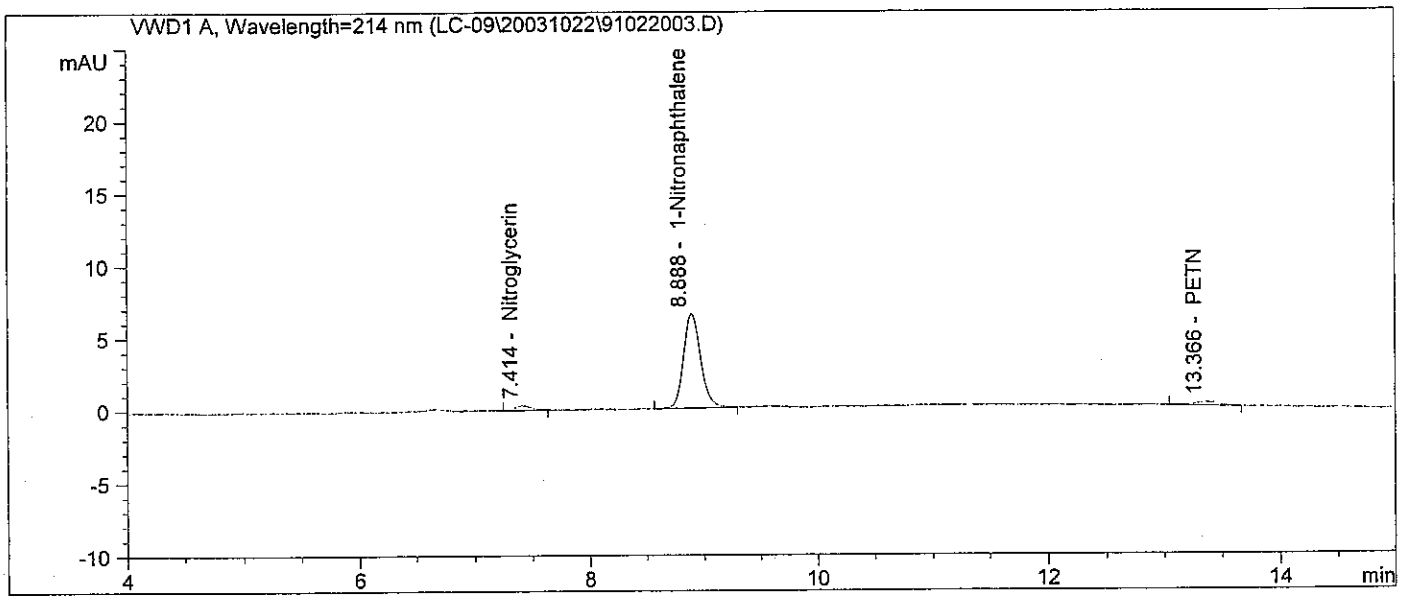
Analyst:_____
SurrTarget=12.98, Range=8.44-16.22ug/L
MDL/CRDLs:
NG=0.198/0.970ug/L
PETN=0.259/0.970ug/L

*** End of Report ***

Data file :C:\HPCHEM\1\DATA\LC-09\20031022\91022003.D
Sample Name:CS1 Info:239WS VAYO

Seq Line :3
Vial No. :3
Inj. No. :1

Injection Date :Wed, 22 Oct. 2003 01:29:45 PM
Acq. Method :8330CNEW.M
Acq Operator :HEUNG
Analysis Method :C:\HPCHEM\1\METHODS\8332CPR9.M
Last Changed->Thu, 23 Oct. 2003, 11:36:26 am
Confirm for 8332 on LC-9, 214nm.



Sorted By Signal
Calib. Data Modified :Wed, 22 Oct. 2003, 02:24:25 pm
Multiplier :1.000000
Dilution :1.000000
Uncalibrated Peaks :not reported
Signal Description :VWD1 A, Wavelength=214 nm

Type	RT [min]	Compound	Amount [ug/ml]	Area
MM	7.414	Nitroglycerin	0.13104	3.531
MM	8.888	1-Nitronaphthalene	0.11352	68.513
MM	13.366	PETN	0.10794	4.267
Totals:			0.35249	

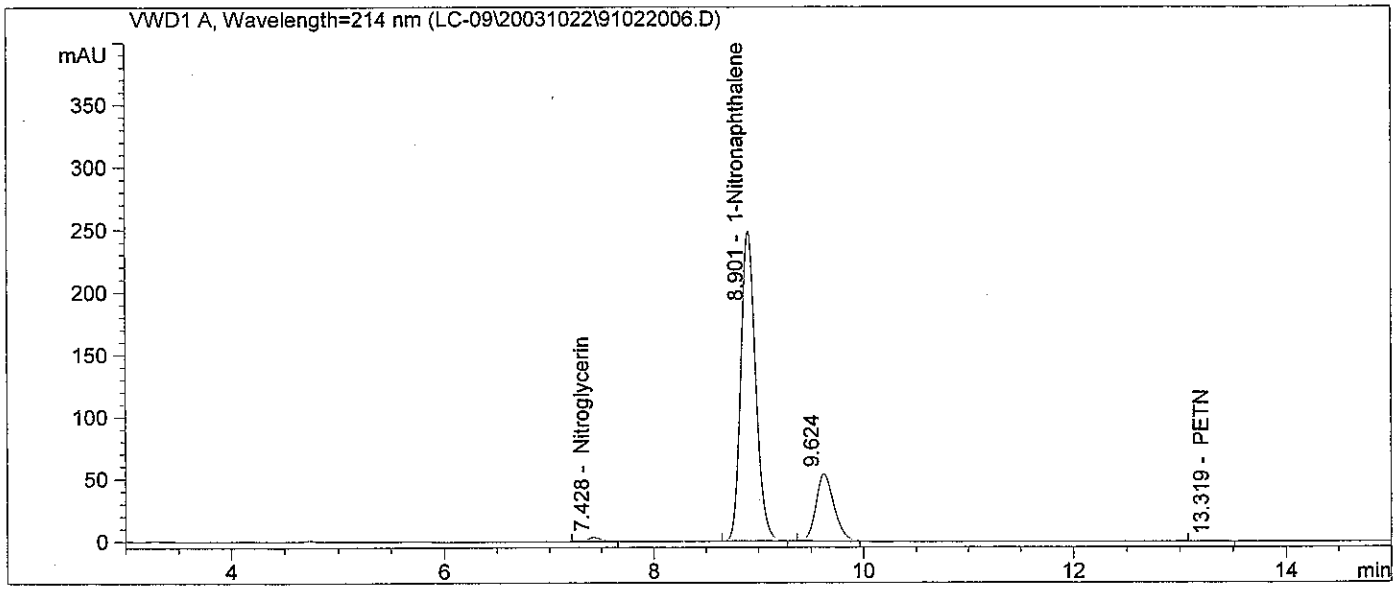
Analyst:_____

Comments:

*** End of Report ***

Data file :C:\HPCHEM\1\DATA\LC-09\20031022\91022006.D
Sample Name:03E04253 Info: VAYO

Seq Line :6
Injection Date :Wed, 22 Oct. 2003 02:16:46 PM Vial No. :6
Acq. Method :8330CNEW.M Inj. No. :1
Acq Operator :HEUNG
Analysis Method :C:\HPCHEM\1\METHODS\8332CPR9.M
Last Changed->Thu, 23 Oct. 2003, 11:38:17 am(modified after loading)
Confirm for 8332 on LC-9, 214nm.



Sorted By Signal
Calib. Data Modified :Wed, 22 Oct. 2003, 02:24:25 pm
Multiplier :2.000000
Dilution :1.000000
Uncalibrated Peaks :not reported
Signal Description :VWD1 A, Wavelength=214 nm

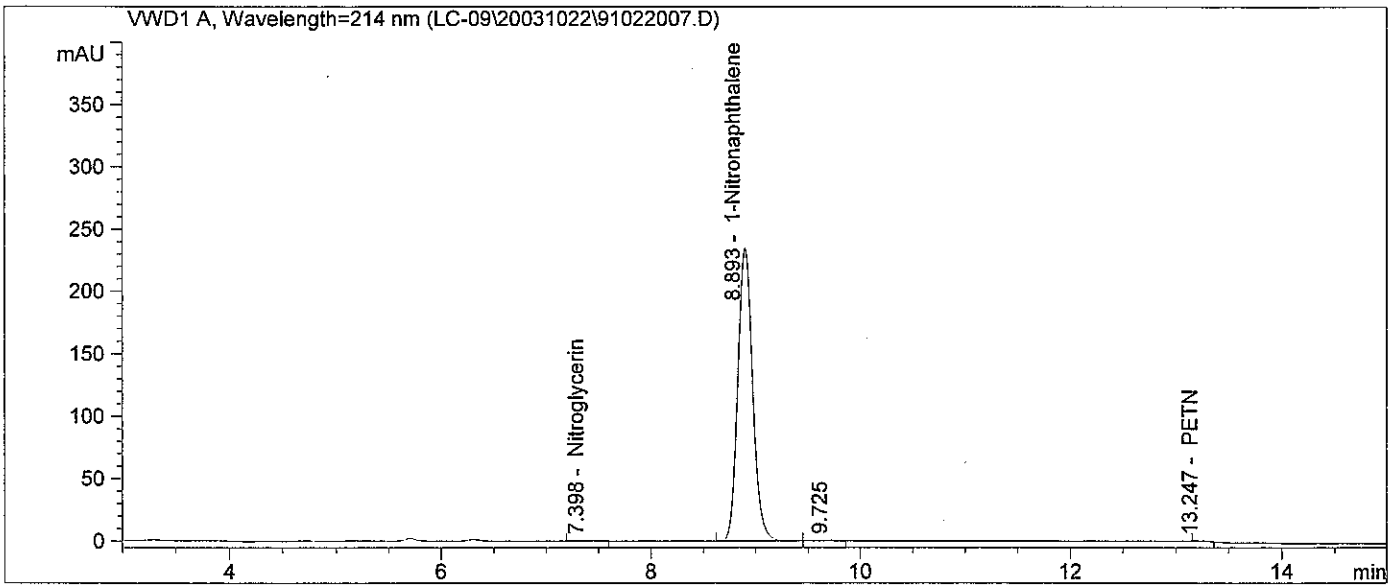
Type	Exp. RT [min]	RT [min]	Compound	Amount [ug/L] mg/kg ext 10/23/03	Area
MM	7.415	7.428	Nitroglycerin	3.22913	35.747
MM	8.891	8.901	1-Nitronaphthalene	11.10198	2.455e3
MM	0.000	9.624		0.00000	658.244
MM	13.393	13.319	PETN	0.25988	4.823
		Totals:		14.59098	

Analyst:_____
SurrTarget=12.98, Range=8.44-16.22ug/L
MDL/CRDLs:
NG=0.198/0.970ug/L
PETN=0.259/0.970ug/L

*** End of Report ***

Data file :C:\HPCHEM\1\DATA\LC-09\20031022\91022007.D
Sample Name:03E04254 Info: VAYO

Seq Line :7
Injection Date :Wed, 22 Oct. 2003 02:32:26 PM Vial No. :7
Acq. Method :8330CNEW.M Inj. No. :1
Acq Operator :HEUNG
Analysis Method :C:\HPCHEM\1\METHODS\8332CPR9.M
Last Changed->Thu, 23 Oct. 2003, 11:38:17 am(modified after loading)
Confirm for 8332 on LC-9, 214nm.



Sorted By Signal
Calib. Data Modified :Wed, 22 Oct. 2003, 02:24:25 pm
Multiplier :2.000000
Dilution :1.000000
Uncalibrated Peaks :not reported
Signal Description :VWD1 A, Wavelength=214 nm

Type	Exp. RT [min]	RT [min]	Compound	Amount [ug/L] mg/kg dat 10/23/03	Area
MM	7.415	7.398	Nitroglycerin	0.33090	4.278
MF	8.891	8.893	1-Nitronaphthalene	10.48940	2.321e3
FM	0.000	9.725		0.00000	8.575
MM	13.393	13.247	PETN	0.25674	4.783

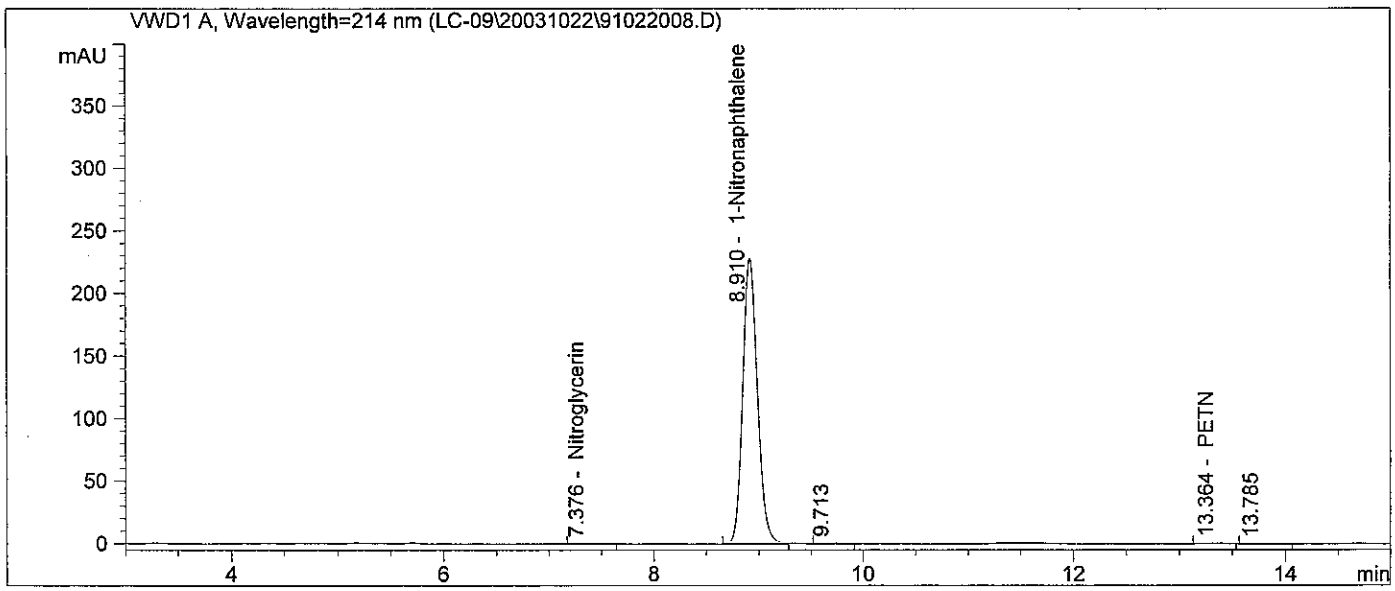
Totals: 11.07703

Analyst:_____
SurrTarget=12.98, Range=8.44-16.22ug/L
MDL/CRDLs:
NG=0.198/0.970ug/L
PETN=0.259/0.970ug/L

*** End of Report ***

Data file :C:\HPCHEM\1\DATA\LC-09\20031022\91022008.D
Sample Name:03E04255 Info: VAYO

Seq Line :8
Injection Date :Wed, 22 Oct. 2003 02:48:07 PM Vial No. :8
Acq. Method :8330CNEW.M Inj. No. :1
Acq Operator :HEUNG
Analysis Method :C:\HPCHEM\1\METHODS\8332CPR9.M
Last Changed->Thu, 23 Oct. 2003, 11:38:17 am(modified after loading)
Confirm for 8332 on LC-9, 214nm.



Sorted By Signal
Calib. Data Modified :Wed, 22 Oct. 2003, 02:24:25 pm
Multiplier :2.000000
Dilution :1.000000
Uncalibrated Peaks :not reported
Signal Description :VWD1 A, Wavelength=214 nm

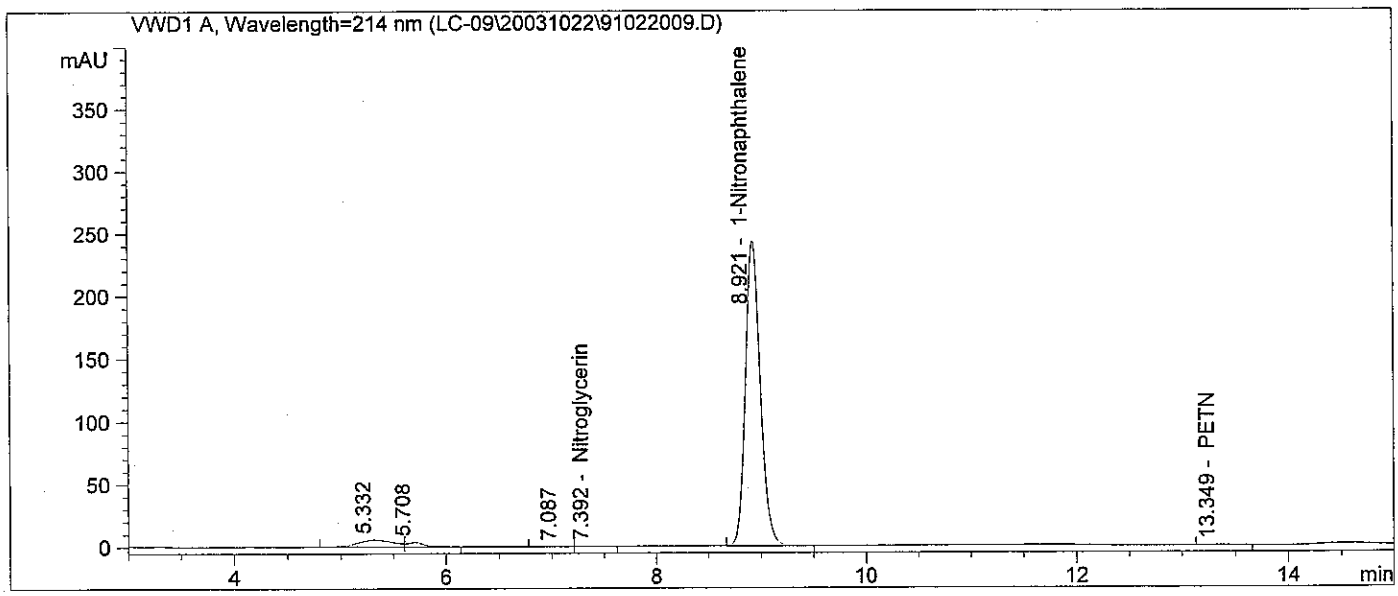
Type	Exp. RT [min]	RT [min]	Compound	Amount [ug/L]	Area
MM	7.415	7.376	Nitroglycerin	0.71604	8.460
MF	8.891	8.910	1-Nitronaphthalene	10.17398	2.252e3
FM	0.000	9.713		0.00000	10.004
MM	13.393	13.364	PETN	0.68784	10.223
VV	0.000	13.785		0.00000	7.568
		Totals:		11.57786	

Analyst:_____
SurrTarget=12.98, Range=8.44-16.22ug/L
MDL/CRDLs:
NG=0.198/0.970ug/L
PETN=0.259/0.970ug/L

*** End of Report ***

Data file :C:\HPCHEM\1\DATA\LC-09\20031022\91022009.D
Sample Name:03E04256 Info: VAYO

Seq Line :9
Injection Date :Wed, 22 Oct. 2003 03:03:48 PM Vial No. :9
Acq. Method :8330CNEW.M Inj. No. :1
Acq Operator :HEUNG
Analysis Method :C:\HPCHEM\1\METHODS\8332CPR9.M
Last Changed->Thu, 23 Oct. 2003, 11:38:17 am(modified after loading)
Confirm for 8332 on LC-9, 214nm.



Sorted By Signal
Calib. Data Modified :Wed, 22 Oct. 2003, 02:24:25 pm
Multiplier :2.000000
Dilution :1.000000
Uncalibrated Peaks :not reported
Signal Description :VWD1 A, Wavelength=214 nm

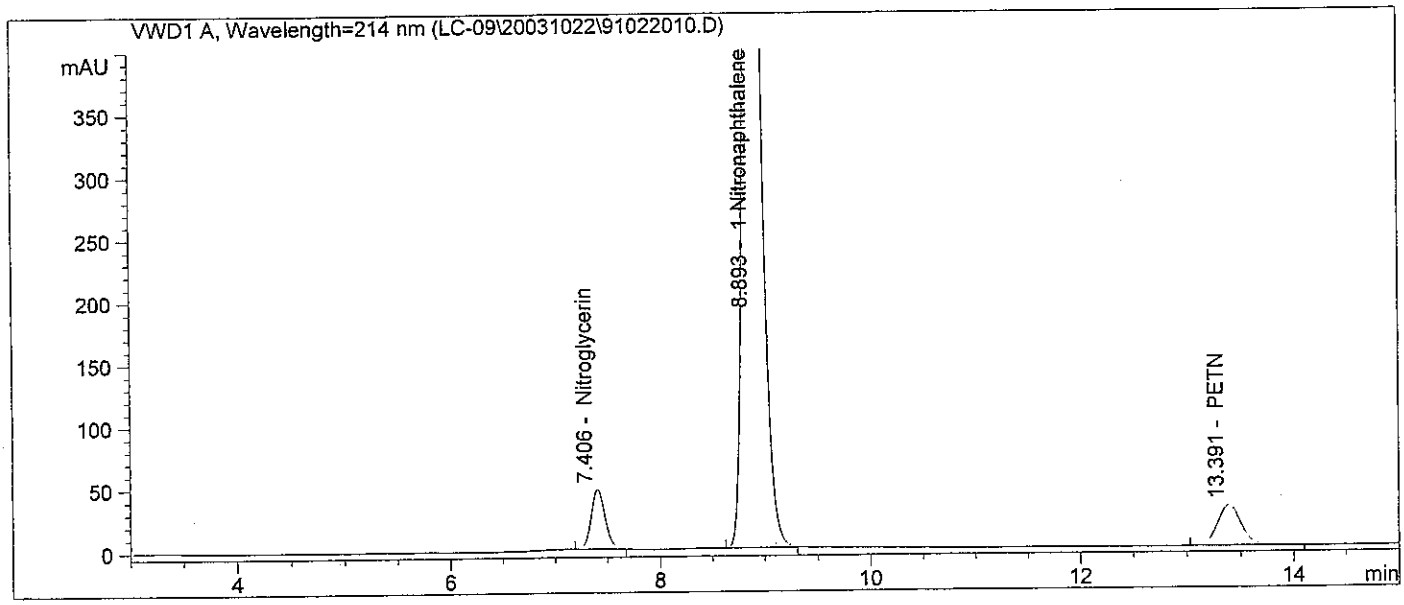
Type	Exp. RT [min]	RT [min]	Compound	Amount [ug/L]	Area
MF	0.000	5.332		0.00000	137.720
FM	0.000	5.708		0.00000	42.540
MF	0.000	7.087		0.00000	3.963
FM	7.415	7.392	Nitroglycerin	0.42505	5.301
MF	8.891	8.921	1-Nitronaphthalene	10.85451	2.401e3
MM	13.393	13.349	PETN	0.31034	5.459
		Totals:		11.58991	

Analyst:_____
SurrTarget=12.98, Range=8.44-16.22ug/L
MDL/CRDLs:
NG=0.198/0.970ug/L
PETN=0.259/0.970ug/L

*** End of Report ***

Data file :C:\HPCHEM\1\DATA\LC-09\20031022\91022010.D
Sample Name:CCV2 Info:239WS VAYO

Seq Line :10
Injection Date :Wed, 22 Oct. 2003 03:19:28 PM Vial No. :2
Acq. Method :8330CNEW.M Inj. No. :1
Acq Operator :HEUNG
Analysis Method :C:\HPCHEM\1\METHODS\8332CPR9.M
Last Changed->Thu, 23 Oct. 2003, 11:38:17 am(modified after loading)
Confirm for 8332 on LC-9, 214nm.



Sorted By Signal
Calib. Data Modified :Wed, 22 Oct. 2003, 02:24:25 pm
Multiplier :1.000000
Dilution :1.000000
Uncalibrated Peaks :not reported
Signal Description :VWD1 A, Wavelength=214 nm

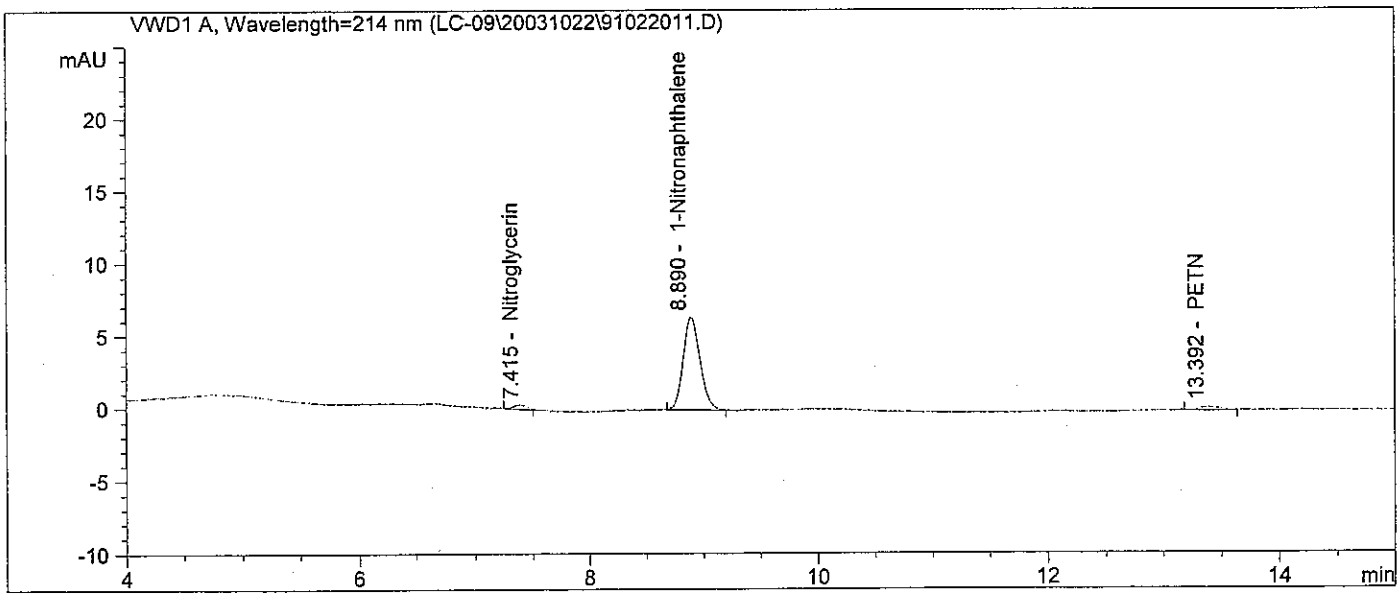
Type	Exp. RT [min]	RT [min]	Compound	Amount [ug/L]	Area
MM	7.415	7.406	Nitroglycerin	20.34765	442.547
MM	8.891	8.893	1-Nitronaphthalene	20.65281	9.085e3
BP	13.393	13.391	PETN	19.56939	495.453
		Totals:		60.56985	

Analyst:_____
SurrTarget=12.98, Range=8.44-16.22ug/L
MDL/CRDLs:
NG=0.198/0.970ug/L
PETN=0.259/0.970ug/L

*** End of Report ***

Data file :C:\HPCHEM\1\DATA\LC-09\20031022\91022011.D
Sample Name:CS2 Info:239WS VAYO

Seq Line :11
Injection Date :Wed, 22 Oct. 2003 03:35:08 PM Vial No. :3
Acq. Method :8330CNEW.M Inj. No. :1
Acq Operator :HEUNG
Analysis Method :C:\HPCHEM\1\METHODS\8332CPR9.M
Last Changed->Thu, 23 Oct. 2003, 11:36:26 am
Confirm for 8332 on LC-9, 214nm.



Sorted By Signal
Calib. Data Modified :Wed, 22 Oct. 2003, 02:24:25 pm
Multiplier :1.000000
Dilution :1.000000
Uncalibrated Peaks :not reported
Signal Description :VWD1 A, Wavelength=214 nm

Type	RT [min]	Compound	Amount [ug/ml]	Area
MM	7.415	Nitroglycerin	0.09726	2.797
MM	8.890	1-Nitronaphthalene	0.10841	66.269
MM	13.392	PETN	0.08370	3.656
Totals:			0.28937	

Analyst:_____

Comments:

*** End of Report ***

Method 8332

RT Windows For Analytical Sequence From 72 Hr RT Study

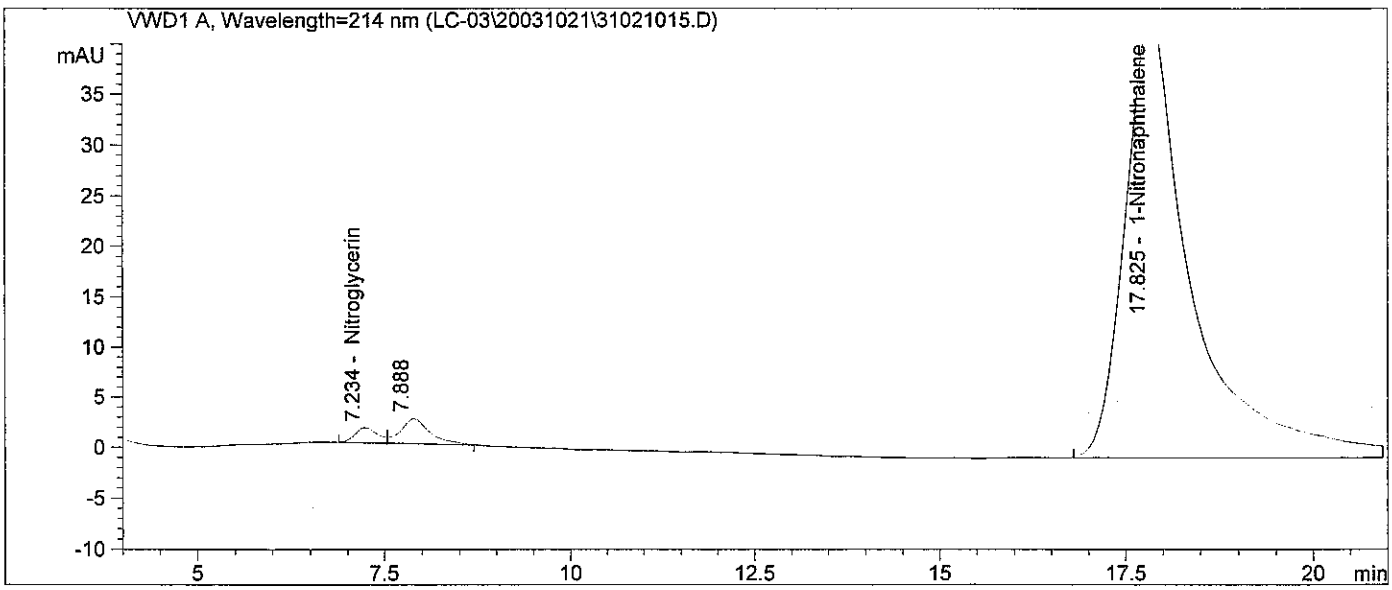
Sequence: **1021LC3** Sample Info: **239WS106**

Analyte	RT Low	RT High	CCV RT	0 Hr RT	Mid Hr RT	72 Hr RT	3xStDv
Datafile:			**31021012.D**	30525-06	30527-01	03528-01	
Nitroglycerin	**7.110**	**7.318**	7.214	7.267	7.314	7.246	0.104
PETN	**13.737**	**14.249**	13.993	14.009	14.179	14.081	0.256
1-Nitronaphthalene	**17.413**	**17.959**	17.686	17.595	17.776	17.702	0.273

Default Minimum Window=+/- 0.030 minutes

Data file :C:\HPCHEM\1\DATA\LC-03\20031021\31021015.D
Sample Name:03E04253 Info: VAYO

Seq Line :15
Injection Date :Tue, 21 Oct. 2003 07:58:27 PM Vial No. :14
Acq. Method :N0527LC3.M Inj. No. :1
Acq Operator :HEUNG
Analysis Method :C:\HPCHEM\1\METHODS\N0527PR3.M
Last Changed->Wed, 22 Oct. 2003, 11:38:56 am(modified after loading)
SOIL/WATER BY SW-846 8332 ON LC-3. Init Cal ID:092100LC3



Sorted By Signal
Calib. Data Modified :Thu, 16 Oct. 2003, 04:50:02 pm
Multiplier :2.000000
Dilution :1.000000
Uncalibrated Peaks :not reported
Signal Description :VWD1 A, Wavelength=214 nm

Type	Exp. RT [min]	RT [min]	Compound	Amount [ug/g]	Area
MF	7.041	7.234	Nitroglycerin	1.77416	33.900
FM	0.000	7.888		0.00000	68.028
	13.567	0.000	PETN	0.00000	0.000
BBA	17.364	17.825	1-Nitronaphthalene	10.79375	2.695e3
		Totals:		12.56791	

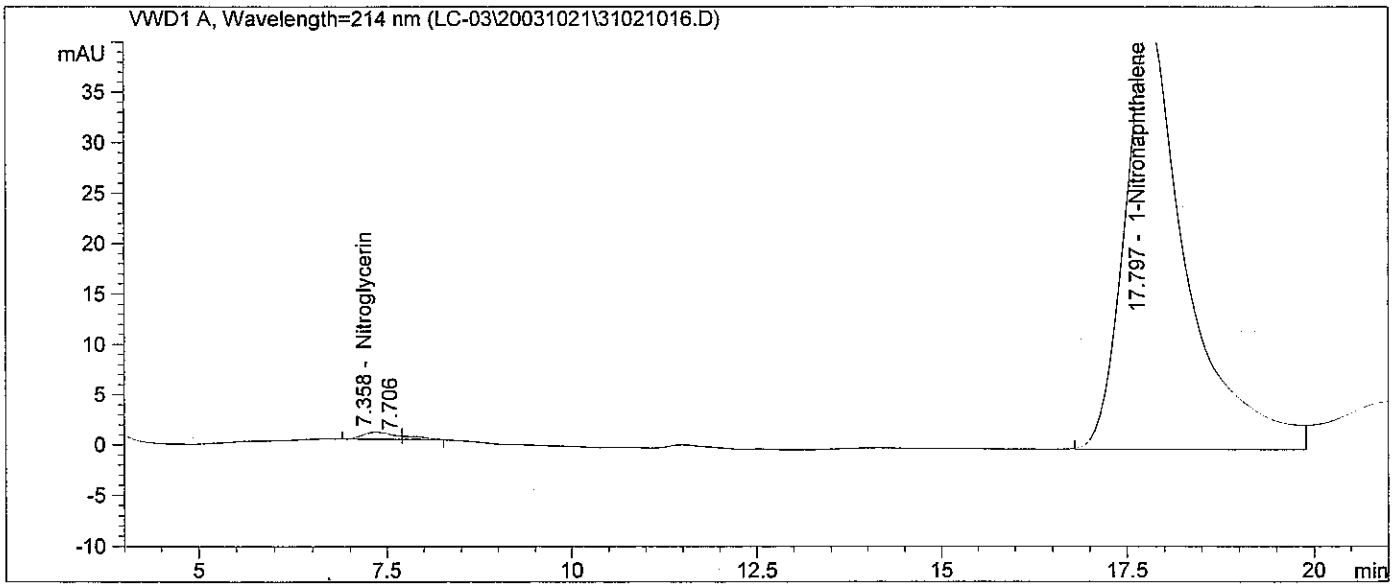
RTN 7.174 - 7.318 ✓

Analyst: _____
Surr Target=10.ug/g, Range=6.5-12.5ug/g
MDL/CRDLs:
NG:0.180/0.300ug/g
PETN:0.250/0.300ug/g

*** End of Report ***

Data file :C:\HPCHEM\1\DATA\LC-03\20031021\31021016.D
Sample Name:03E04254 Info: VAYO

Seq Line :16
Injection Date :Tue, 21 Oct. 2003 08:20:17 PM Vial No. :17
Acq. Method :N0527LC3.M Inj. No. :1
Acq Operator :HEUNG
Analysis Method :C:\HPCHEM\1\METHODS\N0527PR3.M
Last Changed->Wed, 22 Oct. 2003, 11:38:56 am(modified after loading)
SOIL/WATER BY SW-846 8332 ON LC-3. Init Cal ID:092100LC3



Sorted By Signal
Calib. Data Modified :Thu, 16 Oct. 2003, 04:50:02 pm
Multiplier :2.000000
Dilution :1.000000
Uncalibrated Peaks :not reported
Signal Description :VWD1 A, Wavelength=214 nm

Type	Exp. RT [min]	RT [min]	Compound	Amount [ug/g]	Area
MF	7.041	7.358	Nitroglycerin	~~1.10643~~ EXTW C	21.142
FM	0.000	7.706		0.00000	6.491
	13.567	0.000	PETN	0.00000	0.000
BV	17.364	17.797	1-Nitronaphthalene	9.70293	2.423e3

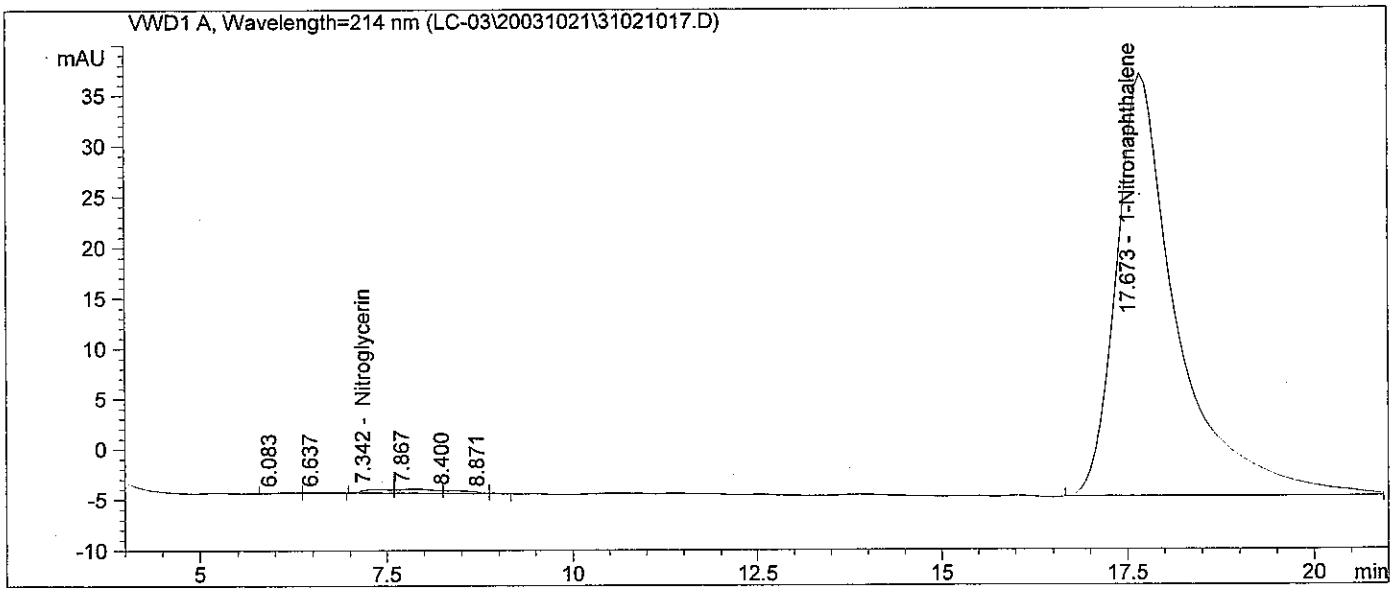
RTW 7.174 - 7.318 OUT

Totals: 10.80936
Analyst: GH
Surr Target=10.ug/g, Range=6.5-12.5ug/g
MDL/CRDLs:
NG:0.180/0.300ug/g
PETN:0.250/0.300ug/g

*** End of Report ***

Data file :C:\HPCHEM\1\DATA\LC-03\20031021\31021017.D
Sample Name:03E04255 Info: VAYO

Seq Line :17
Injection Date :Tue, 21 Oct. 2003 08:42:08 PM Vial No. :18
Acq. Method :N0527LC3.M Inj. No. :1
Acq Operator :HEUNG
Analysis Method :C:\HPCHEM\1\METHODS\N0527PR3.M
Last Changed->Wed, 22 Oct. 2003, 11:38:56 am(modified after loading)
SOIL/WATER BY SW-846 8332 ON LC-3. Init Cal ID:092100LC3



Sorted By Signal
Calib. Data Modified :Thu, 16 Oct. 2003, 04:50:02 pm
Multiplier :2.000000
Dilution :1.000000
Uncalibrated Peaks :not reported
Signal Description :VWD1 A, Wavelength=214 nm

Type	Exp. RT [min]	RT [min]	Compound	Amount [ug/g]	Area
MF	0.000	6.083		0.00000	2.252
FM	0.000	6.637		0.00000	2.237
MF	7.041	7.342	Nitroglycerin	0.54070	10.332
MF	0.000	7.867		0.00000	14.172
MF	0.000	8.400		0.00000	7.875
FM	0.000	8.871		0.00000	0.874
	13.567	0.000	PETN	0.00000	0.000
PBA	17.364	17.673	1-Nitronaphthalene	9.47405	2.366e3
		Totals:		10.01475	

RTW

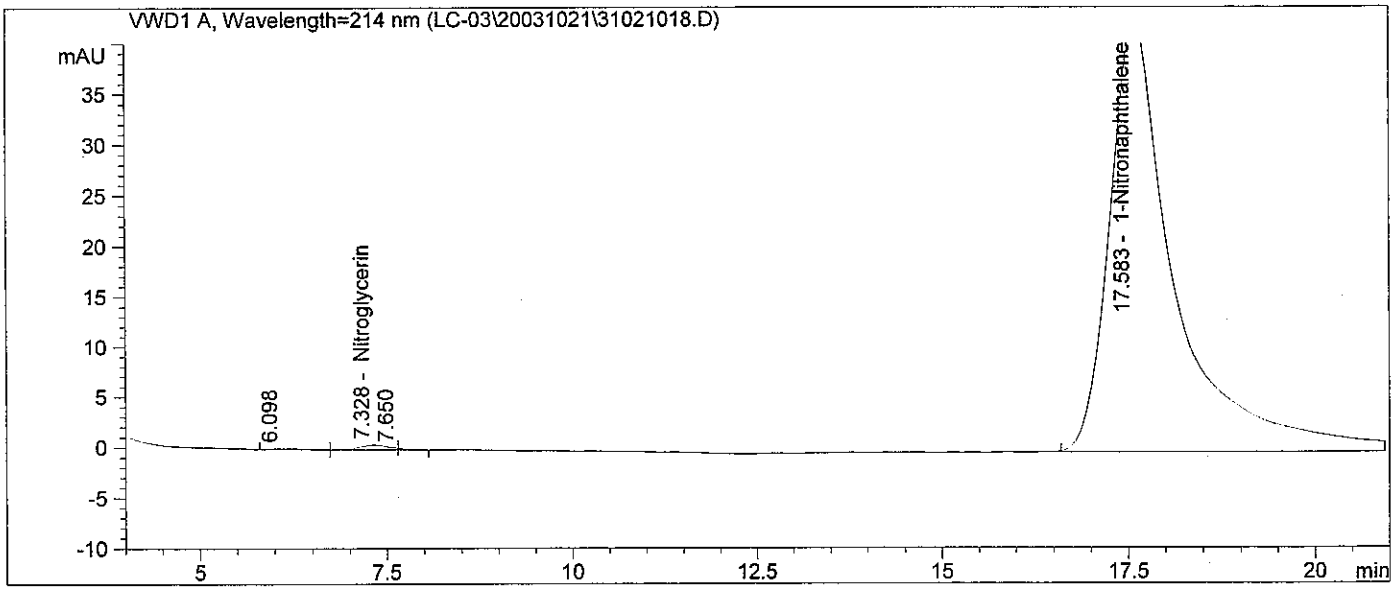
7.174 - 7.318 out

Analyst: ____
Surr Target=10.ug/g, Range=6.5-12.5ug/g
MDL/CRDLs:
NG:0.180/0.300ug/g
PETN:0.250/0.300ug/g

*** End of Report ***

Data file :C:\HPCHEM\1\DATA\LC-03\20031021\31021018.D
Sample Name:03E04256 Info: VAYO

Seq Line :18
Injection Date :Tue, 21 Oct. 2003 09:03:59 PM Vial No. :19
Acq. Method :N0527LC3.M Inj. No. :1
Acq Operator :HEUNG
Analysis Method :C:\HPCHEM\1\METHODS\N0527PR3.M
Last Changed->Wed, 22 Oct. 2003, 11:38:56 am(modified after loading)
SOIL/WATER BY SW-846 8332 ON LC-3. Init Cal ID:092100LC3



Sorted By Signal
Calib. Data Modified :Thu, 16 Oct. 2003, 04:50:02 pm
Multiplier :2.000000
Dilution :1.000000
Uncalibrated Peaks :not reported
Signal Description :VWD1 A, Wavelength=214 nm

Type	Exp. RT [min]	RT [min]	Compound	Amount [ug/g]	Area
BP	0.000	6.098		0.00000	4.432
MF	7.041	7.328	Nitroglycerin	0.72353	13.825
FM	0.000	7.650		0.00000	1.547
	13.567	0.000	PETN	0.00000	0.000
BBA	17.364	17.583	1-Nitronaphthalene	10.43881	2.607e3
		Totals:		11.16234	

RTW
7.174-7.38 out

Analyst: _____
Surr Target=10.ug/g, Range=6.5-12.5ug/g
MDL/CRDLs:
NG:0.180/0.300ug/g
PETN:0.250/0.300ug/g

*** End of Report ***

Project No. X

TITLE: Data Chem Laboratories % Moisture Book No. 4146

From Page No. X

Insert of preparatory report for sets: 03E-0443-02 & 0444-02

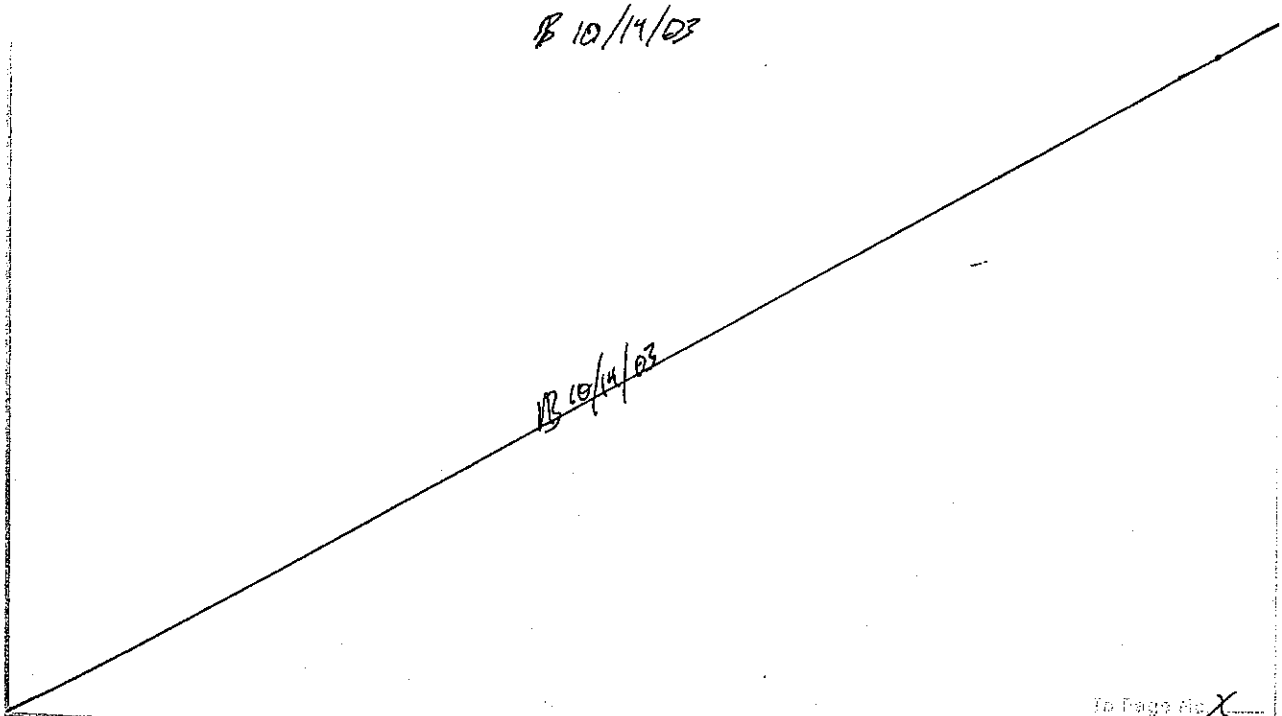
JB 10/14/03

%Moistures & Solids

Start Time: 16:31 13-Oct-03
Finish Time: 9:24 14-Oct-03

Set ID #	Dish #	Sample #	Dish (g)	Dish + Soil (g)	Soil weight(g)	Dish + Dry Soil (g)	Dry Soil (g)	% Solids	% Moistures
03E-0444-02	1	03E04260	1.23	5.22	3.99	4.54	3.31	83.0%	17.0%
03E-0444-02	2	03E04261	1.24	5.23	3.99	4.47	3.23	81.0%	19.0%
03E-0444-02	3	03E04262	1.25	5.74	4.49	4.67	3.42	76.2%	23.8%
03E-0444-02	4	03E04262MD	1.25	5.38	4.13	4.27	3.02	73.1%	26.9%
03E-0444-02	5	03E04263	1.23	8.66	7.43	6.81	5.58	75.1%	24.9%
03E-0444-02	6	03E04264	1.23	5.37	4.14	3.85	2.62	63.3%	36.7%
03E-0444-02	7	03E04265	1.23	5.13	3.90	3.96	2.73	70.0%	30.0%
03E-0444-02	8	03E04266	1.25	5.52	4.27	3.86	2.61	61.1%	38.9%
03E-0444-02	9	03E04267	1.23	5.84	4.61	4.58	3.35	72.7%	27.3%
03E-0444-02	10	03E04268	1.25	5.03	3.78	4.14	2.89	76.5%	23.5%
03E-0444-02	11	03E04269	1.25	5.88	4.63	4.58	3.33	71.9%	28.1%
03E-0444-02	12	03E04270	1.24	5.20	3.96	3.56	2.32	58.6%	41.4%
03E-0444-02	13	03E04271	1.23	5.68	4.45	4.57	3.34	75.1%	24.9%
03E-0443-02	15	03E04253	1.24	6.62	5.38	5.12	3.88	72.1%	27.9%
03E-0443-02	16	03E04253MD	1.23	5.13	3.90	3.97	2.74	70.3%	29.7%
03E-0443-02	17	03E04254	1.24	6.03	4.79	4.75	3.51	73.3%	26.7%
03E-0443-02	18	03E04255	1.24	5.61	4.37	4.22	2.98	68.2%	31.8%
03E-0443-02	19	03E04256	1.24	6.15	4.91	4.96	3.72	75.8%	24.2%
03E-0443-02	20	03E04257	1.24	5.80	4.56	4.67	3.43	75.2%	24.8%
03E-0443-02	21	03E04258	1.23	5.31	4.08	4.22	2.99	73.3%	26.7%
03E-0443-02	22	03E04259	1.24	5.16	3.92	4.29	3.05	77.8%	22.2%

JB 10/14/03



JB 10/14/03

To Page No. X

Witnessed & Understood by me,	Date	Invented by	Date
Jose G. Rocha	10/14/03	N/A	10/14/03
		Recorded by Norman Breaux	

DATA CHEM LABORATORIES
A Sorenson Company

ANALYTICAL REPORT

Form ARF-AL
Page 1 of 2
Part 1 of 1
10140309553246X

Date _____
Laboratory Group Name 03E-0443-02
Account No. 08001 URS02

URS
Attention: Andrea Sansom
849 Intermountain Dr.
Sutie 320
Linthicum, MD 21090

FAX (410) 859-5202
Telephone (410) 859-5049
E-mail Andrea_Sansom@URScorp.com

Sampling Collection and Shipment

Sampling Site RFAAP/09604-317 Date of Collection October 09, 2003

Date Samples Received at Laboratory October 10, 2003

Analysis

Method of Analysis XX-EP-800

Date(s) of Analysis October 14, 2003

Analytical Results

Field Sample Number	Laboratory Number	Sample Type	MOISTURE %								
13SB10C	03E04253	SOIL	27.9								
13SB10C	03E04253MD	SOIL	29.7								
13SB9A	03E04254	SOIL	26.7								
SBD9	03E04255	SOIL	31.8								
13SB9B	03E04256	SOIL	24.2								
13SB9C	03E04257	SOIL	24.8								
13SB8A	03E04258	SOIL	26.7								
13SB8B	03E04259	SOIL	22.2								
Limit of Detection											

† See comment on last page.
ND Parameter not detected above LOD.
NR Parameter not requested.
NA Parameter not applicable.

** See comment on last page.
( ) Parameter between LOD and LOQ.

Norman Breese
Analyst: Norman Breese

Jon Yonk
Reviewer: Johnathan M. Yonk

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

Bmy 10/12/03

Date of Extraction:	OCT 12, 2003	**DataChem** Laboratories Extraction Notebook	Book # Ext 246 Page#
Account #(s):	8001		
DCL Set ID(s):	03E-0443-01, 0444-01		Matrix: SOIL
Group/Lot ID:	G039C001/2 10/12/03		Method: 8332

	DCL Sample ID	Field ID	Initial Vol. / WT	Initial pH	Adj pH		Surr. Added	Matrix Spike		Final Volume
1	BL-211507-1	BL-211507-1	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
2	QC-211507-1	QC-211507-1	1.0gm	N/A	N/A	N/A	1mL	1mL	----	2mL
3	03E04253	13SB10C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
4	03E04254	13SB9A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
5	03E04255	SBD9	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
6	03E04256	13SB9B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
7	03E04257	13SB9C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
8	03E04258	13SB8A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
9	03E04259	13SB8B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
10	03E04260	13SB7A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
11	03E04261	13SB7B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
12	03E04262	13SB7C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
13	03E04262MS	13SB7CMS	1.0gm	N/A	N/A	N/A	1mL	1mL	----	2mL
14	03E04262MSD	13SB7CMSD	1.0gm	N/A	N/A	N/A	1mL	1mL	----	2mL
15	03E04263	13SB12A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
16	03E04264	13SB12B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
17	03E04265	SBD8	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
18	03E04266	13SB12C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
19	03E04267	13SB11A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
20	03E04268	13SB11B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
21	03E04269	13SB11C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
22	03E04270	13SB10A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
23	03E04271	13SB10B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
24										
25										
26										
27										
28										
29										
30										
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										

Solvents:	MeCN	CH016	Comments:
Surrogate Spike:	239 ws 3	1/30/04 By: Bmy	
Matrix Spike:	239 ws 2	1/30/04 6/10/2000 By: Bmy	
Matrix Spike:	----------	---------- By:	
Extractionist:	Benjing Yang	10/12/03	
Checker:	Wenjing	10/13/03	Sonicators tunned by:

*=Entry Error

Bmy 10/12/03

DATA CHEM
LABORATORIES, INC.
A SORENSON COMPANY

Case Narrative

Method:	SW-846 8332	**Client:**	URS
Analysis:	Nitroglycerin, PETN	**Account:**	8001
Preparation SOP #:	OL-SW-8332	**Matrix:**	Solid
Analysis SOP#:	OL-SW-8332	**SDG#:**	URS#02
DCL Set ID's:	03E-0443-01		

General Set Information: This set contained seven solid samples, a method blank, and a laboratory control sample (LCS). This set was batched with another set, which contained twelve samples, a matrix spiked sample (MS) and a matrix spike duplicate.

Method Summary: A 1.0 gram portion of the soil samples was weighed, transferred into a suitable container, and 2 ml of acetonitrile was added. The samples were placed in an ultrasonic bath for a minimum of one hour. The samples were allowed to settle and the supernatant was filtered through a 0.45µ PTFE filter. One part acetonitrile extract was mixed with one part of a 1% calcium chloride solution, then injected into an HP1050 HPLC equipped with UV detection and a Phenomenex Ultracarb ODS C18 column. The instrument was adjusted to the proper operating parameters and allowed to equilibrate until a stable baseline was established. Initial calibration standards were analyzed and linear calibration curves were generated from the data. A continuing calibration standard was analyzed at the beginning of sample analysis, after each ten samples, and at the end of the analysis. The response of the continuing calibration standard must be within method limits when compared to the initial calibration curve.

Samples and QCs were analyzed under identical conditions as those used for initial and continuing calibration. Quantitation was based on calibration curves using the initial calibration standards. Results were reported in units of mg/Kg.

Sample Preparation: No anomalies were observed during the preparation of the samples.

Holding Times: The samples were prepared and analyzed within method required hold times.

Dilution(s): None.

Quality Control Data:

Blank: No confirmed method analytes were detected in the method blank above half of the CRDL.

Laboratory Control Samples: All recoveries met the method limits.

Surrogate Recovery: Surrogate recoveries were acceptable.

MS/MSD: Matrix spiking was performed on sample 03E04262 which belonged to set# 03E-0444-01. All percent recoveries and RPDs were within method limits. does not match 2/2/04

Instrument QC: All initial and continuing calibration verification samples met method criteria.

Flagging Codes: The "U" flag indicates that the analyte was not detected at or above the MDL level. The "J" flag indicates that a value reported between the MDL and CRDL.

NC/CAR: None.

Miscellaneous Comments: None.

Confirmation Analyses: Any sample with a positive result above the MDL was qualitatively analyzed for confirmation on a second column. For samples requiring confirmation, one part acetonitrile extract was mixed with one part of a 1% calcium chloride solution, then injected into an HP1050 HPLC equipped with UV detection and a Phenomenex Synergi Polar-RP column. The instrument was adjusted to the proper operating parameters and allowed to equilibrate until a stable baseline was established. A CCV standard was run to establish retention times and a standard at a level near the reporting limits was run to verify low concentration sensitivity. The second column analyses were used for qualitative confirmation of analytes based on retention time. If a positive result is confirmed, the quantitative result from the primary column is reported.

Gloria W. Heung 10/23/03

Gloria W. Heung Date

Earliest Sampling Date: 8-Oct-2003

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 23-Oct-2003

Project/Job/Task: P021C002 | *Split:* | **Root Set ID:** 03E-0441 * | **Reporting Group** 01 02

Account: 08001

Client: URS

Comments:

Verified: W 10/9/03

Analysis

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Customer ID 2	Nitroglycerin/PETN by 8332	Moisture	# Bottles
8-Oct-2003	57SB4A	03E04239			SOIL		X	X	1
8-Oct-2003	69SB1A	03E04240			SOIL		X	X	1
8-Oct-2003	69SB1B	03E04241			SOIL		X	X	1
8-Oct-2003	69SB1C	03E04242			SOIL		X	X	1
8-Oct-2003	69SB3A	03E04243			SOIL		X	X	1
8-Oct-2003	SBD7	03E04244			SOIL		X	X	1
8-Oct-2003	69SB3B	03E04245			SOIL		X	X	1
8-Oct-2003	69SB3C	03E04246			SOIL		X	X	1
8-Oct-2003	69SB2A	03E04247			SOIL		X	X	1
8-Oct-2003	69SB2B	03E04248			SOIL		X	X	1

6 SR

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Walk-in/ Room/ Shelf/ Fridge R-33-1 MB	10/10/03 13:30	Norman Breese	%Moisture
Norman Breese R-33-1 MB	10/10/03 14:40 (10/11/03 12:..)	R-319-1 MB	storage

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

Printed 10/9/2003 13:2

Check box if there is a continuation page ☐

Form: COPC1.01-SWV2.30

Earliest Sampling Date: 8-Oct-2003

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 23-Oct-2003

Project/Job/Task: P021C002	Split:	Root Set ID: 03E-0441 *	Reporting Group
Client: URS		Account: 08001	Analysis
Comments:			
Verified: JW 10/9/03			

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Customer ID 2	01 Nitroglycerin/PETN by 8332	02 Moisture	# Bottles
8-Oct-2003	69SB2C	03E04249			SOIL		X	X	1
8-Oct-2003	57SB4B	03E04250			SOIL		X	X	1

6C SP ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Walk-in/ Room/ Shelf/ Fridge R-33-1 JB	10/10/03 13:30	Norman Brent	% Moisture
Norman Brent	10/10/03 14:40	R-31B-1 JB	storage
R-33-1 [illegible]	10/10/03 12:11	[illegible]	[illegible]

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

Check box if there is a continuation page ☐

Printed 10/9/2003 13:29

Form: COFC1.01-SWV2.30

Earliest Sampling Date: 9-Oct-2003

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 24-Oct-2003

Project/Job/Task: P021C002	Split:	Root Set ID: 03E-0443 *	Reporting Group	01	02								#
Client: URS		Account: 08001	Analysis	Nitroglycein/PETN by 8332	Moisture								Bottles
Comments:													
Verified: JW 10/10/03													

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Customer ID 2					01	02							# Bottles
9-Oct-2003	13SB10C	03E04253			SOIL						X	X							1
9-Oct-2003	13SB9A	03E04254			SOIL						X	X							1
9-Oct-2003	SBD9	03E04255			SOIL						X	X							1
9-Oct-2003	13SB9B	03E04256			SOIL						X	X							1
9-Oct-2003	13SB9C	03E04257			SOIL						X	X							1
9-Oct-2003	13SB8A	03E04258			SOIL						X	X							1
9-Oct-2003	13SB8B	03E04259			SOIL						X	X							1

SC JB ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Walk in/Room/Shelf/Fridge R-55-1 [illegible]	10/12/03 11:[illegible]	[signature]	[signature]
[signature]	10/13/03 14:30	Norman Breese	% Moisture
Norman Breese	10/13/03 16:34	R-319-1 AB	storage

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

Check box if there is a continuation page ☐

Form: COFCL01-SWV2.30

Printed 10/10/2003 12:06

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DATACHEM LABORATORIES CLIENT-RELATED INFORMATION REPORT (CRIR)

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill In or Circle)

Client Name: URS

Project/Task/Site: 03E-0441

Date/Time of Receipt: 10/9/03 0830

Number of Coolers Received: 1

Condition of Coolers:	~~Acceptable~~/Unacceptable	Temperature Control:	Present/~~Not Included~~
Custody Seals:	~~Present~~/Absent/NA	Location Temp Taken:	Control/~~Between Samples~~
	~~Intact~~/Broken/NA	Are all temperatures within	
Tamper Evident:	Yes/~~No~~/NA	project specific guidelines?	~~Yes~~/No/NA
Ice Present:	~~Yes~~/No/NA	Are all applicable pHs within	
	~~Frozen~~/Melted/NA	specific guidelines?	Yes/No/~~NA~~

pH Check Performed:	Metals	Yes/No/NA	Total Phenolics	Yes/No/NA	NO3/NO2	Yes/No/NA
	Cyanide	Yes/No/NA	TPH – 418.1	Yes/No/NA	Oil & Grease	Yes/No/NA
	Sulfide	Yes/No/NA	COD	Yes/No/NA	Total Phosphorous	Yes/No/NA
	Ammonia	Yes/No/NA	TKN	Yes/No/NA	Gross A.B, Gamma Spec	Yes/No/NA
Residual Chlorine Check Performed:	8270	Yes/No/NA	8310	Yes/No/NA	8330	Yes/No/NA
	8081	Yes/No/NA	8151	Yes/No/NA		

Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.
1	C03- 0437	4 °C	4	C03-	°C	7	C03 -	°C
2	C03-	°C	5	C03-	°C	8	C03-	°C
3	C03 -	°C	6	C03-	°C	9	C03-	°C

Taken By: R (Signature) J. Pate (Printed Name) 10/9/03 (Date)

CLIENT-RELATED INFORMATION

☐ Missing Cooler	☐ Missing Samples/Bottles	☐ Incorrect Preservation	☐ Insufficient Sample Volume
☐ Cooler Conditions	☐ Broken/Leaking Samples	☐ pH Criteria Not Met	☐ Chain of Custody Problems
☐ Missing Paperwork	☐ Incorrect Bottle Type	☐ Residual Chlorine Present	☐ Other:
☐ Missing/Incorrect Bottle Labels	☐ Cooler Temperatures Out of Range	☐ Head Space in Bottles	EPA Custody Seal:

BRIEFLY DESCRIBE THE PROBLEM AND THE ACTION TAKE

Date 10/8/03 FedEx Tracking Number 832942539697

ender's ame Brett Fisher Phone 804 965-9000

Company DAMES & MOORE/URS/CRC

Address 5540 FALMOUTH ST STE 201

Dept/Floor/Suite/Room

ty RICHMOND State VA ZIP 23230

Faxed to Client? YES ☐ NO ☐

our Internal Billing Reference 09604 317

Response Req

PROJECT MANAGEMENT

PROJECT MANAGER COMMENTS:

DCL Project Manager: _____ (Printed Name) Returned to Sample Receipt by: _____ (Signature) Date: _____

DATACHEM LABORATORIES CLIENT-RELATED INFORMATION REPORT (CRIR)

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill In or Circle)

Client Name: URS

Project/Task/Site: 03E-0443

Date/Time of Receipt: 10/10/03 0900

Number of Coolers Received: 1

Condition of Coolers:	Acceptable/Unacceptable	Temperature Control:	Present/Not Included
Custody Seals:	Present/Absent/NA	Location Temp Taken:	Control/Between Samples
	Intact/Broken/NA	Are all temperatures within	
Tamper Evident:	Yes/No/NA	project specific guidelines?	Yes/No/NA
Ice Present:	Yes/No/NA	Are all applicable pHs within	
	Frozen/Melted/NA	specific guidelines?	Yes/No/NA

pH Check Performed:	Metals	Yes/No/NA	Total Phenolics	Yes/No/NA	NO3/NO2	Yes/No/NA
	Cyanide	Yes/No/NA	TPH – 418.1	Yes/No/NA	Oil & Grease	Yes/No/NA
	Sulfide	Yes/No/NA	COD	Yes/No/NA	Total Phosphorous	Yes/No/NA
	Ammonia	Yes/No/NA	TKN	Yes/No/NA	Gross A.B, Gamma Spec	Yes/No/NA
Residual Chlorine Check Performed:	8270	Yes/No/NA	8310	Yes/No/NA	8330	Yes/No/NA
	8081	Yes/No/NA	8151	Yes/No/NA		

Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.
1	C03- 0441	5 °C	4	C03-	°C	7	C03 -	°C
2	C03-	°C	5	C03-	°C	8	C03-	°C
3	C03-	°C	6	C03-	°C	9	C03-	°C

Taken By: _____ (Signature) J. Pate (Printed Name) 10/10/03 (Date)

CLIENT-RELATED INFORMATION

☐ Missing Cooler	☐ Missing Samples/Bottles	☐ Incorrect Preservation	☐ Insufficient Sample Volume
☐ Cooler Conditions	☐ Broken/Leaking Samples	☐ pH Criteria Not Met	☐ Chain of Custody Problems
☐ Missing Paperwork	☐ Incorrect Bottle Type	☐ Residual Chlorine Present	☐ Other:
☐ Missing/Incorrect Bottle Labels	☐ Cooler Temperatures Out of Range	☐ Head Space in Bottles	EPA Custody Seal:

BRIEFLY DESCRIBE THE PROBLEM AND THE ACTION TAKEN: Date 10/9/03 FedEx Tracking Number 832942539675

Sender's Name Brett Fisher Phone 804 965-9000

Company DAMES & MOORE/URS/CRC

Address 5540 FALMOUTH ST STE 201 Dept/Floor/Suite/Room

City RICHMOND State VA ZIP 23230

Faxed to Client? YES ☐ NO ☐ Your Internal Billing Reference 09604 317

Response Requ...

PROJECT MANAGEMENT

PROJECT MANAGER COMMENTS:

DCL Project Manager: _____ (Printed Name) Returned to Sample Receipt by: _____ (Signature) Date: _____

SLC/CRIR.doc Revised 1/01/03

Data Qualifying Codes

Two types of data qualifying codes or flags are applied in the course of the data review. The data validation flags indicate data that are not usable for decision-making, more than normally biased and/or variable, or not representative of field conditions. These codes and their definitions are presented below in the hierarchy stipulated in the USEPA Region III Modifications to the National Functional Guidelines for Data Review (September 1994).

Data Validation Flags

Flag	Interpretation
R	Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.
U	Not detected. The associated number indicates the approximate sample concentration is necessary to be detected.
B	Not detected substantially above the level reported in laboratory or field blanks.
N	Tentative Identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.
J	Analyte present. Reported value may not be accurate or precise.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
UL	Not detected, quantitation limit is probably higher.
NT	Not tested, no analytical result provided.

The other type of code used by URS is a "Reason Code". The reason code indicates the type of quality control failure that led to the application of the data validation flag.

Reason Codes

GC/MS Organics		GC and HPLC Organics		Inorganics and Conventionals	
Code	Interpretation	Code	Interpretation	Code	Interpretation
a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence
b	Bubble found in vial >6mm	b	Instrument performance failure	c	Calibration failure
c	Calibration failure; poor or unstable response	c	Calibration failure; poor or unstable response	d	MS/MSD imprecision
d	MS/MSD imprecision	d	MS/MSD imprecision	e	LCSD imprecision
e	LCSD imprecision	e	LCSD imprecision	f	Field duplicate imprecision
f	Field duplicate imprecision	f	Field duplicate imprecision	h	Holding time violation
h	Holding time violation	g	Dual column confirmation imprecision	k	Laboratory duplicate imprecision
i	Internal standard failure	h	Holding time violation	l	LCS recovery failure
j	Tuning failure or poor mass spectrometer performance	i	Internal standard failure	m	MS/MSD recovery failure
l	LCS recovery failure	l	LCS recovery failure	n	ICS failure
m	MS/MSD recovery failure	m	MS/MSD recovery failure	o	Calibration blank contamination
p	Poor chromatography	p	Poor chromatography	p	Preparation blank contamination
q	Concentration exceeded the linear range of the instrument	q	Concentration exceeded the linear range	q	Concentration exceeded the linear range
r	Linearity failure in initial calibration	r	Linearity failure in initial calibration	r	Linearity failure in calibration or MSA
s	Surrogate failure	s	Surrogate failure	s	Serial dilution failure
t	TIC	u	No confirmation column	v	Post-digestion spike failure
w	Identification criteria failure	w	Retention time failure	w	CRDL Standard Failure
x	Field blank contamination	x	Field blank contamination	x	Field blank contamination
y	Trip blank contamination	z	Method blank contamination	z	Laboratory storage blank contamination
z	Method blank contamination				

DATA VALIDATION REPORT - Level III Review

SDG No.: 03E-0444-01 **Fraction:** PETN_&_Nitroglycerin

Lab: TriMatrix **Project Name:** Radford_SSP

Reviewer: AS **Date:** February_3,_2004

This report presents the findings of a review of the referenced data. The report consists of this summary, copies of data reports with data qualifying flags applied (as required), the completed data validation checklist, supporting documentation, and an explanation of the data qualifying flags employed. The review performed is based on the USEPA Region III Modifications to the National Functional Guidelines for Data Review as pertains to the specifics of the analytical methods employed and provisions of the approved project-specific Quality Assurance Project Plan (QAPP).

Major Anomalies: None.

Minor Anomalies: The relative percent difference between the two analytical column concentrations for nitroglycerin was greater than the control limit (i.e., 40%) for samples 13SB11A at 71% and 13SB11B at 54%. The higher of the two concentrations was reported from the primary calibrated column. These results were flagged "J,g".

The field duplicate pair (13SB12B/SBD8) displayed a relative percent difference greater than the control limit (i.e., 35%) for nitroglycerin at 185%. The data user should be made aware of the possibility for replicate sampling error.

Correctable Anomalies: None.

Comments: Positive field sample results from the primary column were analyzed to confirm on an alternate column. Mid-point standards and standards at levels approximate to the method detection limit were analyzed concurrently to qualitatively identify positive detections by retention time responses only.

Sample SBD8 was analyzed at dilution factor of two to report a positive detection within the linear range of the instrument.

All data are usable, as qualified, for their intended purpose based on the data reviewed.

Signed: Andrea Sansom

Andrea Sansom

DATA CHEM LABORATORIES
A Sorenson Company

COVER PAGE

ANALYTICAL REPORT FOR URS Group, Inc.

E-mail: Darren_Renne@URScorp.com

G0399013

DCL Report Group..: **03E-0444-01**

Date Printed.....: 22-OCT-03 17:40

Project Protocol #: P021C002
Client Ref Number.: Subcontract DCL-09
Release Number....: URS#03

Analysis Method(s): 8332

URS Group, Inc.
Attention: Mr. J Darren Renne
5540 Falmouth Street
Suite 201
Richmond, VA 23229

Client Sample Name	Laboratory Sample Name	Date Sampled	Date Received
13SB7A	03E04260	09-OCT-03	10-OCT-03
13SB7B	03E04261	09-OCT-03	10-OCT-03
13SB7C	03E04262	09-OCT-03	10-OCT-03
13SB7CMS	03E04262MS	09-OCT-03	10-OCT-03
13SB7CMSD	03E04262MSD	09-OCT-03	10-OCT-03
13SB12A	03E04263	09-OCT-03	10-OCT-03
13SB12B	03E04264	09-OCT-03	10-OCT-03
SBD8	03E04265	09-OCT-03	10-OCT-03
13SB12C	03E04266	09-OCT-03	10-OCT-03
13SB11A	03E04267	09-OCT-03	10-OCT-03
13SB11B	03E04268	09-OCT-03	10-OCT-03
13SB11C	03E04269	09-OCT-03	10-OCT-03
13SB10A	03E04270	09-OCT-03	10-OCT-03
13SB10B	03E04271	09-OCT-03	10-OCT-03
Method Blank	BL-211507-1	NA	NA
LCS	QC-211507-1	NA	NA

Gloria W. Heung — Analyst: Gloria W. Heung — 10/23/03 Date

Thomas T. McKay — Reviewer: Thomas T McKay — 10/23/03 Date

Richard W. Wade — Lab Supervisor: Richard W. Wade — 10/23/03 Date

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

Form RLIMS63A-V1.4
10230314295239


S0399039

Date Printed.....: 23-OCT-03 14:29

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#03

Date Received.....: 10-OCT-03 00:00

DCL Preparation Group: G039C001
Date Prepared.....: 13-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **13SB7A**
DCL Sample Name...: **03E04260**
DCL Report Group..: **03E-0444-01**

Matrix.....: SOIL
Date Sampled.....: 09-OCT-03 09:45
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 17.0

DCL Analysis Group: G039C001
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	21-OCT-03 22:54	0.269	ND		U	1	1.20
Nitroglycerin	21-OCT-03 22:54	0.195	ND		U	1	0.602

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

Form RLIMS63A-V1.4
10220317400326
Page 4

S039903B

Date Printed.....: 22-OCT-03 17:40

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#03

Date Received.....: 10-OCT-03 00:00

DCL Preparation Group: G039C001
Date Prepared.....: 13-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **13SB7B**
DCL Sample Name...: **03E04261**
DCL Report Group..: **03E-0444-01**

Matrix.....: SOIL
Date Sampled.....: 09-OCT-03 10:00
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 19.0

DCL Analysis Group: G039C001
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	21-OCT-03 23:16	0.275	ND		U	1	1.23
Nitroglycerin	21-OCT-03 23:16	0.200	ND		U	1	0.617

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039903C

Date Printed.....: 22-OCT-03 17:40

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#03

Date Received.....: 10-OCT-03 00:00

DCL Preparation Group: G039C001
Date Prepared.....: 13-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **13SB7C**
DCL Sample Name...: **03E04262**
DCL Report Group..: **03E-0444-01**

Matrix.....: SOIL
Date Sampled.....: 09-OCT-03 10:15
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 23.8

DCL Analysis Group: G039C001
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	21-OCT-03 23:39	0.293	ND		U	1	1.31
Nitroglycerin	21-OCT-03 23:39	0.213	ND		U	1	0.656

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039903G

Date Printed.....: 22-OCT-03 17:40

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#03

Date Received.....: 10-OCT-03 00:00

DCL Preparation Group: G039C001
Date Prepared.....: 13-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **13SB12A**
DCL Sample Name...: **03E04263**
DCL Report Group..: **03E-0444-01**

Matrix.....: SOIL
Date Sampled.....: 09-OCT-03 10:45
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 24.9

DCL Analysis Group: G039C001
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	22-OCT-03 00:46	0.297	ND		U	1	1.33
Nitroglycerin	22-OCT-03 00:46	0.216	8.48			1	0.666

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039903H

Date Printed.....: 22-OCT-03 17:40

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#03

Date Received.....: 10-OCT-03 00:00

DCL Preparation Group: G039C001
Date Prepared.....: 13-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **13SB12B**
DCL Sample Name...: **03E04264**
DCL Report Group..: **03E-0444-01**

Matrix.....: SOIL
Date Sampled.....: 09-OCT-03 11:00
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 36.7

DCL Analysis Group: G039C001
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	22-OCT-03 01:09	0.352	ND		U	1	1.58
Nitroglycerin	22-OCT-03 01:09	0.256	4.05			1	0.790

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039903J

Date Printed.....: 23-OCT-03 14:29

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#03

Date Received.....: 10-OCT-03 00:00

DCL Preparation Group: G039C001
Date Prepared.....: 13-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **SBD8**
DCL Sample Name...: **03E04265**
DCL Report Group..: **03E-0444-01**

Matrix.....: SOIL
Date Sampled.....: 09-OCT-03 00:00
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 30.0

DCL Analysis Group: G039C001
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	22-OCT-03 01:53	0.319	ND		U	1	1.43
Nitroglycerin	23-OCT-03 12:20	0.462	67.4			2	1.43

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039903K

Date Printed.....: 22-OCT-03 17:40

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#03

Date Received.....: 10-OCT-03 00:00

DCL Preparation Group: G039C001
Date Prepared.....: 13-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **13SB12C**
DCL Sample Name...: **03E04266**
DCL Report Group..: **03E-0444-01**

Matrix.....: SOIL
Date Sampled.....: 09-OCT-03 11:15
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 38.9

DCL Analysis Group: G039C001
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	22-OCT-03 02:16	0.365	ND		U	1	1.64
Nitroglycerin	22-OCT-03 02:16	0.265	2.54			1	0.818

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039903L

Date Printed.....: 22-OCT-03 17:40

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#03

Date Received.....: 10-OCT-03 00:00

DCL Preparation Group: G039C001
Date Prepared.....: 13-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **13SB11A**
DCL Sample Name...: **03E04267**
DCL Report Group..: **03E-0444-01**

Matrix.....: SOIL
Date Sampled.....: 09-OCT-03 12:15
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 27.3

DCL Analysis Group: G039C001
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	22-OCT-03 02:38	0.307	ND		U	1	1.38
Nitroglycerin	22-OCT-03 02:38	0.223	2.11			1	0.688

J,g

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039903M

Date Printed.....: 22-OCT-03 18:01

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#03

Date Received.....: 10-OCT-03 00:00

DCL Preparation Group: G039C001
Date Prepared.....: 13-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **13SB11B**
DCL Sample Name...: **03E04268**
DCL Report Group..: **03E-0444-01**

Matrix.....: SOIL
Date Sampled.....: 09-OCT-03 12:30
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 23.5

DCL Analysis Group: G039C001
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	22-OCT-03 03:01	0.292	ND		U	1	1.31
Nitroglycerin	22-OCT-03 03:01	0.212	2.55			1	0.654

JJg

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039903N

Date Printed.....: 22-OCT-03 18:01

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#03

Date Received.....: 10-OCT-03 00:00

DCL Preparation Group: G039C001
Date Prepared.....: 13-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **13SB11C**
DCL Sample Name...: **03E04269**
DCL Report Group..: **03E-0444-01**

Matrix.....: SOIL
Date Sampled.....: 09-OCT-03 12:45
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 28.1

DCL Analysis Group: G039C001
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	22-OCT-03 03:23	0.310	ND		U	1	1.39
Nitroglycerin	22-OCT-03 03:23	0.225	ND		U	1	0.695

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039903P

Date Printed.....: 22-OCT-03 17:40

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#03

Date Received.....: 10-OCT-03 00:00

DCL Preparation Group: G039C001
Date Prepared.....: 13-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **13SB10A**
DCL Sample Name...: **03E04270**
DCL Report Group..: **03E-0444-01**

Matrix.....: SOIL
Date Sampled.....: 09-OCT-03 13:00
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 41.4

DCL Analysis Group: G039C001
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	22-OCT-03 03:46	0.381	ND		U	1	1.71
Nitroglycerin	22-OCT-03 03:46	0.276	ND		U	1	0.853

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039903Q

Date Printed.....: 22-OCT-03 17:40

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#03

Date Received.....: 10-OCT-03 00:00

DCL Preparation Group: G039C001
Date Prepared.....: 13-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **13SB10B**
DCL Sample Name...: **03E04271**
DCL Report Group..: **03E-0444-01**

Matrix.....: SOIL
Date Sampled.....: 09-OCT-03 13:15
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 24.9

DCL Analysis Group: G039C001
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	22-OCT-03 04:08	0.297	ND		U	1	1.33
Nitroglycerin	22-OCT-03 04:08	0.216	ND		U	1	0.666

DATA VALIDATION WORKSHEET

Explosives

Reviewer: AS
Date: January-04
DV Level: II III IV

Review Document:

_X_ Region III Modified for National Functional Guidelines
____ NFG for organic Data review (February 1994)
_X_ Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: DataChem
SDG No.: 03E-0444-01
Test Name: Explosives
Method No.: 8332-HPLC

1.0 Laboratory Deliverables

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. % solids		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes:

2.0 Holding Times

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	Action: If the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyese, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%	x		
	For initial Calibration: for %RSD > ±20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes: Second column was used to not confirm primary column low level hits. The second column does not have an initial calibration or bracketing continuing calibrations. The one points provided are for retention time purposes only.

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?	x		
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?			x
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.			x
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 40-150%?		x	
6.4	Are there any RPDs outside the QC limits not to exceed 60%? Are there any RPDs outside the QC limits not to exceed 60%?		x	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

7.0 Laboratory Control Sample (LCS)

		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 40-150%?		x	
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?			x
	Action: If Yes, J(+) only.			

Notes:

8.0 Field Duplicate

		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.		x	

Notes:

	SBD8	13SB12B	RPD	Delta	RL	5XRL	4XRL
PETN	ND	ND			1.58	7.9	6.32
nitroglycerin	67.4	2.54	185%	64.86	0.79	3.95	3.16

9.0 Compound Identification and Detection Limit Verification

		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.	x		
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.		x	
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	x		

Notes:

10.0 Data Completeness

			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		x		
	Number of samples:	12			
	Number of target compounds in each analysis:	2			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

Nitroglycerin Results

Sample No.	Primary Column Result (mg/Kg)	Secondary Column Result (mg/Kg)	RPD
03E04263	6.37	7.38	14.7%
03E04264	2.57	3.81	38.9%
03E04265	47.2*	53.3	12.%
03E04266	1.55	1.82	16.%
03E04267	1.53	0.725	71%
03E04268	1.95	1.12	54%

Results were not moisture corrected.
*This result was from the dilution run, sequence 1023LC3.

Gloria W. Heung 10/23/03

Thomas T. McKay 10/23/03

DATA CHEM LABORATORIES
A Sorenson Company

FORM F (TYPE I)
SINGLE METHOD ANALYSES

QUALITY CONTROL DATA SHEET
MATRIX SPIKE SAMPLE
MATRIX SPIKE DUPLICATE SAMPLE


S039903D

Client Name.....: URS Group, Inc.
Release Number.....: URS#03

Matrix.....: SOIL
Reporting Units.....: mg/Kg

DCL Preparation Group: G039C001
Date Prepared.....: 13-OCT-03 00:00
Preparation Method...: 8332

DCL Sample Name...: **03E04262MS**
Date Printed.....: 22-OCT-03 17:40

DCL Analysis Group: G039C001
Analysis Method...: OL-SW-8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

QC Limit Type.....: Method

Analytical Results

Analyte	Date Analyzed	Sample Result	Spiked Result	Spike Added	Percent Recovery	QC Limits	QC Flag
PETN	22-OCT-03 00:01	ND	16.7	20.0	83.4	65.0/125.	
Nitroglycerin	22-OCT-03 00:01	ND	19.8	20.0	99.0	65.0/125.	


S039903F

DCL Sample Name...: **03E04262MSD**

Analytical Results

Analyte	Date Analyzed	Duplicate Result	Percent Recovery	Mean	Range	RPD	QC Limits	QC Flag
PETN	22-OCT-03 00:24	17.5	87.6	17.1	0.839	4.9	0.00/35.0	
Nitroglycerin	22-OCT-03 00:24	18.6	92.8	19.2	1.24	6.5	0.00/35.0	

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

Bmy 10/12/03

Date of Extraction:	OCT 12, 2003	**DataChem** Laboratories Extraction Notebook	Book # Ext 246 Page#
Account #(s):	8001		
DCL Set ID(s):	03E-0443-01, 0444-01		Matrix: SOIL
Group/Lot ID:	G039C001 10/12/03		Method: 8332

	DCL Sample ID	Field ID	Initial Vol. / WT	Initial pH	Adj pH		Surr. Added	Matrix Spike		Final Volume
1	BL-211507-1	BL-211507-1	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
2	QC-211507-1	QC-211507-1	1.0gm	N/A	N/A	N/A	1mL	1mL	----	2mL
3	03E04253	13SB10C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
4	03E04254	13SB9A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
5	03E04255	SBD9	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
6	03E04256	13SB9B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
7	03E04257	13SB9C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
8	03E04258	13SB8A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
9	03E04259	13SB8B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
10	03E04260	13SB7A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
11	03E04261	13SB7B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
12	03E04262	13SB7C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
13	03E04262MS	13SB7CMS	1.0gm	N/A	N/A	N/A	1mL	1mL	----	2mL
14	03E04262MSD	13SB7CMSD	1.0gm	N/A	N/A	N/A	1mL	1mL	----	2mL
15	03E04263	13SB12A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
16	03E04264	13SB12B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
17	03E04265	SBD8	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
18	03E04266	13SB12C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
19	03E04267	13SB11A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
20	03E04268	13SB11B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
21	03E04269	13SB11C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
22	03E04270	13SB10A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
23	03E04271	13SB10B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
24										
25										
26										
27										
28										
29										
30										
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										

Bmy 10/12/03

Solvents:	MeCN	CH016	Comments:
Surrogate Spike:	239 ws 3	1/30/04 By: Bmy	
Matrix Spike:	239 ws 2	1/30/04 6/10/2000 By: Bmy	
Matrix Spike:	----------	---------- By:	
Extractionist:	Bmy Yang	10/12/03	
Checker:	Wenjy Yang	10/13/03	Sonicators tunned by:

*=Entry Error

Project No. X

TITLE Data Chem Laboratories % Moisture Book No. 4146

From Page No. X

Insert of preparatory report for sets: 03E-0443-02 & 0444-02

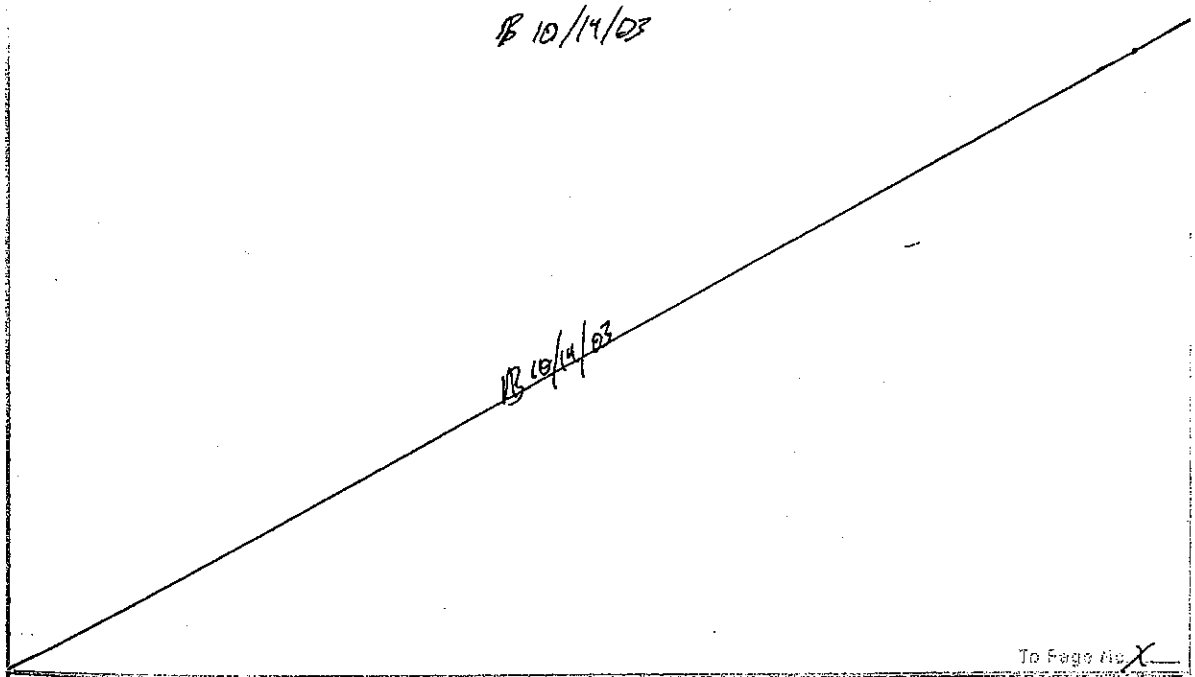
VB 10/14/03

%Moistures & Solids

Start Time: 16:31 13-Oct-03
Finish Time: 9:24 14-Oct-03

Set ID #	Dish #	Sample #	Dish (g)	Dish + Soil (g)	Soil weight(g)	Dish + Dry Soil (g)	Dry Soil (g)	% Solids	% Moistures
03E-0444-02	1	03E04260	1.23	5.22	3.99	4.54	3.31	83.0%	17.0%
03E-0444-02	2	03E04261	1.24	5.23	3.99	4.47	3.23	81.0%	19.0%
03E-0444-02	3	03E04262	1.25	5.74	4.49	4.67	3.42	76.2%	23.8%
03E-0444-02	4	03E04262MD	1.25	5.38	4.13	4.27	3.02	73.1%	26.9%
03E-0444-02	5	03E04263	1.23	8.66	7.43	6.81	5.58	75.1%	24.9%
03E-0444-02	6	03E04264	1.23	5.37	4.14	3.85	2.62	63.3%	36.7%
03E-0444-02	7	03E04265	1.23	5.13	3.90	3.96	2.73	70.0%	30.0%
03E-0444-02	8	03E04266	1.25	5.52	4.27	3.86	2.61	61.1%	38.9%
03E-0444-02	9	03E04267	1.23	5.84	4.61	4.58	3.35	72.7%	27.3%
03E-0444-02	10	03E04268	1.25	5.03	3.78	4.14	2.89	76.5%	23.5%
03E-0444-02	11	03E04269	1.25	5.88	4.63	4.58	3.33	71.9%	28.1%
03E-0444-02	12	03E04270	1.24	5.20	3.96	3.56	2.32	58.6%	41.4%
03E-0444-02	13	03E04271	1.23	5.68	4.45	4.57	3.34	75.1%	24.9%
03E-0443-02	15	03E04253	1.24	6.62	5.38	5.12	3.88	72.1%	27.9%
03E-0443-02	16	03E04253MD	1.23	5.13	3.90	3.97	2.74	70.3%	29.7%
03E-0443-02	17	03E04254	1.24	6.03	4.79	4.75	3.51	73.3%	26.7%
03E-0443-02	18	03E04255	1.24	5.61	4.37	4.22	2.98	68.2%	31.8%
03E-0443-02	19	03E04256	1.24	6.15	4.91	4.96	3.72	75.8%	24.2%
03E-0443-02	20	03E04257	1.24	5.80	4.56	4.67	3.43	75.2%	24.8%
03E-0443-02	21	03E04258	1.23	5.31	4.08	4.22	2.99	73.3%	26.7%
03E-0443-02	22	03E04259	1.24	5.16	3.92	4.29	3.05	77.8%	22.2%

VB 10/14/03



VB 10/14/03

To Page No. X

Witnessed & Understood by me,	Date	Invented by	Date
Jose G. Rocha	10/14/03	N/A	10/14/03
		Recorded by Norman Bleagle	

DATA CHEM LABORATORIES
A Sorenson Company

ANALYTICAL REPORT

Form ARF-AL
Page 1 of 3
Part 1 of 1
10140309510797X

Date _____
Laboratory Group Name 03E-0444-02
Account No. 08001 URS03

URS
Attention: Andrea Sansom
849 Intermountain Dr.
Sutie 320
Linthicum, MD 21090

FAX (410) 859-5202
Telephone (410) 859-5049
E-mail Andrea_Sansom@URScorp.com

Sampling Collection and Shipment

Sampling Site RFAAP/09604-317 Date of Collection October 09, 2003

Date Samples Received at Laboratory October 10, 2003

Analysis

Method of Analysis XX-EP-800

Date(s) of Analysis October 14, 2003

Analytical Results

Field Sample Number	Laboratory Number	Sample Type	MOISTURE %								
13SB7A	03E04260	SOIL	17.0								
13SB7B	03E04261	SOIL	19.0								
13SB7C	03E04262	SOIL	23.8								
13SB7CMD	03E04262MD	SOIL	26.9								
13SB12A	03E04263	SOIL	24.9								
13SB12B	03E04264	SOIL	36.7								
SBD8	03E04265	SOIL	30.0								
13SB12C	03E04266	SOIL	38.9								
13SB11A	03E04267	SOIL	27.3								
13SB11B	03E04268	SOIL	23.5								
13SB11C	03E04269	SOIL	28.1								
13SB10A	03E04270	SOIL	41.4								
13SB10B	03E04271	SOIL	24.9								

† See comment on last page.
ND Parameter not detected above LOD.
NR Parameter not requested.
NA Parameter not applicable.

** See comment on last page.
( ) Parameter between LOD and LOQ.

Norman Breese
Analyst: Norman Breese

Jon Yonk
Reviewer: Johnathan M. Yonk

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

DATA CHEM
LABORATORIES, INC.
A SORENSON COMPANY

Case Narrative

Method:	SW-846 8332	**Client:**	URS
Analysis:	Nitroglycerin, PETN	**Account:**	8001
Preparation SOP #:	OL-SW-8332	**Matrix:**	Solid
Analysis SOP#:	OL-SW-8332	**SDG#:**	URS#03
DCL Set ID's:	03E-0444-01		

General Set Information: This set contained twelve samples, a matrix spiked sample (MS) and a matrix spike duplicate. This set was batched with another set, which contained seven solid samples, a method blank, and a laboratory control sample (LCS).

Method Summary: A 1.0 gram portion of the soil samples was weighed, transferred into a suitable container, and 2 ml of acetonitrile was added. The samples were placed in an ultrasonic bath for a minimum of one hour. The samples were allowed to settle and the supernatant was filtered through a 0.45µ PTFE filter. One part acetonitrile extract was mixed with one part of a 1% calcium chloride solution, then injected into an HP1050 HPLC equipped with UV detection and a Phenomenex Ultracarb ODS C18 column. The instrument was adjusted to the proper operating parameters and allowed to equilibrate until a stable baseline was established. Initial calibration standards were analyzed and linear calibration curves were generated from the data. A continuing calibration standard was analyzed at the beginning of sample analysis, after each ten samples, and at the end of the analysis. The response of the continuing calibration standard must be within method limits when compared to the initial calibration curve.

Samples and QCs were analyzed under identical conditions as those used for initial and continuing calibration. Quantitation was based on calibration curves using the initial calibration standards. Results were reported in units of mg/Kg.

Sample Preparation: No anomalies were observed during the preparation of the samples.

Holding Times: The samples were prepared and analyzed within method required hold times.

Dilution(s): Sample 03E04265 was diluted at a ratio of 1 to 2.

Quality Control Data:

Blank: No confirmed method analytes were detected in the method blank above half of the CRDL. The method blank belonged to set# 03E-0443-01.

Laboratory Control Samples: All recoveries met the method limits. The LCS belonged to set# 03E-0443-01.

Surrogate Recovery: Surrogate recoveries were acceptable.

MS/MSD: Matrix spiking was performed on sample 03E04262. All percent recoveries and RPDs were within method limits.

Instrument QC: All initial and continuing calibration verification samples met method criteria.

Flagging Codes: The "U" flag indicates that the analyte was not detected at or above the MDL level. The "J" flag indicates that a value reported between the MDL and CRDL.

NC/CAR: None.

Miscellaneous Comments: None.

Confirmation Analyses: Any sample with a positive result above the MDL was qualitatively analyzed for confirmation on a second column. For samples requiring confirmation, one part acetonitrile extract was mixed with one part of a 1% calcium chloride solution, then injected into an HP1050 HPLC equipped with UV detection and a Phenomenex Synergi Polar-RP column. The instrument was adjusted to the proper operating parameters and allowed to equilibrate until a stable baseline was established. A CCV standard was run to establish retention times and a standard at a level near the reporting limits was run to verify low concentration sensitivity. The second column analyses were used for qualitative confirmation of analytes based on retention time. If a positive result is confirmed, the quantitative result from the primary column is reported.

Gloria W. Heung 10/23/03

Gloria W. Heung / Date

03E-0444
SDG#URS#03

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1145

Project Number	Project Name
07604317	RFAAP

Project Contact (Name and Phone Number): Darren Renne (804) 965 9000

Samplers: Brett Fisher / John Spangler

LAB: Data Chem

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives ([redacted], 8332) PETN/NG	Dioxin/Furan(8290)	TAL Metals (Including Mercury)	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	Paint Filter (9095B)	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
13SB7A	10/9/03 945	5		X	5	F	/	1						X									03E04266
13SB7B	10/9/03 1000	5		X	5	F	/	1						X									61
13SB7C	10/9/03 1015	5		X	5	F	/	1						X									62
13SB7C MS	10/9/03 1015	5		X	5	F	/	1						X									62ms
13SB7C MSD	10/9/03 1015	5		X	5	F	/	1						X									62msd
13SB12A	10/9/03 1045	5		X	5	F	/	1						X									63
13SB12B	10/9/03 1100	5		X	5	F	/	1						X									64
SBD8	10/9/03 —	5		X	5	F	/	1						X									65
13SB12C	10/9/03 1115	5		X	5	F	/	1						X									66
13SB11A	10/9/03 1215	5		X	5	F	/	1						X									67
13SB11B	10/9/03 1230	5		X	5	F	/	1						X									68
13SB11C	10/9/03 1245	5		X	5	F	/	1						X									69
13SB10A	10/9/03 1300	5		X	5	F	/	1						X									70
13SB10B	10/9/03 1315	5		X	5	F	/	1						X									71

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
Brett [signature] 10/9/03	1800	FedEx			
Relinquished by: FedEx 10/10/03	Date/time 0900	Received by: (for lab) [signature] R-33-1	Date/Time		

NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement

Earliest Sampling Date: 9-Oct-2003

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 24-Oct-2003

Project/Job/Task: P021C002 | Split: | Root Set ID: 03E-0444 * | Reporting Group | 01 | 02 | #

Client: URS | Account: 08001

Comments:

Verified: JW 10/10/03

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Customer ID 2	Analysis: Nitroglycein/PETN by 8332	Analysis: Moisture	Bottles
9-Oct-2003	13SB7A	03E04260			SOIL		X	X	1
9-Oct-2003	13SB7B	03E04261			SOIL		X	X	1
9-Oct-2003	13SB7C	03E04262			SOIL		X	X	1
9-Oct-2003	13SB7CMS	03E04262MS		MS	SOIL		X		1
9-Oct-2003	13SB7CMSD	03E04262MSD		MSD	SOIL		X		1
9-Oct-2003	13SB12A	03E04263			SOIL		X	X	1
9-Oct-2003	13SB12B	03E04264			SOIL		X	X	1
9-Oct-2003	SBD8	03E04265			SOIL		X	X	1
9-Oct-2003	13SB12C	03E04266			SOIL		X	X	1
9-Oct-2003	13SB11A	03E04267			SOIL		X	X	1

1B JP

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Walk-in/Room/Shelf/Fridge	10/12/03 11:[illegible]	[signature]	[signature]
[signature]	10/13/03 14:30	Norman Brace	% Moisture
Norman Brace	10/13/03 16:34	R-369-1 NB	Storage

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

Check box if there is a continuation page ☐

Printed 10/10/2003 12:06

Form: COFC1.01-SWV2.30

310

Earliest Sampling Date: 9-Oct-2003

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 24-Oct-2003

Project/Job/Task: P021C002 | *Split:* | **Root Set ID:** 03E-0444 * | **Reporting Group**

Client: URS | **Account:** 08001

Comments:

Verified: JW 10/10/03

Analysis

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Customer ID 2	01 Nitroglycein/PETN by 8332	02 Moisture	# Bottles
9-Oct-2003	13SB11B	03E04268			SOIL		X	X	1
9-Oct-2003	13SB11C	03E04269			SOIL		X	X	1
9-Oct-2003	13SB10A	03E04270			SOIL		X	X	1
9-Oct-2003	13SB10B	03E04271			SOIL		X	X	1
9-Oct-2003	13SB7CMD	03E04262MD		MD	SOIL			X	0

IB JP

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Walk-in/ Room/ Shelf/ Fridge	10/12/03 11:..		
	10/13/03 14:30	Norman Burns	To Moisture
Norman Burns	10/13/03 16:34	R-309-4 B	storage

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

Check box if there is a continuation page ☐

Printed 10/10/2003 12:06

Form: COFC1.01-SWV2.30

DATACHEM LABORATORIES CLIENT-RELATED INFORMATION REPORT (CRIR)

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill In or Circle)

Client Name: URS

Project/Task/Site: 03E-0444

Date/Time of Receipt: 10/10/03 0900

Number of Coolers Received: 1

Condition of Coolers:	Acceptable/Unacceptable
Custody Seals:	Present/Absent/NA
	Intact/Broken/NA
Tamper Evident:	Yes/No/NA
Ice Present:	Yes/No/NA
	Frozen/Melted/NA
Temperature Control:	Present/Not Included
Location Temp Taken:	Control/Between Samples
Are all temperatures within project specific guidelines?	Yes/No/NA
Are all applicable pHs within specific guidelines?	Yes/No/NA

pH Check Performed:							
	Metals	Yes/No/NA	Total Phenolics	Yes/No/NA	NO3/NO2	Yes/No/NA
	Cyanide	Yes/No/NA	TPH – 418.1	Yes/No/NA	Oil & Grease	Yes/No/NA
	Sulfide	Yes/No/NA	COD	Yes/No/NA	Total Phosphorous	Yes/No/NA
	Ammonia	Yes/No/NA	TKN	Yes/No/NA	Gross A.B, Gamma Spec	Yes/No/NA
Residual Chlorine Check Performed:	8270	Yes/No/NA	8310	Yes/No/NA	8330	Yes/No/NA
	8081	Yes/No/NA	8151	Yes/No/NA		

Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.
1	C03- 0441	5 °C	4	C03-	°C	7	C03 -	°C
2	C03-	°C	5	C03-	°C	8	C03 -	°C
3	C03 -	°C	6	C03-	°C	9	C03 -	°C

Taken By: _____ (Signature) J. Pate (Printed Name) 10/10/03 (Date)

CLIENT-RELATED INFORMATION

☐ Missing Cooler	☐ Missing Samples/Bottles	☐ Incorrect Preservation	☐ Insufficient Sample Volume
☐ Cooler Conditions	☐ Broken/Leaking Samples	☐ pH Criteria Not Met	☐ Chain of Custody Problems
☐ Missing Paperwork	☐ Incorrect Bottle Type	☐ Residual Chlorine Present	☐ Other:
☐ Missing/Incorrect Bottle Labels	☐ Cooler Temperatures Out of Range	☐ Head Space in Bottles	EPA Custody Seal:

BRIEFLY DESCRIBE THE PROBLEM AND THE ACTION TAKEN: 10/9/03 FedEx Tracking Number 832942539675

Sender's Name: Brett Fisher Phone 804 965-9000

Company DAMES & MOORE/URS/CRC

Address 5540 FALMOUTH ST STE 201 Dept./Floor/Suite/Room

City RICHMOND State VA ZIP 23230

Faxed to Client? YES ☐ NO ☐ Your Internal Billing Reference 09604 317

Response Requested:

PROJECT MANAGEMENT

PROJECT MANAGER COMMENTS:

DCL Project Manager: _____ (Printed Name) Returned to Sample Receipt by: _____ (Signature) Date: _____

SLC/CRIR.doc Revised 1/01/03

Data Qualifying Codes

Two types of data qualifying codes or flags are applied in the course of the data review. The data validation flags indicate data that are not usable for decision-making, more than normally biased and/or variable, or not representative of field conditions. These codes and their definitions are presented below in the hierarchy stipulated in the USEPA Region III Modifications to the National Functional Guidelines for Data Review (September 1994).

Data Validation Flags

Flag	Interpretation
R	Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.
U	Not detected. The associated number indicates the approximate sample concentration is necessary to be detected.
B	Not detected substantially above the level reported in laboratory or field blanks.
N	Tentative Identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.
J	Analyte present. Reported value may not be accurate or precise.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
UL	Not detected, quantitation limit is probably higher.
NT	Not tested, no analytical result provided.

The other type of code used by URS is a "Reason Code". The reason code indicates the type of quality control failure that led to the application of the data validation flag.

Reason Codes

GC/MS Organics		GC and HPLC Organics		Inorganics and Conventionals	
Code	Interpretation	Code	Interpretation	Code	Interpretation
a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence
b	Bubble found in vial >6mm	b	Instrument performance failure	c	Calibration failure
c	Calibration failure; poor or unstable response	c	Calibration failure; poor or unstable response	d	MS/MSD imprecision
d	MS/MSD imprecision	d	MS/MSD imprecision	e	LCSD imprecision
e	LCSD imprecision	e	LCSD imprecision	f	Field duplicate imprecision
f	Field duplicate imprecision	f	Field duplicate imprecision	h	Holding time violation
h	Holding time violation	g	Dual column confirmation imprecision	k	Laboratory duplicate imprecision
i	Internal standard failure	h	Holding time violation	l	LCS recovery failure
j	Tuning failure or poor mass spectrometer performance	i	Internal standard failure	m	MS/MSD recovery failure
l	LCS recovery failure	l	LCS recovery failure	n	ICS failure
m	MS/MSD recovery failure	m	MS/MSD recovery failure	o	Calibration blank contamination
p	Poor chromatography	p	Poor chromatography	p	Preparation blank contamination
q	Concentration exceeded the linear range of the instrument	q	Concentration exceeded the linear range	q	Concentration exceeded the linear range
r	Linearity failure in initial calibration	r	Linearity failure in initial calibration	r	Linearity failure in calibration or MSA
s	Surrogate failure	s	Surrogate failure	s	Serial dilution failure
t	TIC	u	No confirmation column	v	Post-digestion spike failure
w	Identification criteria failure	w	Retention time failure	w	CRDL Standard Failure
x	Field blank contamination	x	Field blank contamination	x	Field blank contamination
y	Trip blank contamination	z	Method blank contamination	z	Laboratory storage blank contamination
z	Method blank contamination				

DATA VALIDATION REPORT - Level III Review

SDG No.: 03E-0448-01 **Fraction:** PETN_&_Nitroglycerin

Lab: TriMatrix **Project Name:** Radford_SSP

Reviewer: AS **Date:** February_3,_2004

This report presents the findings of a review of the referenced data. The report consists of this summary, copies of data reports with data qualifying flags applied (as required), the completed data validation checklist, supporting documentation, and an explanation of the data qualifying flags employed. The review performed is based on the USEPA Region III Modifications to the National Functional Guidelines for Data Review as pertains to the specifics of the analytical methods employed and provisions of the approved project-specific Quality Assurance Project Plan (QAPP).

Major Anomalies: None.

Minor Anomalies: None.

Correctable Anomalies: None.

Comments: All data are usable, as qualified, for their intended purpose based on the data reviewed.

Signed: Andrea Sansom

Andrea Sansom

DATA CHEM LABORATORIES
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COVER PAGE

ANALYTICAL REPORT FOR
URS Group, Inc.

E-mail: Darren_Renne@URScorp.com

Form COVER-V1.4
10230316223606
Page 1

G039D01L

DCL Report Group..: **03E-0448-01**

Date Printed.....: 23-OCT-03 16:22

Project Protocol #: P021C002
Client Ref Number.: Subcontract DCL-09
Release Number....: URS#03

Analysis Method(s): 8332

URS Group, Inc.
Attention: Mr. J Darren Renne
5540 Falmouth Street
Suite 201
Richmond, VA 23229

Client Sample Name	Laboratory Sample Name	Date Sampled	Date Received
Method Blank	BL-211588-1	NA	NA
LCS	QC-211588-1	NA	NA
13SW3	03E04283	10-OCT-03	11-OCT-03
SWD1	03E04284	10-OCT-03	11-OCT-03
13SW2	03E04285	10-OCT-03	11-OCT-03
13SW2MS	03E04285MS	10-OCT-03	11-OCT-03
13SW2MSD	03E04285MSD	10-OCT-03	11-OCT-03
EQB5	03E04286	10-OCT-03	11-OCT-03
EQB6	03E04287	10-OCT-03	11-OCT-03

Analyst: Gloria W. Heung — Date 10/23/03

Reviewer: Thomas T McKay — Date 10/23/03

Lab Supervisor: Richard W. Wade — Date 10/23/03

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FAX (801) 268-9992 E-mail: lab@datachem.com

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

Form RLIMS63A-V1.4
10230316223606
Page 3

S039D06Q

Date Printed.....: 23-OCT-03 16:22

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: URS#03

Date Received.....: 11-OCT-03 00:00

Client Sample Name: **13SW3**
DCL Sample Name...: **03E04283**
DCL Report Group..: **03E-0448-01**

Matrix.....: WATER
Date Sampled.....: 10-OCT-03 13:00
Reporting Units...: ug/L
Report Basis.....: ☒ As Received ☐ Dried

DCL Preparation Group: G039F006
Date Prepared.....: 15-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 770 mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G039F006
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	21-OCT-03 07:59	0.311	ND		U	1	0.970
Nitroglycerin	21-OCT-03 07:59	0.213	ND		U	1	0.970

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039D06R

Date Printed.....: 23-OCT-03 16:22

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: URS#03

Date Received.....: 11-OCT-03 00:00

Client Sample Name: **SWD1**
DCL Sample Name...: **03E04284**
DCL Report Group..: **03E-0448-01**

Matrix.....: WATER
Date Sampled.....: 10-OCT-03 00:00
Reporting Units...: ug/L
Report Basis.....: [X] As Received [ ] Dried

DCL Preparation Group: G039F006
Date Prepared.....: 15-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 770 mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G039F006
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
[X] Primary
[ ] Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	21-OCT-03 08:21	0.311	ND		U	1	0.970
Nitroglycerin	21-OCT-03 08:21	0.213	ND		U	1	0.970

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039D06S

Date Printed.....: 23-OCT-03 16:22

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: URS#03

Date Received.....: 11-OCT-03 00:00

Client Sample Name: **13SW2**
DCL Sample Name...: **03E04285**
DCL Report Group..: **03E-0448-01**

Matrix.....: WATER
Date Sampled.....: 10-OCT-03 14:00
Reporting Units...: ug/L
Report Basis.....: ☒ As Received ☐ Dried

DCL Preparation Group: G039F006
Date Prepared.....: 15-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 770 mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G039F006
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	21-OCT-03 08:44	0.311	ND		U	1	0.970
Nitroglycerin	21-OCT-03 08:44	0.213	ND		U	1	0.970

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039D06T

Date Printed.....: 23-OCT-03 16:22

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: URS#03

Date Received.....: 11-OCT-03 00:00

Client Sample Name: **EQB5**
DCL Sample Name...: **03E04286**
DCL Report Group..: **03E-0448-01**

Matrix.....: WATER
Date Sampled.....: 10-OCT-03 09:45
Reporting Units...: ug/L
Report Basis.....: ☒ As Received ☐ Dried

DCL Preparation Group: G039F006
Date Prepared.....: 15-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 770 mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G039F006
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	21-OCT-03 09:51	0.311	ND		U	1	0.970
Nitroglycerin	21-OCT-03 09:51	0.213	ND		U	1	0.970

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SAMPLE ANALYSIS DATA SHEET

Date Printed.....: 23-OCT-03 16:22

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: URS#03

Date Received.....: 11-OCT-03 00:00

Client Sample Name: **EQB6**
DCL Sample Name...: **03E04287**
DCL Report Group..: **03E-0448-01**

Matrix.....: WATER
Date Sampled.....: 10-OCT-03 11:00
Reporting Units...: ug/L
Report Basis.....: ☒ As Received ☐ Dried

DCL Preparation Group: G039F006
Date Prepared.....: 15-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 770 mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G039F006
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	21-OCT-03 10:13	0.311	ND		U	1	0.970
Nitroglycerin	21-OCT-03 10:13	0.213	ND		U	1	0.970

DATA VALIDATION WORKSHEET

Reviewer: AS
Date: January-04
DV Level: II III IV
Review Document:
_X__ Region III Modified for National Functional Guidelines
____ NFG for organic Data review (February 1994)
_X__ Project QAPP/SAP

Explosives

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: DataChem
SDG No.: 03E-0448-01
Test Name: Explosives
Method No.: 8332-HPLC

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. % solids		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes:

2.0 Holding Times		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	Action: If the temperature of the cooler was elevated (> 10 ℃), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyese, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%	x		
	For initial Calibration: for %RSD > ±20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?	x		
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?			x
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.			x
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 40-150%?		x	
6.4	Are there any RPDs outside the QC limits not to exceed 60%? Are there any RPDs outside the QC limits not to exceed 60%?		x	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

7.0 Laboratory Control Sample (LCS)

		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 40-150%?		x	
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?			x
	Action: If Yes, J(+) only.			

Notes:

8.0 Field Duplicate

		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

	SWD1	13SW3	RPD	Delta	RL	5XRL	4XRL
PETN	ND	ND			0.97	4.85	3.88
nitroglycerin	ND	ND			0.97	4.85	3.88

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.	x		
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.	x		
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	x		

Notes:

10.0 Data Completeness			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		x		
	Number of samples:	5			
	Number of target compounds in each analysis:	2			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

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FORM F (TYPE I)
SINGLE METHOD ANALYSES

QUALITY CONTROL DATA SHEET
MATRIX SPIKE SAMPLE
MATRIX SPIKE DUPLICATE SAMPLE


S039D07M

Client Name.....: URS Group, Inc.
Release Number.....: URS#03

Matrix.....: WATER
Reporting Units.....: ug/L

DCL Preparation Group: G039F006
Date Prepared.....: 15-OCT-03 00:00
Preparation Method...: 8332

DCL Sample Name...: **03E04285MS**
Date Printed.....: 23-OCT-03 16:22

DCL Analysis Group: G039F006
Analysis Method...: OL-SW-8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

QC Limit Type.....: Method

Analytical Results

Analyte	Date Analyzed	Sample Result	Spiked Result	Spike Added	Percent Recovery	QC Limits	QC Flag
PETN	21-OCT-03 09:06	ND	21.1	26.0	81.3	65.0/125.	
Nitroglycerin	21-OCT-03 09:06	ND	19.5	26.0	74.9	65.0/125.	


S039D07N

DCL Sample Name...: **03E04285MSD**

Analytical Results

Analyte	Date Analyzed	Duplicate Result	Percent Recovery	Mean	Range	RPD	QC Limits	QC Flag
PETN	21-OCT-03 09:28	19.4	74.6	20.2	1.74	8.6	0.00/35.0	
Nitroglycerin	21-OCT-03 09:28	20.2	77.6	19.8	0.697	3.5	0.00/35.0	

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DB 10/15/03

Date of Extraction:	10/15/03
Account #(s):	8001
DCL Set ID(s):	03E-0448-01
Group/Lot ID:	G039F006

DataChem Laboratories Extraction Notebook

Book #	Ext 007	Page# 56
Matrix:	WATER	
Method:	8332	

	DCL Sample ID	Field ID	Initial Vol. / WT	Initial pH	Adj pH		Surr. Added	Matrix Spike		Final Volume
1	BL-211588-1	BL-211588-1	770mL	N/A	N/A	N/A	1mL	----	----	5mL
2	QC-211588-1	QC-211588-1	770mL	N/A	N/A	N/A	1mL	1mL	----	5mL
3	03E04283	13SW3	770mL	N/A	N/A	N/A	1mL	----	----	5mL
4	03E04284	SWD1	770mL	N/A	N/A	N/A	1mL	----	----	5mL
5	03E04285	13SW2	770mL	N/A	N/A	N/A	1mL	----	----	5mL
6	03E04285MS	13SW2MS	770mL	N/A	N/A	N/A	1mL	1mL	----	5mL
7	03E04285MSD	13SW2MSD	770mL	N/A	N/A	N/A	1mL	1mL	----	5mL
8	03E04286	EQB5	770mL	N/A	N/A	N/A	1mL	----	----	5mL
9	03E04287	EQB6	770mL	N/A	N/A	N/A	1mL	----	----	5mL
10										
11										
12										
13										
14										
15										
16										
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36										
37										
38										
39										
40										

Solvents:	MeCN	C1946	Comments:
Surrogate Spike:	239WS3 #2	01/30/2004 By: DB	
Matrix Spike:	239WS99	04/12/2004 By: DB	
Matrix Spike:	----------	---------- By: NA	
Extractionist:	DB	10/15/03	
Checker:	[illegible]	10/15/03	Sonicators tunned by: NA

*=Entry Error

DB 10/15/03

DATA CHEM
LABORATORIES, INC.
A SORENSON COMPANY

Case Narrative

Method:	SW-846 8332	**Client:**	URS
Analysis:	Nitroglycerin, PETN	**Account:**	8001
Preparation SOP #:	OL-SW-8332	**Matrix:**	Water
Analysis SOP#:	OL-SW-8332	**SDG#:**	URS#03
DCL Set ID's:	03E-0448-01		

General Set Information: This set consisted of five water samples, a method blank, a laboratory control sample (LCS), a matrix spiked sample (MS), and a matrix spiked sample duplicate.

Method Summary: The samples were extracted using the double salting out procedure prescribed in EPA method 8332. An aliquot of 770 mL of each sample was saturated with salt and extracted twice with acetonitrile by stirring at timed intervals. The acetonitrile extracts were combined and re-extracted with fresh salt water. The final volume of the extract was adjusted to 5 mL for each sample and filtered through a 0.45 um PTFE filter. One part acetonitrile extract was mixed with one part of a 1% calcium chloride solution, and then injected into an HP1050 HPLC equipped with UV detection and a Phenomenex Ultracarb ODS column. The instrument was adjusted to the proper operating parameters and allowed to equilibrate until a stable baseline was established. Initial Calibration standards were analyzed and linear calibration curves were generated from the data. A continuing calibration standard was analyzed at the beginning of sample analysis and after each ten samples and at the end of the analysis. The response of the continuing calibration standard must be within method limits when compared to the initial calibration curve.

Samples and QCs were analyzed under identical conditions as those used for initial and continuing calibration. Quantitation was based on calibration curves using the initial calibration standards. Results were reported in units of µg/L.

Sample Preparation: No anomalies were observed during the preparation of the sample set.

Holding Times: The samples were prepared and analyzed within method required hold times.

Dilution(s): None

Quality Control Data:

Blank: No confirmed method analytes were detected in the method blank above half of the CRDL.

Laboratory Control Samples: All recoveries were within method limits.

Surrogate Recovery: Surrogate recoveries were all acceptable.

MS/MSD: Matrix spiking was performed on sample 03E04285. All percent recoveries and RPDs were within method limits.

Instrument QC: All initial and continuing calibration verification samples met method criteria.

Flagging Codes: The "U" flag indicates that the analyte was not detected at or above the MDL level. The "J" flag indicates that the value reported was between the MDL and CRDL.

NC/CAR: None.

Miscellaneous Comments: Any sample with a positive result above the MDL was qualitatively analyzed for confirmation on a second column. For samples requiring confirmation, one part acetonitrile extract was mixed with one part of a 1% calcium chloride solution, then injected into an HP1050 HPLC equipped with UV detection and Phenomenex Synergi Polar-RP column. The instrument was adjusted to the proper operating parameters and allowed to equilibrate until a stable baseline was established. A CCV standard was run to establish retention times and a standard at the reporting limits was run to verify low concentration sensitivity. The second column analyses were used for qualitative confirmation of analytes based on retention time. When a positive result is confirmed, the quantitative result from the primary column is reported.

Gloria W. Heung 09/23/03

Gloria W. Heung Date

03E-0448
SDG# URS#03

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1112

Project Number	Project Name
096049317	RFAAP

Project Contact (Name and Phone Number): Dawn Rowe (804) 765 9000

Samplers: Brett Fisher / John Spangler

LAB: Data Chem

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, 8332 RDX/TNT/NG)	Dioxin/Furan(8290)	TAL Metals (Including Mercury)	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	Paint Filter (9095B)	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
135W1 X3 10/13	10/10/03 1300	5		X	1	F	U	2						X									03E0448 3
5WD1	10/10/03 —	5		X	1	F	U	2						X									84
135W2	10/10/03 1400	5		X	1	F	U	2						X									85
135W2MS	10/10/03 1400	5		X	1	F	U	2						X									85MS
135W2MSD	10/10/03 1400	5		X	1	F	U	2						X									85MSD
135D3	10/10/03 1300	5		X	5	F	/	1						X									88
135DD1	10/10/03 —	5		X	5	F	/	1						X									89
135D2	10/10/03 1400	5		X	5	F	/	1						X									90
135D2MS	10/10/03 1400	5		X	5	F	/	1						X									90MS
135D2MSD	10/10/03 1400	5		X	5	F	/	1						X									90MSD

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
[signature]	10/10/03 1800	FedEx			
FedEx	10/11/03 0900	(for lab) R-33-1			

Date/Time

NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement

2

03E-0448
SDG# URS#03

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1141

Project Number	Project Name
02604 317	RFAAP

Project Contact (Name and Phone Number): Darren Rennie (804) 765 9000

Samplers: Brett Fidler / John Spangler

LAB: Data Chem

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	ANALYSES: TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, 8332) PETN/NG	Dioxin/Furan(8290)	TAL Metals (Including Mercury)	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	Paint Filter (9095B)	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
EQ65	10/10/03 945	5		X	4	F	U	2						X									03E04286
EQ66	10/10/03 1100	5		X	4	F	U	2						X									187

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
Brett Fidler	10/10/03 1800	FedEx			
Relinquished by: FedEx	Date/time 10/11/03 0900	Received by: (for lab) R-33-1	Date/Time	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

Earliest Sampling Date: 10-Oct-2003

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 24-Oct-2003

Project/Job/Task: P021C002	Split:	Root Set ID: 03E-0448 *	Reporting Group	01									#
Client: URS		Account: 08001	Analysis	PETN/NG in Water by EPA 8332									Bottles
Comments:													
Verified: JW 10/13/03													

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Customer ID 2															
10-Oct-2003	13SW3	03E04283			WATER						X										2
10-Oct-2003	SWD1	03E04284			WATER						X										2
10-Oct-2003	13SW2	03E04285			WATER						X										2
10-Oct-2003	13SW2MS	03E04285MS		MS	WATER						X										2
10-Oct-2003	13SW2MSD	03E04285MSD		MSD	WATER						X										2
10-Oct-2003	EQB5	03E04286			WATER						X										2
10-Oct-2003	EQB6	03E04287			WATER						X										2

15C JP

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Walk-in/ Room/ Shelf/ Fridge R-33-1 DB	10/15/03 11:40	D-e B-e	Ext. 8332
D-e B-e			

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

Check box if there is a continuation page ☐

Printed 10/13/2003 16:19

Form: COFC1.01-SWV2.30

3C-22

Pate, Justin M.

From: John_Spangler@URSCorp.com
Sent: Monday, October 13, 2003 3:04 PM
To: Andrea_Sansom@URSCorp.com
Cc: Darren_Renne@URSCorp.com; James_O_Spencer@URSCorp.com; Brett_Fisher@URSCorp.com; Pate, Justin M.
Subject: Re: COC/Label Problems



pic10980.pcx

Andrea the sample is 13SW3, not 13SW1. Same for the sediment sample.

The table was incorrect as the samples were identified in the WP as 13SW2 and 13SW3

Andrea Sansom
10/13/2003 02:16 PM

To: John Spangler/Richmond/URSCorp@URSCORP
cc: Darren Renne@URSCorp, James O Spencer/Richmond/URSCorp@URSCORP
Subject: COC/Label Problems

John,

I imagine this should be 13SW1, since there should not have been a 13SW3.

Please confirm.
(Embedded image moved to file: pic10980.pcx)
----- Forwarded by Andrea Sansom/Linthicum/URSCorp on 10/13/2003 02:15 PM -----

"Pate, Justin M." <pate@datachem.com>
10/13/2003 01:33 PM

To: <andrea_sansom@urscorp.com>
cc:
Subject: COC/Label Problems

Andrea,
We received samples from URS for the RFAAP project on Saturday and we had a discrepancy between the COC and the labels on one of the samples. The COC lists 13SW1 as the sample ID but the bottle lists 13SW3. Which one is correct, the bottle or COC? Could you get back to me with the corrections. Paul is out sick today so you can reach me by email or at (801) 904-4296.
Thanks,

Justin Pate
Sample Control Coordinator

USE-0448-

Fax To: URS - Andrea Sansom
(410)859-5202
Date Faxed:_____

Radford SSP

Corrective Action Log

Laboratory: DATACHEM LABORATORIES
Instrument: HPLC
Method: EPA 8332

Sample Date: 10/10/2003
Analysis Date: _____

Project Number/ Batch Number	Affected Samples	Excursions	Criteria Comparison	Corrective Action Proposed
0904317	135W1	incorrect sample#		Sample 135W1 of chain of custody did not match any samples in cooler. 135W1 was changed to 135W3.

Reviewed By: _____ Section Supervisor Date

Reviewed By: _____ QA/QC Officer Date

Reviewed By: _____ Project Supervisor Date

DATACHEM LABORATORIES CLIENT-RELATED INFORMATION REPORT (CRIR)

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill In or Circle)

Client Name: URS

Project/Task/Site: 03E-0448

Date/Time of Receipt: 10/11/03 0900

Number of Coolers Received: 2

Condition of Coolers: (Acceptable)/Unacceptable

Custody Seals: (Present)/Absent/NA

(Intact)/Broken/NA

Tamper Evident: Yes/(No)/NA

Ice Present: (Yes)/No/NA

(Frozen)/Melted/NA

Temperature Control: (Present)/Not Included

Location Temp Taken: (Cooler)/Between Samples

Are all temperatures within project specific guidelines? (Yes)/No/NA

Are all applicable pHs within specific guidelines? Yes/No/(NA)

pH Check Performed:						
	Metals	Yes/No/NA	Total Phenolics	Yes/No/NA	NO3/NO2	Yes/No/NA
	Cyanide	Yes/No/NA	TPH – 418.1	Yes/No/NA	Oil & Grease	Yes/No/NA
	Sulfide	Yes/No/NA	COD	Yes/No/NA	Total Phosphorous	Yes/No/NA
	Ammonia	Yes/No/NA	TKN	Yes/No/NA	Gross A.B, Gamma Spec	Yes/No/NA
Residual Chlorine Check Performed:	8270	Yes/No/NA	8310	Yes/No/NA	8330	Yes/No/NA
	8081	Yes/No/NA	8151	Yes/No/NA		

Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.
1	C03- 0442	5 °C	4	C03-	°C	7	C03 -	°C
2	C03- 0443	6 °C	5	C03-	°C	8	C03 -	°C
3	C03 -	°C	6	C03-	°C	9	C03 -	°C

Taken By: _____ (Signature) J. Pate (Printed Name) 10/11/03 (Date)

CLIENT-RELATED INFORMATION

- ☐ Missing Cooler
- ☐ Cooler Conditions
- ☐ Missing Paperwork
- ☒ Missing/Incorrect Bottle Labels
- ☐ Missing Samples/Bottles
- ☐ Broken/Leaking Samples
- ☐ Incorrect Bottle Type
- ☐ Cooler Temperatures Out of Range
- ☐ Incorrect Preservation
- ☐ pH Criteria Not Met
- ☐ Residual Chlorine Present
- ☐ Head Space in Bottles
- ☐ Insufficient Sample Volume
- ☒ Chain of Custody Problems
- ☐ Other:

EPA Custody Seal:

BRIEFLY DESCRIBE THE PROBLEM AND THE ACTION TAKEN:

COC lists 135W1, bottle lists 135W3.

Date 10/10/03 FedEx Tracking Number 832942539631

Sender's Name Brett Fitler Phone 804 965-9000

Company DAMES & MOORE/URS/CRC

Address 5540 FALMOUTH ST STE 201 Dept/Floor/Suite/Room

City RICHMOND State VA ZIP 23230

Faxed to Client? YES ☐ NO ☐

Your Internal Billing Reference 09604 317

Response Requi

PROJECT MANAGEMENT

PROJECT MANAGER COMMENTS:

135W3 is correct as per JohnSpangler @ URS. See email

DCL Project Manager: _____ (Printed Name) Returned to Sample Receipt by: _____ (Signature) Date: 10/13/03

SLC/CRIR.doc Revised 1/01/03

Data Qualifying Codes

Two types of data qualifying codes or flags are applied in the course of the data review. The data validation flags indicate data that are not usable for decision-making, more than normally biased and/or variable, or not representative of field conditions. These codes and their definitions are presented below in the hierarchy stipulated in the USEPA Region III Modifications to the National Functional Guidelines for Data Review (September 1994).

Data Validation Flags

Flag	Interpretation
R	Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.
U	Not detected. The associated number indicates the approximate sample concentration is necessary to be detected.
B	Not detected substantially above the level reported in laboratory or field blanks.
N	Tentative Identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.
J	Analyte present. Reported value may not be accurate or precise.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
UL	Not detected, quantitation limit is probably higher.
NT	Not tested, no analytical result provided.

The other type of code used by URS is a "Reason Code". The reason code indicates the type of quality control failure that led to the application of the data validation flag.

Reason Codes

GC/MS Organics		GC and HPLC Organics		Inorganics and Conventionals	
Code	Interpretation	Code	Interpretation	Code	Interpretation
a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence
b	Bubble found in vial >6mm	b	Instrument performance failure	c	Calibration failure
c	Calibration failure; poor or unstable response	c	Calibration failure; poor or unstable response	d	MS/MSD imprecision
d	MS/MSD imprecision	d	MS/MSD imprecision	e	LCSD imprecision
e	LCSD imprecision	e	LCSD imprecision	f	Field duplicate imprecision
f	Field duplicate imprecision	f	Field duplicate imprecision	h	Holding time violation
h	Holding time violation	g	Dual column confirmation imprecision	k	Laboratory duplicate imprecision
i	Internal standard failure	h	Holding time violation	l	LCS recovery failure
j	Tuning failure or poor mass spectrometer performance	i	Internal standard failure	m	MS/MSD recovery failure
l	LCS recovery failure	l	LCS recovery failure	n	ICS failure
m	MS/MSD recovery failure	m	MS/MSD recovery failure	o	Calibration blank contamination
p	Poor chromatography	p	Poor chromatography	p	Preparation blank contamination
q	Concentration exceeded the linear range of the instrument	q	Concentration exceeded the linear range	q	Concentration exceeded the linear range
r	Linearity failure in initial calibration	r	Linearity failure in initial calibration	r	Linearity failure in calibration or MSA
s	Surrogate failure	s	Surrogate failure	s	Serial dilution failure
t	TIC	u	No confirmation column	v	Post-digestion spike failure
w	Identification criteria failure	w	Retention time failure	w	CRDL Standard Failure
x	Field blank contamination	x	Field blank contamination	x	Field blank contamination
y	Trip blank contamination	z	Method blank contamination	z	Laboratory storage blank contamination
z	Method blank contamination				

DATA VALIDATION REPORT - Level III Review

SDG No.: 03E-0448-02 **Fraction:** PETN_&_Nitroglycerin

Lab: TriMatrix **Project Name:** Radford_SSP

Reviewer: AS **Date:** February_3,_2004

This report presents the findings of a review of the referenced data. The report consists of this summary, copies of data reports with data qualifying flags applied (as required), the completed data validation checklist, supporting documentation, and an explanation of the data qualifying flags employed. The review performed is based on the USEPA Region III Modifications to the National Functional Guidelines for Data Review as pertains to the specifics of the analytical methods employed and provisions of the approved project-specific Quality Assurance Project Plan (QAPP).

Major Anomalies: None.

Minor Anomalies: None.

Correctable Anomalies: None.

Comments: All data are usable, as qualified, for their intended purpose based on the data reviewed.

Signed: Andrea Sansom

Andrea Sansom

DATA CHEM LABORATORIES
A Sorenson Company

COVER PAGE

ANALYTICAL REPORT FOR URS Group, Inc.

E-mail: Darren_Renne@URScorp.com

G039D01M

DCL Report Group..: **03E-0448-02**

Date Printed.....: 24-OCT-03 11:50

Project Protocol #: P021C002
Client Ref Number.: Subcontract DCL-09
Release Number....: URS#03

Analysis Method(s): 8332

URS Group, Inc.
Attention: Mr. J Darren Renne
5540 Falmouth Street
Suite 201
Richmond, VA 23229

Client Sample Name	Laboratory Sample Name	Date Sampled	Date Received
Method Blank	BL-211589-1	NA	NA
LCS	QC-211589-1	NA	NA
13SD3	03E04288	10-OCT-03	11-OCT-03
SDD1	03E04289	10-OCT-03	11-OCT-03
13SD2	03E04290	10-OCT-03	11-OCT-03
13SD2MS	03E04290MS	10-OCT-03	11-OCT-03
13SD2MSD	03E04290MSD	10-OCT-03	11-OCT-03

Analyst: Gloria W. Heung — Date 10/24/03

Reviewer: Thomas F McKay — Date 10/27/03

Lab Supervisor: Richard W. Wade for RWW — Date 10.28.03

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

SAMPLE ANALYSIS DATA SHEET



Date Printed.....: 27-OCT-03 14:13

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: URS#03

Date Received.....: 11-OCT-03 00:00

DCL Preparation Group: G039F00P
Date Prepared.....: 15-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **13SD3**
DCL Sample Name...: **03E04288**
DCL Report Group..: **03E-0448-02**

Matrix.....: SOIL
Date Sampled.....: 10-OCT-03 13:00
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 33.9

DCL Analysis Group: G039F00P
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	23-OCT-03 18:42	0.337	ND		U	1	1.51
Nitroglycerin	23-OCT-03 18:42	0.245	ND		U	1	0.756

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039D06X

Date Printed.....: 27-OCT-03 14:13

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: URS#03

Date Received.....: 11-OCT-03 00:00

DCL Preparation Group: G039F00P
Date Prepared.....: 15-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **SDD1**
DCL Sample Name...: **03E04289**
DCL Report Group..: **03E-0448-02**

Matrix.....: SOIL
Date Sampled.....: 10-OCT-03 00:00
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 37.4

DCL Analysis Group: G039F00P
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	23-OCT-03 19:03	0.356	ND		U	1	1.60
Nitroglycerin	23-OCT-03 19:03	0.259	ND		U	1	0.799

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039D06Y

Date Printed.....: 24-OCT-03 11:50

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: URS#03

Date Received.....: 11-OCT-03 00:00

DCL Preparation Group: G039F00P
Date Prepared.....: 15-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **13SD2**
DCL Sample Name...: **03E04290**
DCL Report Group..: **03E-0448-02**

Matrix.....: SOIL
Date Sampled.....: 10-OCT-03 14:00
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 32.1

DCL Analysis Group: G039F00P
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	23-OCT-03 19:25	0.328	ND		U	1	1.47
Nitroglycerin	23-OCT-03 19:25	0.239	ND		U	1	0.736

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

DATA VALIDATION WORKSHEET

Reviewer: AS
Date: January-04
DV Level: II III IV
Review Document:
_X_ Region III Modified for National Functional Guidelines
___ NFG for organic Data review (February 1994)
_X_ Project QAPP/SAP

Explosives

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: DataChem
SDG No.: 03E-0448-02
Test Name: Explosives
Method No.: 8332-HPLC

1.0 Laboratory Deliverables

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. % solids		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes:

2.0 Holding Times

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	Action: If the temperature of the cooler was elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyese, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%	x		
	For initial Calibration: for %RSD > ±20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?	x		
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?			x
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.			x
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 40-150%?		x	
6.4	Are there any RPDs outside the QC limits not to exceed 60%? Are there any RPDs outside the QC limits not to exceed 60%?		x	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

7.0 Laboratory Control Sample (LCS)		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 40-150%?		x	
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?			x
	Action: If Yes, J(+) only.			

Notes:

8.0 Field Duplicate		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

	SDD1	13SD3	RPD	Delta	RL	5XRL	4XRL
PETN	ND	ND			1.51	7.55	6.04
nitroglycerin	ND	ND			0.756	3.78	3.024

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.	x		
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.	x		
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	x		

Notes:

10.0 Data Completeness			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		x		
	Number of samples:	3			
	Number of target compounds in each analysis:	2			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:


S039D06Z

Client Name.....: URS Group, Inc.
Release Number.....: URS#03

Matrix.....: SOIL
Reporting Units.....: mg/Kg

DCL Preparation Group: G039F00P
Date Prepared.....: 15-OCT-03 00:00
Preparation Method...: 8332

DCL Sample Name...: **03E04290MS**
Date Printed.....: 28-OCT-03 14:10

DCL Analysis Group: G039F00P
Analysis Method...: OL-SW-8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
[X] Primary
[ ] Confirmation

QC Limit Type.....: Method

Analytical Results

Analyte	Date Analyzed	Sample Result	Spiked Result	Spike Added	Percent Recovery	QC Limits	QC Flag
PETN	23-OCT-03 19:47	ND	15.1	20.0	75.6	65.0/125.	
Nitroglycerin	23-OCT-03 19:47	ND	15.3	20.0	76.5	65.0/125.	


S039D070

DCL Sample Name...: **03E04290MSD**

Analytical Results

Analyte	Date Analyzed	Duplicate Result	Percent Recovery	Mean	Range	RPD	QC Limits	QC Flag
PETN	23-OCT-03 20:09	15.0	74.8	15.0	0.153	1.0	0.00/35.0	
Nitroglycerin	23-OCT-03 20:09	15.0	75.2	15.2	0.243	1.6	0.00/35.0	

Bm 10/15/03

Date of Extraction:	OCT 15, 2003	**DataChem** Laboratories Extraction Notebook	Book # Ext 246	Page#
Account #(s):	8001			
DCL Set ID(s):	03E-0448-02,0450-01		Matrix: SOIL	
Group/Lot ID:	G039F00P		Method: 8332	

	DCL Sample ID	Field ID	Initial Vol. / WT	Initial pH	Adj pH		Surr. Added	Matrix Spike		Final Volume
1	BL-211589-1	BL-211589-1	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
2	QC-211589-1	QC-211589-1	1.0gm	N/A	N/A	N/A	1mL	1mL	----	2mL
3	03E04288	13SD3	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
4	03E04289	SDD1	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
5	03E04290	13SD2	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
6	03E04290MS	13SD2MS	1.0gm	N/A	N/A	N/A	1mL	1mL	----	2mL
7	03E04290MSD	13SD2MSD	1.0gm	N/A	N/A	N/A	1mL	1mL	----	2mL
8	03E04292	ASB1A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
9	03E04293	ASB1B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
10	03E04294	ASB1C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
11	03E04295	ASB2A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
12	03E04296	ASB2B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
13	03E04297	SBD-10	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
14	03E04298	ASB2C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
15	03E04298MS	ASB2CMS	1.0gm	N/A	N/A	N/A	1mL	1mL	----	2mL
16	03E04298MSD	ASB2CMSD	1.0gm	N/A	N/A	N/A	1mL	1mL	----	2mL
17	03E04299	ASB3A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
18	03E04300	ASB3B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
19	03E04301	ASB3C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										

Solvents:	MeCN	CH016	Comments:
Surrogate Spike:	239 ws 3	1/30/04 By: Bm	
Matrix Spike:	239 ws 99	1/12/04 By: Bm	
Matrix Spike:	----	---- By:	
Extractionist:	Bm 10/15/03		
Checker:	10/15/03		Sonicators tunned by:

*=Entry Error

Bm 10/15/03

DATA CHEM LABORATORIES
A Sorenson Company

ANALYTICAL REPORT

Form ARF-AL
Page 1 of 2
Part 1 of 1
10160309150845X

Date _____
Laboratory Group Name 03E-0448-03
Account No. 08001 IRS#03

URS Group, Inc.
Attention: Mr. J Darren Renne
5540 Falmouth Street
Suite 201
Richmond, VA 23229

FAX _____
Telephone _____
E-mail _____

Sampling Collection and Shipment

Sampling Site 09604-317 Date of Collection October 10, 2003

Date Samples Received at Laboratory October 11, 2003

Analysis

Method of Analysis XX-EP-800

Date(s) of Analysis October 16, 2003

Analytical Results

Field Sample Number	Laboratory Number	Sample Type	MOISTURE %							
13SD3	03E04288	SOIL	33.9							
SDD1	03E04289	SOIL	37.4							
13SD2	03E04290	SOIL	32.1							
13SD2MD	03E04290MD	SOIL	31.8							
Limit of Detection										

† See comment on last page.
ND Parameter not detected above LOD.
NR Parameter not requested.
NA Parameter not applicable.

** See comment on last page.
( ) Parameter between LOD and LOQ.

Norman Breese
Analyst: Norman Breese

Jon Yonk
Reviewer: Johnathan M. Yonk

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

Date _____

Laboratory Group Name 03E-0448-03

General Lab Comments

The results provided in this report relate only to the items tested.
This page is the concluding page of the report.

This went through drying twice, because of an error in a spreadsheet cell formula. The formula was corrected returning proper results.

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

Project No. X

TITLE: 03E-0448-03 OstaChem Laboratories %moisture Book No 4146

From: Page No. X

Insert of preparatory report for set: 03E-0448-03
IB 10/16/03

%Moistures & Solids

Start Time: 10:07 15-Oct-03
Finish Time: 8:56 16-Oct-03

Set ID #	Dish #	Sample #	Dish (g)	Dish + Soil (g)	Soil weight(g)	Dish + Dry Soil (g)	Dry Soil (g)	% Solids	% Moistures
03E-0448-03	1	03E04288	1.24	5.60	4.36	4.12	2.88	66.1%	33.9%
03E-0448-03	2	03E04289	1.23	5.51	4.28	3.91	2.68	62.6%	37.4%
03E-0448-03	3	03E04290	1.23	6.09	4.86	4.53	3.30	67.9%	32.1%
03E-0448-03	4	03E04290MD	1.24	5.73	4.49	4.30	3.06	68.2%	31.8%

IB 10/16/03

IB 10/16/03

To Page No. X

Witnessed & Understood by:	Date	Inventor(s):	Date
Jose G. Rocha	10/16/03	NA	10/16/03
		Recorded by: Norman Bueso	

DATA CHEM
LABORATORIES, INC.
A SORENSON COMPANY

Case Narrative

Method:	SW-846 8332	**Client:**	URS
Analysis:	Nitroglycerin, PETN	**Account:**	8001
Preparation SOP #:	OL-SW-8332	**Matrix:**	Solid
Analysis SOP#:	OL-SW-8332	**SDG#:**	URS#03
DCL Set ID's:	03E-0448-02		

General Set Information: This set contained three solid samples, a method blank, a laboratory control sample (LCS), a matrix spiked sample and a matrix spiked duplicate. This set was batched with another set, which contained ten samples, a matrix spiked sample (MS) and a matrix spike duplicate.

Method Summary: A 1.0 gram portion of the soil samples was weighed, transferred into a suitable container, and 2 ml of acetonitrile was added. The samples were placed in an ultrasonic bath for a minimum of one hour. The samples were allowed to settle and the supernatant was filtered through a 0.45µ PTFE filter. One part acetonitrile extract was mixed with one part of a 1% calcium chloride solution, then injected into an HP1050 HPLC equipped with UV detection and a Phenomenex Ultracarb ODS C18 column. The instrument was adjusted to the proper operating parameters and allowed to equilibrate until a stable baseline was established. Initial calibration standards were analyzed and linear calibration curves were generated from the data. A continuing calibration standard was analyzed at the beginning of sample analysis, after each ten samples, and at the end of the analysis. The response of the continuing calibration standard must be within method limits when compared to the initial calibration curve.

Samples and QCs were analyzed under identical conditions as those used for initial and continuing calibration. Quantitation was based on calibration curves using the initial calibration standards. Results were reported in units of mg/Kg.

Sample Preparation: No anomalies were observed during the preparation of the samples.

Holding Times: The samples were prepared and analyzed within method required hold times.

Dilution(s): None.

Quality Control Data:

Blank: No confirmed method analytes were detected in the method blank above half of the CRDL.

Laboratory Control Samples: All recoveries met the method limits.

Surrogate Recovery: Surrogate recoveries were acceptable.

MS/MSD: Matrix spiking was performed on sample 03E04290. All percent recoveries and RPDs were within method limits.

Instrument QC: All initial and continuing calibration verification samples met method criteria.

Flagging Codes: The "U" flag indicates that the analyte was not detected at or above the MDL level. The "J" flag indicates that a value reported between the MDL and CRDL.

NC/CAR: None.

Miscellaneous Comments: None.

Confirmation Analyses: Any sample with a positive result above the MDL was qualitatively analyzed for confirmation on a second column. For samples requiring confirmation, one part acetonitrile extract was mixed with one part of a 1% calcium chloride solution, then injected into an HP1050 HPLC equipped with UV detection and a Phenomenex Synergi Polar-RP column. The instrument was adjusted to the proper operating parameters and allowed to equilibrate until a stable baseline was established. A CCV standard was run to establish retention times and a standard at a level near the reporting limits was run to verify low concentration sensitivity. The second column analyses were used for qualitative confirmation of analytes based on retention time. If a positive result is confirmed, the quantitative result from the primary column is reported.

Gloria W. Heung 10/27/03

Gloria W. Heung Date

03E-0448
SDG# URS#03

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1112

LAB: Data Chem

AIRBILL No:

Courier:

Project Number: 09604317

Project Name: RFAAP

Project Contact (Name and Phone Number): Darren Renne (804) 765 9000

Samplers: Brett Fisher / John Spangler

ANALYSES

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, 8332) PETN/NG	Dioxin/Furan(8290)	TAL Metals (Including Mercury)	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	Paint Filter (9095B)	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
13SW3	10/10/03 1300	S		X	1	F	U	2						X									03E04283
SWD1	10/10/03 —	S		X	1	F	U	2						X									84
13SW2	10/10/03 1400	S		X	1	F	U	2						X									85
13SW2MS	10/10/03 1400	S		X	1	F	U	2						X									85MS
13SW2MSD	10/10/03 1400	S		X	1	F	U	2						X									85MSD
13SD3	10/10/03 1300	S		X	5	F	/	1						X									88
DF 13SDD1	10/10/03 —	S		X	5	F	/	1						X									89
13SD2	10/10/03 1400	S		X	5	F	/	1						X									90
13SD2MS	10/10/03 1400	S		X	5	F	/	1						X									90MS
13SD2MSD	10/10/03 1400	S		X	5	F	/	1						X									90MSD

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
Brett Fisher 10/10/03	1800	FedEx			
Relinquished by: FedEx 10/11/03	Date/time 0900	Received by: (for lab) R-33-1	Date/Time		

NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement

Earliest Sampling Date: 10-Oct-2003

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 24-Oct-2003

Project/Job/Task: P021C002	Split:	Root Set ID: 03E-0448 *	Reporting Group	02	03								#
Client: URS		Account: 08001	Analysis	Nitroglycein/PETN by 8332	Moisture								Bottles
Comments:													
Verified: JW 10/13/03													

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Customer ID 2															
10-Oct-2003	13SD3	03E04288			SOIL						X	X									1
10-Oct-2003	SDD1	03E04289			SOIL						X	X									1
10-Oct-2003	13SD2	03E04290			SOIL						X	X									1
10-Oct-2003	13SD2MS	03E04290MS		MS	SOIL						X										1
10-Oct-2003	13SD2MSD	03E04290MSD		MSD	SOIL						X										1
10-Oct-2003	13SD2MD	03E04290MD		MD	SOIL							X									0

15C JR

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Walk-in/Room/Shelf/Fridge	10/14/03 10:30		
	10/14/03 16:11	Norman Breese	% Moisture
Norman Breese	10/14/03 17:00	R-319-1 NB	storage
R-319-1 NB	10/15/03 10:00	Norman Breese	% Moisture
Norman Breese	10/15/03 16:30	R-319-1 NB	storage

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

Check box if there is a continuation page ☐

Printed 10/13/2003 16:19

Form: COFC1.01-SWV2.30

DATACHEM LABORATORIES CLIENT-RELATED INFORMATION REPORT (CRIR)

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill In or Circle)

Client Name: URS

Project/Task/Site: 03E-0448

Date/Time of Receipt: 10/11/03 0900

Number of Coolers Received: 2

Condition of Coolers: (Acceptable/Unacceptable)

Custody Seals: (Present/Absent/NA) (Intact/Broken/NA)

Tamper Evident: Yes/(No)/NA

Ice Present: (Yes)/No/NA (Frozen/Melted/NA)

Temperature Control: (Present)/Not Included

Location Temp Taken: (Cooler)/Between Samples

Are all temperatures within project specific guidelines? (Yes)/No/NA

Are all applicable pHs within specific guidelines? Yes/No/(NA)

pH Check Performed:	Metals	Yes/No/NA	Total Phenolics	Yes/No/NA	NO3/NO2	Yes/No/NA
	Cyanide	Yes/No/NA	TPH – 418.1	Yes/No/NA	Oil & Grease	Yes/No/NA
	Sulfide	Yes/No/NA	COD	Yes/No/NA	Total Phosphorous	Yes/No/NA
	Ammonia	Yes/No/NA	TKN	Yes/No/NA	Gross A.B, Gamma Spec	Yes/No/NA
Residual Chlorine Check Performed:	8270	Yes/No/NA	8310	Yes/No/NA	8330	Yes/No/NA
	8081	Yes/No/NA	8151	Yes/No/NA		

Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.
1	C03- 0442	5 °C	4	C03-	°C	7	C03 -	°C
2	C03- 0443	6 °C	5	C03-	°C	8	C03-	°C
3	C03-	°C	6	C03-	°C	9	C03-	°C

Taken By: [signature] (Signature) J. Pate (Printed Name) 10/11/03 (Date)

CLIENT-RELATED INFORMATION

- ☐ Missing Cooler
- ☐ Cooler Conditions
- ☐ Missing Paperwork
- ☒ Missing/Incorrect Bottle Labels
- ☐ Missing Samples/Bottles
- ☐ Broken/Leaking Samples
- ☐ Incorrect Bottle Type
- ☐ Cooler Temperatures Out of Range
- ☐ Incorrect Preservation
- ☐ pH Criteria Not Met
- ☐ Residual Chlorine Present
- ☐ Head Space in Bottles
- ☐ Insufficient Sample Volume
- ☒ Chain of Custody Problems
- ☐ Other:

EPA Custody Seal:

BRIEFLY DESCRIBE THE PROBLEM AND THE ACTION TAKEN:

COC lists 13SW1, bottle ~~sa~~ lists 13SW3.

Date 10/10/03 FedEx Tracking Number 832942539631

Sender's Name Brett Fisher Phone 804 965-9000

Company DAMES & MOORE/URS/CRC

Address 5540 FALMOUTH ST STE 201 Dept./Floor/Suite/Room

City RICHMOND State VA ZIP 23230

Faxed to Client? YES ☐ NO ☐

Your Internal Billing Reference 09604 317

Response Requi:

PROJECT MANAGEMENT

PROJECT MANAGER COMMENTS:

13SW3 is correct as per JohnSpangler @ URS. See email

DCL Project Manager: [signature] (Printed Name) Returned to Sample Receipt by: [signature] (Signature) Date: 10/13/03

Data Qualifying Codes

Two types of data qualifying codes or flags are applied in the course of the data review. The data validation flags indicate data that are not usable for decision-making, more than normally biased and/or variable, or not representative of field conditions. These codes and their definitions are presented below in the hierarchy stipulated in the USEPA Region III Modifications to the National Functional Guidelines for Data Review (September 1994).

Data Validation Flags

Flag	Interpretation
R	Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.
U	Not detected. The associated number indicates the approximate sample concentration is necessary to be detected.
B	Not detected substantially above the level reported in laboratory or field blanks.
N	Tentative Identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.
J	Analyte present. Reported value may not be accurate or precise.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
UL	Not detected, quantitation limit is probably higher.
NT	Not tested, no analytical result provided.

The other type of code used by URS is a "Reason Code". The reason code indicates the type of quality control failure that led to the application of the data validation flag.

Reason Codes

GC/MS Organics		GC and HPLC Organics		Inorganics and Conventionals	
Code	Interpretation	Code	Interpretation	Code	Interpretation
a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence
b	Bubble found in vial >6mm	b	Instrument performance failure	c	Calibration failure
c	Calibration failure; poor or unstable response	c	Calibration failure; poor or unstable response	d	MS/MSD imprecision
d	MS/MSD imprecision	d	MS/MSD imprecision	e	LCSD imprecision
e	LCSD imprecision	e	LCSD imprecision	f	Field duplicate imprecision
f	Field duplicate imprecision	f	Field duplicate imprecision	h	Holding time violation
h	Holding time violation	g	Dual column confirmation imprecision	k	Laboratory duplicate imprecision
i	Internal standard failure	h	Holding time violation	l	LCS recovery failure
j	Tuning failure or poor mass spectrometer performance	i	Internal standard failure	m	MS/MSD recovery failure
l	LCS recovery failure	l	LCS recovery failure	n	ICS failure
m	MS/MSD recovery failure	m	MS/MSD recovery failure	o	Calibration blank contamination
p	Poor chromatography	p	Poor chromatography	p	Preparation blank contamination
q	Concentration exceeded the linear range of the instrument	q	Concentration exceeded the linear range	q	Concentration exceeded the linear range
r	Linearity failure in initial calibration	r	Linearity failure in initial calibration	r	Linearity failure in calibration or MSA
s	Surrogate failure	s	Surrogate failure	s	Serial dilution failure
t	TIC	u	No confirmation column	v	Post-digestion spike failure
w	Identification criteria failure	w	Retention time failure	w	CRDL Standard Failure
x	Field blank contamination	x	Field blank contamination	x	Field blank contamination
y	Trip blank contamination	z	Method blank contamination	z	Laboratory storage blank contamination
z	Method blank contamination				

DATA VALIDATION REPORT - Level III Review

SDG No.: 03E-0450-01 **Fraction:** PETN_&_Nitroglycerin

Lab: TriMatrix **Project Name:** Radford_SSP

Reviewer: AS **Date:** February_3,_2004

This report presents the findings of a review of the referenced data. The report consists of this summary, copies of data reports with data qualifying flags applied (as required), the completed data validation checklist, supporting documentation, and an explanation of the data qualifying flags employed. The review performed is based on the USEPA Region III Modifications to the National Functional Guidelines for Data Review as pertains to the specifics of the analytical methods employed and provisions of the approved project-specific Quality Assurance Project Plan (QAPP).

Major Anomalies: None.

Minor Anomalies: None.

Correctable Anomalies: None.

Comments: All data are usable, as qualified, for their intended purpose based on the data reviewed.

Signed: Andrea Sansom

Andrea Sansom

DATA CHEM LABORATORIES
A Sorenson Company

COVER PAGE

ANALYTICAL REPORT FOR
URS Group, Inc.

E-mail: Darren_Renne@URScorp.com

Form COVER-V1.4
10240311533488
Page 1

G039F00Q

DCL Report Group..: **03E-0450-01**

Date Printed.....: 24-OCT-03 11:53

Project Protocol #: P021C002
Client Ref Number.: Subcontract DCL-09
Release Number....: URS#04

Analysis Method(s): 8332

URS Group, Inc.
Attention: Mr. J Darren Renne
5540 Falmouth Street
Suite 201
Richmond, VA 23229

Client Sample Name	Laboratory Sample Name	Date Sampled	Date Received
ASB1A	03E04292	11-OCT-03	14-OCT-03
ASB1B	03E04293	11-OCT-03	14-OCT-03
ASB1C	03E04294	11-OCT-03	14-OCT-03
ASB2A	03E04295	11-OCT-03	14-OCT-03
ASB2B	03E04296	11-OCT-03	14-OCT-03
SBD-10	03E04297	11-OCT-03	14-OCT-03
ASB2C	03E04298	11-OCT-03	14-OCT-03
ASB2CMS	03E04298MS	11-OCT-03	14-OCT-03
ASB2CMSD	03E04298MSD	11-OCT-03	14-OCT-03
ASB3A	03E04299	11-OCT-03	14-OCT-03
ASB3B	03E04300	11-OCT-03	14-OCT-03
ASB3C	03E04301	11-OCT-03	14-OCT-03
Method Blank	BL-211589-1	NA	NA
LCS	QC-211589-1	NA	NA

Gloria W. Heung — Analyst: Gloria W. Heung — 10/24/03 Date

Thomas T McKay — Reviewer: Thomas T McKay — 10/27/03 Date

Richard W. Wade — Lab Supervisor: Richard W. Wade — 10/27/03 Date

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DATA CHEM LABORATORIES
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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039F01H

Date Printed.....: 24-OCT-03 11:53

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#04

Date Received.....: 14-OCT-03 00:00

DCL Preparation Group: G039F00P
Date Prepared.....: 15-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **ASB1A**
DCL Sample Name...: **03E04292**
DCL Report Group..: **03E-0450-01**

Matrix.....: SOIL
Date Sampled.....: 11-OCT-03 08:45
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 17.6

DCL Analysis Group: G039F00P
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	23-OCT-03 20:31	0.271	ND		U	1	1.21
Nitroglycerin	23-OCT-03 20:31	0.197	ND		U	1	0.607

DATA CHEM LABORATORIES
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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039F01J

Date Printed.....: 24-OCT-03 11:53

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#04

Date Received.....: 14-OCT-03 00:00

DCL Preparation Group: G039F00P
Date Prepared.....: 15-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **ASB1B**
DCL Sample Name...: **03E04293**
DCL Report Group..: **03E-0450-01**

Matrix.....: SOIL
Date Sampled.....: 11-OCT-03 09:00
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 20.9

DCL Analysis Group: G039F00P
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	23-OCT-03 20:52	0.282	ND		U	1	1.26
Nitroglycerin	23-OCT-03 20:52	0.205	ND		U	1	0.632

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039F01K

Date Printed.....: 24-OCT-03 11:53

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#04

Date Received.....: 14-OCT-03 00:00

DCL Preparation Group: G039F00P
Date Prepared.....: 15-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **ASB1C**
DCL Sample Name...: **03E04294**
DCL Report Group..: **03E-0450-01**

Matrix.....: SOIL
Date Sampled.....: 11-OCT-03 09:15
Reporting Units...: mg/kg
Report Basis.....: ☐As Received ☒Dried
Percent Moisture..: 27.1

DCL Analysis Group: G039F00P
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: 1c03
Column Type.....: ultracarb ods
☒Primary
☐Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	23-OCT-03 21:14	0.306	ND		U	1	1.37
Nitroglycerin	23-OCT-03 21:14	0.222	ND		U	1	0.686

SAMPLE ANALYSIS DATA SHEET



Date Printed.....: 24-OCT-03 11:53

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#04

Date Received.....: 14-OCT-03 00:00

DCL Preparation Group: G039F00P
Date Prepared.....: 15-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **ASB2A**
DCL Sample Name...: **03E04295**
DCL Report Group..: **03E-0450-01**

Matrix.....: SOIL
Date Sampled.....: 11-OCT-03 10:15
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 17.7

DCL Analysis Group: G039F00P
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	23-OCT-03 21:58	0.271	ND		U	1	1.22
Nitroglycerin	23-OCT-03 21:58	0.197	ND		U	1	0.608

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A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039F01M

Date Printed.....: 24-OCT-03 11:53

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#04

Date Received.....: 14-OCT-03 00:00

DCL Preparation Group: G039F00P
Date Prepared.....: 15-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **ASB2B**
DCL Sample Name...: **03E04296**
DCL Report Group..: **03E-0450-01**

Matrix.....: SOIL
Date Sampled.....: 11-OCT-03 10:30
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 18.4

DCL Analysis Group: G039F00P
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	23-OCT-03 22:20	0.273	ND		U	1	1.23
Nitroglycerin	23-OCT-03 22:20	0.199	ND		U	1	0.613

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039F01N

Date Printed.....: 24-OCT-03 11:53

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#04

Date Received.....: 14-OCT-03 00:00

Client Sample Name: **SBD-10**
DCL Sample Name...: **03E04297**
DCL Report Group..: **03E-0450-01**

Matrix.....: SOIL
Date Sampled.....: 11-OCT-03 00:00
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 19.6

DCL Preparation Group: G039F00P
Date Prepared.....: 15-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

DCL Analysis Group: G039F00P
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	23-OCT-03 22:42	0.277	ND		U	1	1.24
Nitroglycerin	23-OCT-03 22:42	0.201	ND		U	1	0.622

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039F01P

Date Printed.....: 24-OCT-03 11:53

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#04

Date Received.....: 14-OCT-03 00:00

DCL Preparation Group: G039F00P
Date Prepared.....: 15-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **ASB2C**
DCL Sample Name...: **03E04298**
DCL Report Group..: **03E-0450-01**

Matrix.....: SOIL
Date Sampled.....: 11-OCT-03 11:15
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 33.3

DCL Analysis Group: G039F00P
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	23-OCT-03 23:03	0.334	ND		U	1	1.50
Nitroglycerin	23-OCT-03 23:03	0.243	ND		U	1	0.750

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039F01S

Date Printed.....: 24-OCT-03 11:53

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#04

Date Received.....: 14-OCT-03 00:00

DCL Preparation Group: G039F00P
Date Prepared.....: 15-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **ASB3A**
DCL Sample Name...: **03E04299**
DCL Report Group..: **03E-0450-01**

Matrix.....: SOIL
Date Sampled.....: 11-OCT-03 12:00
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 20.3

DCL Analysis Group: G039F00P
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: 1c03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	24-OCT-03 00:09	0.280	ND		U	1	1.25
Nitroglycerin	24-OCT-03 00:09	0.203	ND		U	1	0.627

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039F01T

Date Printed.....: 24-OCT-03 11:53

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#04

Date Received.....: 14-OCT-03 00:00

DCL Preparation Group: G039F00P
Date Prepared.....: 15-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **ASB3B**
DCL Sample Name...: **03E04300**
DCL Report Group..: **03E-0450-01**

Matrix.....: SOIL
Date Sampled.....: 11-OCT-03 12:15
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 19.6

DCL Analysis Group: G039F00P
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	24-OCT-03 00:31	0.277	ND		U	1	1.24
Nitroglycerin	24-OCT-03 00:31	0.201	ND		U	1	0.622

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039F01V

Date Printed.....: 24-OCT-03 11:53

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#04

Date Received.....: 14-OCT-03 00:00

DCL Preparation Group: G039F00P
Date Prepared.....: 15-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **ASB3C**
DCL Sample Name...: **03E04301**
DCL Report Group..: **03E-0450-01**

Matrix.....: SOIL
Date Sampled.....: 11-OCT-03 12:30
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 17.8

DCL Analysis Group: G039F00P
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	24-OCT-03 00:54	0.271	ND		U	1	1.22
Nitroglycerin	24-OCT-03 00:54	0.197	ND		U	1	0.608

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DATA VALIDATION WORKSHEET

Reviewer: AS
Date: January-04
DV Level: II III IV
Review Document:
_X_ Region III Modified for National Functional Guidelines
____ NFG for organic Data review (February 1994)
_X_ Project QAPP/SAP

Explosives

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: DataChem
SDG No.: 03E-0450-01
Test Name: Explosives
Method No.: 8332-HPLC

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. % solids		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes:

2.0 Holding Times		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	Action: If the temperature of the cooler was elevated (> 10 ^{O}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyese, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%	x		
	For initial Calibration: for %RSD > ±20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?	x		
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?			x
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.			x
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 40-150%?		x	
6.4	Are there any RPDs outside the QC limits not to exceed 60%?		x	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

7.0 Laboratory Control Sample (LCS)

		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 40-150%?		x	
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?			x
	Action: If Yes, J(+) only.			

Notes:

8.0 Field Duplicate

		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

	SBD10	ASB2B
PETN	ND	ND
nitroglycerin	ND	ND

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.			x
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.			x
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	x		

Notes:

10.0 Data Completeness			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		x		
	Number of samples:	10			
	Number of target compounds in each analysis:	2			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

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FORM F (TYPE I)
SINGLE METHOD ANALYSES

QUALITY CONTROL DATA SHEET
MATRIX SPIKE SAMPLE
MATRIX SPIKE DUPLICATE SAMPLE


S039F01Q

Client Name.....: URS Group, Inc.
Release Number.....: URS#04

Matrix.....: SOIL
Reporting Units.....: mg/Kg

DCL Preparation Group: G039F00P
Date Prepared.....: 15-OCT-03 00:00
Preparation Method...: 8332

DCL Sample Name...: **03E04298MS**
Date Printed.....: 24-OCT-03 11:53

DCL Analysis Group: G039F00P
Analysis Method...: OL-SW-8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

QC Limit Type.....: Method

Analytical Results

Analyte	Date Analyzed	Sample Result	Spiked Result	Spike Added	Percent Recovery	QC Limits	QC Flag
PETN	23-OCT-03 23:25	ND	17.7	20.0	88.3	65.0/125.	
Nitroglycerin	23-OCT-03 23:25	ND	18.4	20.0	92.0	65.0/125.	


S039F01R

DCL Sample Name...: **03E04298MSD**

Analytical Results

Analyte	Date Analyzed	Duplicate Result	Percent Recovery	Mean	Range	RPD	QC Limits	QC Flag
PETN	23-OCT-03 23:47	18.7	93.6	18.2	1.06	5.8	0.00/35.0	
Nitroglycerin	23-OCT-03 23:47	18.3	91.6	18.4	0.0814	0.44	0.00/35.0	

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DATA CHEM LABORATORIES
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ANALYTICAL REPORT

Form ARF-AL
Page 1 of 2
Part 1 of 1
10160310443945X

Date _____
Laboratory Group Name 03E-0450-02
Account No. 08001 URSAOU

URS Group, Inc.
Attention: Mr. J Darren Renne
5540 Falmouth Street
Suite 201
Richmond, VA 23229

FAX _____
Telephone _____
E-mail _____

Sampling Collection and Shipment

Sampling Site RFAAP/09604-317 Date of Collection October 11, 2003

Date Samples Received at Laboratory October 14, 2003

Analysis

Method of Analysis XX-EP-800

Date(s) of Analysis October 16, 2003

Analytical Results

Field Sample Number	Laboratory Number	Sample Type	MOISTURE %							
ASB1A	03E04292	SOIL	17.6							
ASB1B	03E04293	SOIL	20.9							
ASB1C	03E04294	SOIL	27.1							
ASB2A	03E04295	SOIL	17.7							
ASB2B	03E04296	SOIL	18.4							
SBD-10	03E04297	SOIL	19.6							
ASB2C	03E04298	SOIL	33.3							
ASB2CMD	03E04298MD	SOIL	31.2							
ASB3A	03E04299	SOIL	20.3							
ASB3B	03E04300	SOIL	19.6							
ASB3C	03E04301	SOIL	17.8							
Limit of Detection										

† See comment on last page.
ND Parameter not detected above LOD.
NR Parameter not requested.
NA Parameter not applicable.

** See comment on last page.
( ) Parameter between LOD and LOQ.

Norman Breese
Analyst: Norman Breese

Jon Yonk
Reviewer: Johnathan M. Yonk

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

Bm 10/15/03

Date of Extraction:	OCT 15, 2003	DataChem Laboratories Extraction Notebook	Book # Ext 246 Page#
Account #(s):	8001		
DCL Set ID(s):	03E-0448-02,0450-01		Matrix: SOIL
Group/Lot ID:	G039F00P		Method: 8332

	DCL Sample ID	Field ID	Initial Vol. / WT	Initial pH	Adj pH			Surr. Added	Matrix Spike		Final Volume
1	BL-211589-1	BL-211589-1	1.0gm	N/A	N/A	N/A		1mL	----	----	2mL
2	QC-211589-1	QC-211589-1	1.0gm	N/A	N/A	N/A		1mL	1mL	----	2mL
3	03E04288	13SD3	1.0gm	N/A	N/A	N/A		1mL	----	----	2mL
4	03E04289	SDD1	1.0gm	N/A	N/A	N/A		1mL	----	----	2mL
5	03E04290	13SD2	1.0gm	N/A	N/A	N/A		1mL	----	----	2mL
6	03E04290MS	13SD2MS	1.0gm	N/A	N/A	N/A		1mL	1mL	----	2mL
7	03E04290MSD	13SD2MSD	1.0gm	N/A	N/A	N/A		1mL	1mL	----	2mL
8	03E04292	ASB1A	1.0gm	N/A	N/A	N/A		1mL	----	----	2mL
9	03E04293	ASB1B	1.0gm	N/A	N/A	N/A		1mL	----	----	2mL
10	03E04294	ASB1C	1.0gm	N/A	N/A	N/A		1mL	----	----	2mL
11	03E04295	ASB2A	1.0gm	N/A	N/A	N/A		1mL	----	----	2mL
12	03E04296	ASB2B	1.0gm	N/A	N/A	N/A		1mL	----	----	2mL
13	03E04297	SBD-10	1.0gm	N/A	N/A	N/A		1mL	----	----	2mL
14	03E04298	ASB2C	1.0gm	N/A	N/A	N/A		1mL	----	----	2mL
15	03E04298MS	ASB2CMS	1.0gm	N/A	N/A	N/A		1mL	1mL	----	2mL
16	03E04298MSD	ASB2CMSD	1.0gm	N/A	N/A	N/A		1mL	1mL	----	2mL
17	03E04299	ASB3A	1.0gm	N/A	N/A	N/A		1mL	----	----	2mL
18	03E04300	ASB3B	1.0gm	N/A	N/A	N/A		1mL	----	----	2mL
19	03E04301	ASB3C	1.0gm	N/A	N/A	N/A		1mL	----	----	2mL
20											
21											
22											
23											
24											
25											
26											
27											
28											
29											
30											
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32											
33											
34											
35											
36											
37											
38											
39											
40											

Solvents:	MeCN	CH016	Comments:
Surrogate Spike:	239 ws 3	1/30/04 By: Bm	
Matrix Spike:	239 ws 99	2/12/04 By: Bm	
Matrix Spike:	---I---	----------By:	
Extractionist:	Bm 10/15/03		
Checker:	10/15/03		Sonicators tunned by:

*=Entry Error

Bm 10/15/03

Bm 10/15/03

DATA CHEM
LABORATORIES, INC.
A SORENSON COMPANY

Case Narrative

Method:	SW-846 8332	**Client:**	URS
Analysis:	Nitroglycerin, PETN	**Account:**	8001
Preparation SOP #:	OL-SW-8332	**Matrix:**	Solid
Analysis SOP#:	OL-SW-8332	**SDG#:**	URS#04
DCL Set ID's:	03E-0450-01		

General Set Information: This set contained ten samples, a matrix spiked sample (MS) and a matrix spike duplicate. This set was batched with another set, which contained three solid samples, a method blank, a laboratory control sample (LCS), a matrix spiked sample (MS) and a matrix spike duplicate.

Method Summary: A 1.0 gram portion of the soil samples was weighed, transferred into a suitable container, and 2 ml of acetonitrile was added. The samples were placed in an ultrasonic bath for a minimum of one hour. The samples were allowed to settle and the supernatant was filtered through a 0.45µ PTFE filter. One part acetonitrile extract was mixed with one part of a 1% calcium chloride solution, then injected into an HP1050 HPLC equipped with UV detection and a Phenomenex Ultracarb ODS C18 column. The instrument was adjusted to the proper operating parameters and allowed to equilibrate until a stable baseline was established. Initial calibration standards were analyzed and linear calibration curves were generated from the data. A continuing calibration standard was analyzed at the beginning of sample analysis, after each ten samples, and at the end of the analysis. The response of the continuing calibration standard must be within method limits when compared to the initial calibration curve.

Samples and QCs were analyzed under identical conditions as those used for initial and continuing calibration. Quantitation was based on calibration curves using the initial calibration standards. Results were reported in units of mg/Kg.

Sample Preparation: No anomalies were observed during the preparation of the samples.

Holding Times: The samples were prepared and analyzed within method required hold times.

Dilution(s): No dilutions were performed on this set.

Quality Control Data:

Blank: No confirmed method analytes were detected in the method blank above half of the CRDL. The method blank belonged to set# 03E-0448-02.

Laboratory Control Samples: All recoveries met the method limits. The LCS belonged to set# 03E-0448-02.

Surrogate Recovery: Surrogate recoveries were acceptable.

MS/MSD: Matrix spiking was performed on sample 03E04298. All percent recoveries and RPDs were within method limits.

Instrument QC: All initial and continuing calibration verification samples met method criteria.

Flagging Codes: The "U" flag indicates that the analyte was not detected at or above the MDL level. The "J" flag indicates that a value reported between the MDL and CRDL.

NC/CAR: None.

Miscellaneous Comments: None.

Confirmation Analyses: Any sample with a positive result above the MDL was qualitatively analyzed for confirmation on a second column. For samples requiring confirmation, one part acetonitrile extract was mixed with one part of a 1% calcium chloride solution, then injected into an HP1050 HPLC equipped with UV detection and a Phenomenex Synergi Polar-RP column. The instrument was adjusted to the proper operating parameters and allowed to equilibrate until a stable baseline was established. A CCV standard was run to establish retention times and a standard at a level near the reporting limits was run to verify low concentration sensitivity. The second column analyses were used for qualitative confirmation of analytes based on retention time. If a positive result is confirmed, the quantitative result from the primary column is reported.

Gloria W. Heung 9/27/03

Gloria W. Heung Date

03E-0450
SDG# URS#04

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1121

Project Number	Project Name
09604.317	RFAAP 55L

Project Contact (Name and Phone Number): Darren Kerns

Samplers: T. Spangler

LAB: DataChem

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, 8332) PETN/NG	Dioxin/Furan(8290)	TAL Metals (Including Mercury)	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	Paint Filter (9095B)	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
ASD1A	10-11-03 8:45	S		X	S	F		1						X									03E04292
ASB1B	9:00	S		X	S	F		1						X									93
ASB1C	9:15	S		X	S	F		1						X									94
ASB2A	10:15	S		X	S	F		1						X									95
ASB2B	10:30	S		X	S	F		1						X									96
SBD-10	-	S		X	S	F		1						X									97
ASB2C	11:05	S		X	S	F		1						X									98
ASD2CMS	11:15	S		X	S	F		1						X									98MS
ASB2CMSD	11:15	S		X	S	F		1						X									98MSD
ASB3A	12:00	S		X	S	F		1						X									99
ASB3B	12:15	S		X	S	F		1						X									300
ASB3C	12:30	S		X	S	F		1						X									301
				X																			

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
[signature]	10/13/03 1400	FedEx			
FedEx	10/14/03 0830	(for lab) [signature] R-33-1			

NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement

001

Earliest Sampling Date: 11-Oct-2003

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 28-Oct-2003

Project/Job/Task: P021C002 | *Split:* | **Root Set ID:** 03E-0450 * | **Reporting Group**

Client: URS | **Account:** 08001

Comments:

Verified: JW 10/14/03

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Customer ID 2			Analysis		01 Nitroglycein/PETN by 8332	02 Moisture							# Bottles
11-Oct-2003	ASB1A	03E04292			SOIL						X	X							1
11-Oct-2003	ASB1B	03E04293			SOIL						X	X							1
11-Oct-2003	ASB1C	03E04294			SOIL				—		X	X							1
11-Oct-2003	ASB2A	03E04295			SOIL						X	X							1
11-Oct-2003	ASB2B	03E04296			SOIL						X	X							1
11-Oct-2003	SBD-10	03E04297			SOIL						X	X							1
11-Oct-2003	ASB2C	03E04298			SOIL						X	X							1
11-Oct-2003	ASB2CMS	03E04298MS		MS	SOIL						X								1
11-Oct-2003	ASB2CMSD	03E04298MSD		MSD	SOIL						X								1
11-Oct-2003	ASB3A	03E04299			SOIL						X	X							1

13B JR

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Walk-in/Room/Shelf/Fridge R-33 / 6-19	10/15/03 10:00	[signature]	Ext
[signature]	10/15/03 13:10	Norman Breese	c/o Moisture
Norman Breese	10/15/03 15:10	33 13 10/15/03 13 10/15/03 R-319-1 13 R-319-1 13	Storage

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

Check box if there is a continuation page ☐

Printed 10/14/2003 10:39

Form: COFC1.01-SWV2.30

Earliest Sampling Date: 11-Oct-2003

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 28-Oct-2003

Project/Job/Task: P021C002 | Split: | Root Set ID: 03E-0450 * | Reporting Group | 01 | 02 | #

Client: URS | Account: 08001

Comments:

Verified: JW 10/14/03

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Customer ID 2	Analysis: Nitroglycein/PETN by 8332	Analysis: Moisture	# Bottles
11-Oct-2003	ASB3B	03E04300			SOIL		X	X	1
11-Oct-2003	ASB3C	03E04301			SOIL		X	X	1
11-Oct-2003	ASB2CMD	03E04298MD		MD	SOIL			X	0

13B JL

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Walk-in/Room/Shelf/Fridge R-34 1 m	10/15/03 10:..	[signature]	EST
[signature]	10/15/03 13:30	Norman Bruce	w/o Moisture
Norman Bruce	10/15/03 15:10	R-319-1 JB R-319-1 JB	Storage

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

Check box if there is a continuation page ☐

Printed 10/14/2003 10:39

Form: COFC1.01-SWV2.30

DATACHEM LABORATORIES CLIENT-RELATED INFORMATION REPORT (CRIR)

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill In or Circle)

Client Name: URS

Project/Task/Site: 03E-0450

Date/Time of Receipt: 10/14/03 0830

Number of Coolers Received: 1

Condition of Coolers: Acceptable/Unacceptable
Custody Seals: Present/Absent/NA
Intact/Broken/NA
Tamper Evident: Yes/No/NA
Ice Present: Yes/No/NA
Frozen/Melted/NA

Temperature Control: Present/Not Included
Location Temp Taken: Cooler/Between Samples
Are all temperatures within project specific guidelines? Yes/No/NA
Are all applicable pHs within specific guidelines? Yes/No/NA

pH Check Performed:	Metals	Yes/No/NA	Total Phenolics	Yes/No/NA	NO3/NO2	Yes/No/NA
	Cyanide	Yes/No/NA	TPH – 418.1	Yes/No/NA	Oil & Grease	Yes/No/NA
	Sulfide	Yes/No/NA	COD	Yes/No/NA	Total Phosphorous	Yes/No/NA
	Ammonia	Yes/No/NA	TKN	Yes/No/NA	Gross A.B, Gamma Spec	Yes/No/NA
Residual Chlorine Check Performed:	8270	Yes/No/NA	8310	Yes/No/NA	8330	Yes/No/NA
	8081	Yes/No/NA	8151	Yes/No/NA		

Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.
1	C03-6444	5 °C	4	C03-	°C	7	C03-	°C
2	C03-	°C	5	C03-	°C	8	C03-	°C
3	C03-	°C	6	C03-	°C	9	C03-	°C

Taken By: _____ (Signature) S. Pate (Printed Name) 10/14/03 (Date)

CLIENT-RELATED INFORMATION

- ☐ Missing Cooler
- ☐ Cooler Conditions
- ☐ Missing Paperwork
- ☐ Missing/Incorrect Bottle Labels
- ☐ Missing Samples/Bottles
- ☐ Broken/Leaking Samples
- ☐ Incorrect Bottle Type
- ☐ Cooler Temperatures Out of Range
- ☐ Incorrect Preservation
- ☐ pH Criteria Not Met
- ☐ Residual Chlorine Present
- ☐ Head Space in Bottles
- ☐ Insufficient Sample Volume
- ☐ Chain of Custody Problems
- ☐ Other:

EPA Custody Seal:

BRIEFLY DESCRIBE THE PROBLEM AND THE ACTION TAKE

Date 10/13/03 FedEx Tracking Number 832942539767

Sender's Name Brett Fisher Phone 804 965-9000

Company DAMES & MOORE/URS/CRC

Address 5540 FALMOUTH ST STE 201 Dept./Floor/Suite/Room

City RICHMOND State VA ZIP 23230

Faxed to Client? YES ☐ No ☐

Response Req Your Internal Billing Reference 09604 317

PROJECT MANAGEMENT

PROJECT MANAGER COMMENTS:

DCL Project Manager: _____ (Printed Name) Returned to Sample Receipt by: _____ (Signature) Date: _____

Data Qualifying Codes

Two types of data qualifying codes or flags are applied in the course of the data review. The data validation flags indicate data that are not usable for decision-making, more than normally biased and/or variable, or not representative of field conditions. These codes and their definitions are presented below in the hierarchy stipulated in the USEPA Region III Modifications to the National Functional Guidelines for Data Review (September 1994).

Data Validation Flags

Flag	Interpretation
R	Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.
U	Not detected. The associated number indicates the approximate sample concentration is necessary to be detected.
B	Not detected substantially above the level reported in laboratory or field blanks.
N	Tentative Identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.
J	Analyte present. Reported value may not be accurate or precise.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
UL	Not detected, quantitation limit is probably higher.
NT	Not tested, no analytical result provided.

The other type of code used by URS is a "Reason Code". The reason code indicates the type of quality control failure that led to the application of the data validation flag.

Reason Codes

GC/MS Organics		GC and HPLC Organics		Inorganics and Conventionals	
Code	Interpretation	Code	Interpretation	Code	Interpretation
a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence
b	Bubble found in vial >6mm	b	Instrument performance failure	c	Calibration failure
c	Calibration failure; poor or unstable response	c	Calibration failure; poor or unstable response	d	MS/MSD imprecision
d	MS/MSD imprecision	d	MS/MSD imprecision	e	LCSD imprecision
e	LCSD imprecision	e	LCSD imprecision	f	Field duplicate imprecision
f	Field duplicate imprecision	f	Field duplicate imprecision	h	Holding time violation
h	Holding time violation	g	Dual column confirmation imprecision	k	Laboratory duplicate imprecision
i	Internal standard failure	h	Holding time violation	l	LCS recovery failure
j	Tuning failure or poor mass spectrometer performance	i	Internal standard failure	m	MS/MSD recovery failure
l	LCS recovery failure	l	LCS recovery failure	n	ICS failure
m	MS/MSD recovery failure	m	MS/MSD recovery failure	o	Calibration blank contamination
p	Poor chromatography	p	Poor chromatography	p	Preparation blank contamination
q	Concentration exceeded the linear range of the instrument	q	Concentration exceeded the linear range	q	Concentration exceeded the linear range
r	Linearity failure in initial calibration	r	Linearity failure in initial calibration	r	Linearity failure in calibration or MSA
s	Surrogate failure	s	Surrogate failure	s	Serial dilution failure
t	TIC	u	No confirmation column	v	Post-digestion spike failure
w	Identification criteria failure	w	Retention time failure	w	CRDL Standard Failure
x	Field blank contamination	x	Field blank contamination	x	Field blank contamination
y	Trip blank contamination	z	Method blank contamination	z	Laboratory storage blank contamination
z	Method blank contamination				

Paradigm Analytical Laboratories, Inc.

Dioxin/Furans

DATA VALIDATION REPORT - Level III Review

SDG No.: G296-180 **Fraction:** Dioxin/Furan

Lab: Paradigm_Analytical **Project Name:** Radford_SSP

Reviewer: Andrea_Sansom **Date:** March_5,_2004

This report presents the findings of a review of the referenced data. The report consists of this summary, copies of data reports with data qualifying flags applied (as required), the completed data validation checklist, supporting documentation, and an explanation of the data qualifying flags employed. The review performed is based on the USEPA Region III Modifications to the National Functional Guidelines for Organic Data Review and National Functional Guidelines for Chlorinated Dioxin/Furan Data Review as pertains to the specifics of the analytical methods employed and provisions of the approved project-specific QAPP.

Major Anomalies: None.

Minor Anomalies: The soil laboratory control spike pair displayed percent recoveries greater than the upper control limit (i.e., 120%) for 1,2,3,6,7,8-HxCDD (124%) and 1,2,3,7,8,9-HxCDD (130%/129%). The associated field sample results were positive for these constituents and were flagged "J,l". The aqueous laboratory control spike duplicate displayed recoveries greater than the upper control limit for several constituents. Since the laboratory control spike displayed acceptable recoveries and the associated equipment blank (EQB-4) was non-detect, no data qualifying action was required.

All the labeled extraction and cleanup standards displayed percent recoveries greater than the upper control limit (i.,e.,135%) for the soil method blank. Since this is a quality control sample, no data qualifying action was required. The equipment blank displayed a positive detection for Total TCDF at 0.00768 ng/L. The associated result less than five times the blank concentration was flagged "B,x" in sample SBD9.

The matrix spike pair performed on sample 13SB9A displayed recoveries greater than the upper control limit (i.e., 120%) for 1,2,3,6,7,8-HxCDD (122%), 1,2,3,7,8,9-HxCDD (125%/135%), 2,3,4,6,7,8-HxCDF (122%/126%), and 1,2,3,7,8,9-HxCDF (138%). Since the recoveries were marginally greater than the control limit and the laboratory control spike displayed similar anomalies, no data qualifying action was taken.

The field duplicate pair (13SB9A and SBD9) displayed a relative percent difference greater than the control limit (i.e., 35%) for OCDD at 62.4%. The positive OCDD result for 13SB9A was flagged "J,f". The concentration of OCDD was greater than the linear range of the initial calibration for sample SBD9. This result was flagged "J,q".

Correctable Anomalies: None.

Comments: The positive 2,3,7,8-TCDF detections for samples 13SB9A and SBD9 on the primary column was re-analyzed on a more suitable column for determination of this congener. The concentration for this congener from the re-analysis should be used for data interpretation.

Signed: Andrea Sansom

Radford SSP
Duplicate Statistics

13SB9A and SBD9

	Units	RL	5xRL	Sample Conc Hits	Duplicate Conc EMPC	Duplicate Conc Hits	Duplicate Conc EMPC	%RPD Hits	Delta Hits	4xRL	Pass/ Fail
Dioxin/Furan											
2,3,7,8-TCDD	pg/g	1.2	6.2	0.12 U		0.13 U		12.0%	0.015	4.96	N/A
1,2,3,7,8-PeCDD	pg/g	6.2	31	0.33 U	0.66 J	0.37 U		11.6%	0.041	24.84	N/A
1,2,3,4,7,8-HxCDD	pg/g	6.2	31	0.74 J		0.30 U	0.48 J	83.8%	0.434	24.84	N/A
1,2,3,6,7,8-HxCDD	pg/g	6.2	31	2.24 J		1.04 J		73.2%	1.20	24.84	N/A
1,2,3,7,8,9-HxCDD	pg/g	6.2	31	2.33 J		0.63 U	1.37 J	115%	1.702	24.84	N/A
1,2,3,4,6,7,8-HpCDD	pg/g	6.2	31	50.0		40.6		20.8%	9.4	24.84	PASS
OCDD	pg/g	12.4	62	1520		2900		**62.4%**	1380	49.6	**FAIL**
2,3,7,8-TCDF	pg/g	1.2	6.2	0.84 J		0.22 J		117%	0.622	4.96	N/A
1,2,3,7,8-PeCDF	pg/g	6.2	31	0.45 J		0.22 U		69.9%	0.233	24.84	N/A
2,3,4,7,8-PeCDF	pg/g	6.2	31	0.57 J		0.26 U		75.0%	0.313	24.84	N/A
1,2,3,4,7,8-HxCDF	pg/g	6.2	31	0.68 J		0.26 U	0.28 J	90.4%	0.424	24.84	N/A
1,2,3,6,7,8-HxCDF	pg/g	6.2	31	0.53 J		0.24 J		74.9%	0.291	24.84	N/A
2,3,4,6,7,8-HxCDF	pg/g	6.2	31	0.49 J		0.51 U		2.6%	0.013	24.84	N/A
1,2,3,7,8,9-HxCDF	pg/g	6.2	31	0.55 U		0.62 U		11.6%	0.068	24.84	N/A
1,2,3,4,6,7,8-HpCDF	pg/g	6.2	31	5.11 J		2.14 J		81.9%	2.97	24.84	N/A
1,2,3,4,7,8,9-HpCDF	pg/g	6.2	31	0.44 U	0.46 J	0.49 U		11.5%	0.053	24.84	N/A
OCDF	pg/g	12.4	62	11.2 J		4.35 J		88.1%	6.85	49.6	N/A
2,3,4,7,8-PeCDF	pg/g	6.2	31	1.08 J	2.24 J	0.13 U	0.40 J	156%	0.948	24.84	N/A
1,2,3,4,7,8-HxCDF	pg/g	6.2	31	3.82 J	6.03 J	2.57 J		39.1%	1.25	24.84	N/A
1,2,3,6,7,8-HxCDF	pg/g	6.2	31	21.6	22.1	10.50	13.10 J	69.2%	11.1	24.84	PASS
2,3,4,6,7,8-HxCDF	pg/g	6.2	31	96.8		93.90		3.0%	2.90	24.84	PASS
1,2,3,7,8,9-HxCDF	pg/g	6.2	31	7.11	8.80	1.07 J	1.94 J	148%	6.04	24.84	N/A
1,2,3,4,6,7,8-HpCDF	pg/g	6.2	31	4.85 J		0.92 J		136%	3.93	24.84	N/A
1,2,3,4,7,8,9-HpCDF	pg/g	6.2	31	8.31		2.18 J	2.93 J	117%	6.13	24.84	N/A
OCDF	pg/g	6.2	31	13.0	13.4	4.88 J		90.8%	8.12	24.84	N/A

Soil Control Limits

[sample] > 5 x RL, use 35%
[sample] < 5 x RL, use 4 x RL

Method 8290

EQB-4

URS Greiner Woodward Clyde

Analytical Data Summary Sheet

Analyte	Adj. MDL (ng/L)	Amount (ng/L)		Adj. RL (ng/L)	EMPC (ng/L)	RT (min.)	Ratio	Qualifier
2,3,7,8-TCDD	0.00493	0.00493	U	0.0100				
1,2,3,7,8-PeCDD	0.0221	0.0221	U	0.0500				
1,2,3,4,7,8-HxCDD	0.00986	0.00986	U	0.0500				
1,2,3,6,7,8-HxCDD	0.0142	0.0142	U	0.0500				
1,2,3,7,8,9-HxCDD	0.0132	0.0132	U	0.0500				
1,2,3,4,6,7,8-HpCDD	0.0124	0.0124	U	0.0500				
OCDD	0.0619	0.0619	U	0.100				
2,3,7,8-TCDF	0.00493	0.00493	U	0.0100				
1,2,3,7,8-PeCDF	0.0221	0.0221	U	0.0500				
2,3,4,7,8-PeCDF	0.0201	0.0201	U	0.0500				
1,2,3,4,7,8-HxCDF	0.0115	0.0115	U	0.0500				
1,2,3,6,7,8-HxCDF	0.0122	0.0122	U	0.0500				
2,3,4,6,7,8-HxCDF	0.0107	0.0107	U	0.0500				
1,2,3,7,8,9-HxCDF	0.0131	0.0131	U	0.0500				
1,2,3,4,6,7,8-HpCDF	0.00962	0.00962	U	0.0500				
1,2,3,4,7,8,9-HpCDF	0.00866	0.00866	U	0.0500				
OCDF	0.0165	0.0165	U	0.100				
Total TCDDs	0.00493	0.00493	U	0.0500				
Total PeCDDs	0.0221	0.0221	U	0.0500				
Total HxCDDs	0.00986	0.00986	U	0.0500				
Total HpCDDs	0.0124	0.0124	U	0.0500				
Total TCDFs	0.00493	0.00768	J	0.0500				
Total PeCDFs	0.0201	0.0201	U	0.0500				
Total HxCDFs	0.0107	0.0107	U	0.0500				
Total HpCDFs	0.00866	0.00866	U	0.0500				
ITEF TEQ (ND=0)		0			0			
ITEF TEQ (ND=½)		0.00461			0.00461			

Client Information

Project Name:	Radford Army Ammunition Plant
Sample ID:	EQB-4

Laboratory Information

Project ID:	G296-180	
Sample ID:	G296-180-1A	
Collection Date/Time:	09-Oct-03	16:20
Receipt Date:	10-Oct-03	
Extraction Date:	15-Oct-03	
Analysis Date:	17-Oct-03	

Sample Information

Matrix:	Water	
Weight / Volume:	500	mL
Solids / Lipids:	NA	%
Original pH :	6	
Batch ID:	WG10010	
Filename:	a15oct03a_5-11	
Retchk:	a15oct03a_4-14	
Begin ConCal:	a15oct03a_4-14	
End ConCal:	a15oct03a_5-14	
Initial Cal:	m8290-100103b	

Method 8290

13SB9A

URS Greiner Woodward Clyde

Analytical Data Summary Sheet

Analyte	Adj. MDL (pg/g)	Amount (pg/g)		Adj. RL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio	Qualifier
2,3,7,8-TCDD	0.117	0.117	U	1.24				
1,2,3,7,8-PeCDD	0.332	EMPC	J	6.21	0.656	33:28	1.31	
1,2,3,4,7,8-HxCDD	0.268	0.735	J	6.21		35:56	1.11	
1,2,3,6,7,8-HxCDD	0.456	2.24	J	6.21		36:01	1.16	J,1
1,2,3,7,8,9-HxCDD	0.559	2.33	J	6.21		36:14	1.17	J,1
1,2,3,4,6,7,8-HpCDD	0.423	50.0		6.21		39:07	1.00	
OCDD	1.12	1520		12.4		43:05	0.90	J,f
~~2,3,7,8-TCDF~~	~~0.153~~	~~0.842~~	~~J~~	~~1.24~~		~~29:07~~	~~0.85~~	
1,2,3,7,8-PeCDF	0.193	0.450	J	6.21		32:41	1.61	
2,3,4,7,8-PeCDF	0.232	0.574	J	6.21		33:16	1.72	
1,2,3,4,7,8-HxCDF	0.229	0.681	J	6.21		35:15	1.41	
1,2,3,6,7,8-HxCDF	0.116	0.534	J	6.21		35:21	1.17	
2,3,4,6,7,8-HxCDF	0.451	0.494	J	6.21		35:49	1.16	
1,2,3,7,8,9-HxCDF	0.554	0.554	U	6.21				
1,2,3,4,6,7,8-HpCDF	0.489	5.11	J	6.21		37:57	1.00	
1,2,3,4,7,8,9-HpCDF	0.436	EMPC	J	6.21	0.460	39:43	1.49	
OCDF	0.709	11.2	J	12.4		43:18	0.88	
Total TCDDs	0.117	1.08	J	6.21	2.24			
Total PeCDDs	0.332	3.82	J	6.21	6.03			
Total HxCDDs	0.268	21.6		6.21	22.1			
Total HpCDDs	0.423	96.8		6.21				
Total TCDFs	0.153	7.11		6.21	8.80			
Total PeCDFs	0.193	4.85	J	6.21				
Total HxCDFs	0.116	8.31		6.21				
Total HpCDFs	0.436	13.0		6.21	13.4			
ITEF TEQ (ND=0)		3.18			3.51			
ITEF TEQ (ND=½)		3.43			3.69			

see next page. 3/3/04

Client Information

Project Name:	Radford Army Ammunition Plant
Sample ID:	13SB9A

Laboratory Information

Project ID:	G296-180
Sample ID:	G296-180-2A
Collection Date/Time:	09-Oct-03 14:00
Receipt Date:	10-Oct-03
Extraction Date:	13-Oct-03
Analysis Date:	15-Oct-03

Sample Information

Report Basis:	Dry Weight	
Matrix:	Soil	
Weight / Volume:	10.07	g
Solids / Lipids:	79.9	%
Original pH :	NA	
Batch ID:	WG10007	
Filename:	a13oct03a_4-12	
Retchk:	a13oct03a_3-14	
Begin ConCal:	a13oct03a_3-14	
End ConCal:	a13oct03a_4-14	
Initial Cal:	m8290-100103b	

Method 8290
13SB9A
URS Greiner Woodward Clyde

Analytical Data Summary Sheet

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio	Qualifier
2,3,7,8-TCDF	0.784			13.34	0.78	A

Labeled Standard	Spiked Amount (ng)	RT (min.)	Ratio	Qualifier
Extraction Standards				
13C12-2,3,7,8-TCDF	2.00	13.33	0.79	

Client Information			**Sample Information**	
Project Name:	Radford Army Ammunition Plant		Report Basis:	Dry
			Matrix:	Soil
Sample ID:	13SB9A		Weight / Volume:	10.1 g
			Solids / Lipids:	79.9
			Original pH :	NA
Laboratory Information			Batch ID:	WG10007
Project ID:	G296-180		Instrument:	hrms3
Sample ID:	G296-180-2A		Filename:	c31oct03-5
Collection Date/Time:	10/09/03	14:00	Retchk:	c31oct03-2
Receipt Date:	10/10/03		Begin ConCal:	c31oct03-3
Extraction Date:	10/13/03		End ConCal:	c31oct03-9
Analysis Date/Time:	10/31/03	13:53	Initial Cal:	mCF-c100603

Analyzed by: _____
Date: 10/31/03

Reviewed by: _____
Date: 10/31/03

Method 8290

SBD9

URS Greiner Woodward Clyde

Analytical Data Summary Sheet

Analyte	Adj. MDL (pg/g)	Amount (pg/g)		Adj. RL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio	Qualifier
2,3,7,8-TCDD	0.132	0.132	U	1.39				
1,2,3,7,8-PeCDD	0.373	0.373	U	6.97				
1,2,3,4,7,8-HxCDF	0.301	EMPC	J	6.97	0.477	35:55	1.05	
1,2,3,6,7,8-HxCDF	0.512	1.04	J	6.97		36:00	1.07	
1,2,3,7,8,9-HxCDF	0.628	EMPC	J	6.97	1.37	36:15	1.03	
1,2,3,4,6,7,8-HpCDD	0.474	40.6		6.97		39:07	1.06	
OCDD	1.26	2900		13.9		43:04	0.88	E
~~2,3,7,8-TCDF~~	~~0.172~~	~~0.220~~	~~J~~	~~1.39~~		~~29:06~~	~~0.72~~	
1,2,3,7,8-PeCDF	0.217	0.217	U	6.97				
2,3,4,7,8-PeCDF	0.261	0.261	U	6.97				
1,2,3,4,7,8-HxCDF	0.257	EMPC	J	6.97	0.276	35:16	0.93	
1,2,3,6,7,8-HxCDF	0.130	0.243	J	6.97		35:21	1.16	
2,3,4,6,7,8-HxCDF	0.507	0.507	U	6.97				
1,2,3,7,8,9-HxCDF	0.622	0.622	U	6.97				
1,2,3,4,6,7,8-HpCDF	0.549	2.14	J	6.97		37:57	1.08	
1,2,3,4,7,8,9-HpCDF	0.489	0.489	U	6.97				
OCDF	0.796	4.35	J	13.9		43:18	0.87	
Total TCDDs	0.132	ND	J	6.97	0.399			
Total PeCDDs	0.373	2.57	J	6.97				
Total HxCDDs	0.301	10.5		6.97	13.1			
Total HpCDDs	0.474	93.9		6.97				
Total TCDFs	0.172	1.07	J	6.97	1.94			
Total PeCDFs	0.217	0.921	J	6.97				
Total HxCDFs	0.130	2.18	J	6.97	2.93			
Total HpCDFs	0.489	4.88	J	6.97				
ITEF TEQ (ND=0)		3.48			3.69			
ITEF TEQ (ND=½)		3.89			4.05			

J, I
J, I
J, Q
see next page
4/5 3/5/04
B, X

Client Information

Project Name:	Radford Army Ammunition Plant
Sample ID:	SBD9

Laboratory Information

Project ID:	G296-180
Sample ID:	G296-180-5A
Collection Date:	09-Oct-03
Receipt Date:	10-Oct-03
Extraction Date:	13-Oct-03
Analysis Date:	15-Oct-03

Sample Information

Report Basis:	Dry Weight	
Matrix:	Soil	
Weight / Volume:	10.00	g
Solids / Lipids:	71.7	%
Original pH :	NA	
Batch ID:	WG10007	
Filename:	a15oct03a-11	
Retchk:	a15oct03a-14	
Begin ConCal:	a15oct03a-14	
End ConCal:	a15oct03a-14	
Initial Cal:	m8290-100103b	

Method 8290

SBD9

URS Greiner Woodward Clyde

Analytical Data Summary Sheet

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio	Qualifier
2,3,7,8-TCDF	EMPC	0.139	0.194	13.34	0.92 *	A

Labeled Standard	Spiked Amount (ng)	RT (min.)	Ratio	Qualifier
Extraction Standards				
13C12-2,3,7,8-TCDF	2.00	13.33	0.78	

Client Information		**Sample Information**	
Project Name:	Radford Army Ammunition Plant	Report Basis:	Dry
		Matrix:	Soil
Sample ID:	SBD9	Weight / Volume:	10.0 g
		Solids / Lipids:	71.7
		Original pH :	NA
Laboratory Information		Batch ID:	WG10007
Project ID:	G296-180	Instrument:	hrms3
Sample ID:	G296-180-5A	Filename:	c31oct03-11
Collection Date/Time:	10/09/03	Retchk:	c31oct03-2
Receipt Date:	10/10/03	Begin ConCal:	c31oct03-3
Extraction Date:	10/13/03	End ConCal:	c31oct03-12
Analysis Date/Time:	10/31/03 15:50	Initial Cal:	mCF-c100603

Analyzed by: _____
Date: 10/31/03

Reviewed by: _____
Date: 10/31/03

DATA VALIDATION WORKSHEET

Dioxins and Furans Analysis

Reviewer: AS
Date: March-03
DV Level: II III IV
Review Document:
__X__ SW-846 __X__ Project QAPP/SAP __X__ NFG EPA 540-R-02-003 (August 2002)

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: Paradigm
SDG No.: G296-180
Method No.: 8290

1.0 General: Chain-of-Custody

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples which were analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		X	

Notes:

2.0 Preservation/ Holding Times

		Yes	No	NA
2.1	Were samples preserved properly? Stored at 4°C ± 2°C (<4°C to lab and <-10°C at lab for tissue) in the dark. For aqueous, 80mg/L of sodium thiosulfate is required if residual chlorine is present and if the pH is >9, this is adjusted to 7-9 with sulfuric acid. If not, J(+)/UJ(-)	X		
2.2	Have any technical holding times been exceeded? Extraction within 30 days of collection and analysis within 45 days of extraction (tissue must be extracted within 24 hours of defrost) (To comply with 40CFR Part 136.3, drinking water must be extracted within seven days of collection). If yes, J(+)/UJ(-).		X	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-) .		X	

Notes:

3.0 Blanks (Laboratory and Field)

		Yes	No	NA
3.1	Was a preparation blank prepared with each batch?	X		
3.2	Do any blanks have positive results? Action: If yes, an action level of 5 times the blank value is used to qualify sample results "B".		X	
3.3	Do any field equipment blanks/trip blanks have positive results? Use the same rule.	X		

Notes:

4.0 Instrument Calibration

		Yes	No	NA
4.1	Are five standards included in the calibration curve? If no, apply "J+/R-".	X		
4.2	Are RSD/%D ± 20% for standard compounds? If no, for RSD out apply "J+/UJ-" to associated specific analytes. For %D indicating a positive bias, flag "J+". For %D indicating a negative bias, flag "J+/UJ-".	X		
4.3	Are RSD/%D ± 30% for reference compounds? If no, apply "J" to all positive associated analytes.	X		
4.4	Is the signal to noise ratio acceptable for each selected ion current profile? (ICAL≥ 2.5:1 ; CCC ≥10:1) If no, apply "R" to estimated detection limits.	X		
4.5	Are Isotopic ratios within the following established control limits...? If no, apply "J+/R-".	X		

# Cl ion atoms	Ion Type	Theoretical Ratio	Control Limits
4	M/M+2	0.77	0.65- 0.89
5	M+2/M+4	1.55	1.32- 1.78
6	M+2/M+2	1.24	1.05- 1.43
(13)C-HxCDF	M/M+2	0.51	0.43- 0.59
(13)C-HpCDF	M/M+2	0.44	0.37- 0.51
7	M+2/M+4	1.04	0.88- 1.2
8	M+2	0.89	0.76- 1.02

4.6	Was the CCV analyzed at the beginning and end of every 12 hours? If no, J(+)/UJ(-) all associated samples.	X		

Notes:

5.0 GC/MS Instrument Performance Check

		Yes	No	NA
5.1	Are tuning forms present using perfluorokerosene (PFK) for each start of a 12 hour sequence? If no, apply "R".	X		
5.1a	Is the resolving power ≥ 10,000 with m/z 304.9824? If not, apply "R".	X		
5.1b	Is the deviation from exact m/z and theoretical m/z <0.005 amu or 5 ppm? If not, apply "R".	X		
5.2	Was a window defining mix analyzed defining descriptor switching times of scan ranges? If not, flag total homologue results "J+/UJ-".	X		
5.3	Was an isomer specificity check analyzed with peaks resolved with a valley ≥ 25%? (DB5 column: 2,3,7,8-TCDD and 1,2,3,8-TCDD ; DB225 column: 2,3,7,8-TCDF and 2,3,4,7-TCDF) If not, flag positive 2,3,7,8-TCDD and /or 2,3,7,8-TCDF, whichever failed, "J".	X		

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	X		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	X		
6.3	Are there any %R for matrix spike and matrix spike duplicate recoveries outside the QC limits?	X		
6.4	Are there any RPD for matrix spike and matrix spike duplicate recoveries outside the QC limits?		X	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

7.0 Laboratory Control Sample (LCS)		Yes	No	NA
7.1	Is the LCS recovery form present?	X		
7.2	Was an LCS analyzed for each batch?	X		
7.3	Are there any percent recoveries outside the QC limits of ±20% for targets and ±30% for reference compounds?	X		
	If Yes, for %R > UCL, "J+" only; for %R < LCL but greater than 10%, "J+/UJ-"; for %R < 10%, flag "J+/R-".			

Notes:

8.0 Nine Internal Standards and Two Clean-Up Recovery Standards		Yes	No	NA
8.1	Are internal standard recoveries for all samples within 40-135%? If no, apply J/UJ to associated targets.	X		
8.2	Are standard recoveries for all samples within 40-135% for all samples? If no, apply J/UJ.	X		

Notes: soil MB displayed all standards > 135%

9.0 Field Duplicate

		Yes	No	NA
9.1	Was a field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix)?	X		
9.2	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.		X	

Notes:

10.0 Sample Results/Detection Limit Verification

		Yes	No	NA
10.1	Were all sample results within the calibrated range, if not apply J.	X		
10.2	Is the signal to noise ion ratios ≥ 2.5:1 for positive results? If not, flag "J".	X		
10.3	Is the ion abundance ratio within 10% of the ratio in the most current CCC for positive results? If no, this result should be reported as an EMPC.	X		
10.4	Are the two identification peak apexs within 2 seconds for positive identifications? If not, flag "R".	X		
10.5	Was a second column confirmation used for positive 2,3,7,8-TCDF? If no, apply "R" to the 2,3,7,8-TCDF results.	X		
10.6	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture?	X		

Notes:

11.0 Data Completeness

		Yes	No	NA
11.1	Is the percent completeness within the control limits? (Control limit 90%)	X		
11.1.1	Number of samples: 3			
11.1.2	Number of target compounds in each analysis: 17			
11.1.3	Number of results rejected and not reported: 0			
	% Completeness = (11.1.1 x 11.1.2 - 11.1.3) x 100/(11.1.1 x 11.1.2)			
	% Completeness = 100%			

Notes:

Method 8290 - Blank Results

LMB

MB for 2 Soils

Analytical Data Summary Sheet

Analyte	Adj. MDL (ng/L)	Amount (ng/L)		Adj. RL (ng/L)	EMPC (ng/L)	RT (min.)	Ratio	Qualifier
2,3,7,8-TCDD	0.246	0.246	U	0.500				
1,2,3,7,8-PeCDD	1.11	1.11	U	2.50				
1,2,3,4,7,8-HxCDD	0.493	0.493	U	2.50				
1,2,3,6,7,8-HxCDD	0.711	0.711	U	2.50				
1,2,3,7,8,9-HxCDD	0.661	0.661	U	2.50				
1,2,3,4,6,7,8-HpCDD	0.621	0.621	U	2.50				
OCDD	3.10	3.10	U	5.00				
2,3,7,8-TCDF	0.247	0.247	U	0.500				
1,2,3,7,8-PeCDF	1.10	1.10	U	2.50				
2,3,4,7,8-PeCDF	1.01	1.01	U	2.50				
1,2,3,4,7,8-HxCDF	0.573	0.573	U	2.50				
1,2,3,6,7,8-HxCDF	0.610	0.610	U	2.50				
2,3,4,6,7,8-HxCDF	0.536	0.536	U	2.50				
1,2,3,7,8,9-HxCDF	0.655	0.655	U	2.50				
1,2,3,4,6,7,8-HpCDF	0.481	0.481	U	2.50				
1,2,3,4,7,8,9-HpCDF	0.433	0.433	U	2.50				
OCDF	0.823	0.823	U	5.00				
Total TCDDs	0.246	0.246	U	2.50				
Total PeCDDs	1.11	1.11	U	2.50				
Total HxCDDs	0.493	0.493	U	2.50				
Total HpCDDs	0.621	0.621	U	2.50				
Total TCDFs	0.247	0.247	U	2.50				
Total PeCDFs	1.01	1.01	U	2.50				
Total HxCDFs	0.536	0.536	U	2.50				
Total HpCDFs	0.433	0.433	U	2.50				
ITEF TEQ (ND=0)		0			0			
ITEF TEQ (ND=½)		0.196			0.196			

Laboratory Information

Sample ID:	LMB10007-A
Extraction Date:	13-Oct-03
Analysis Date:	14-Oct-03

Sample Information

Matrix:	Water	
Weight / Volume:	10.0	mL
Solids / Lipids:	NA	%
Original pH :	NA	
Batch ID:	WG10007	
Filename:	a13oct03a_3-3	
Retchk:	a13oct03a_2-14	
Begin ConCal:	a13oct03a_2-14	
End ConCal:	a13oct03a_3-14	
Initial Cal:	m8290-100103b	

Method 8290 - Blank Results

LMB

Analytical Data Summary Sheet

Labeled Standard	Expected Amount (ng)	Measured Amount (ng)	Percent Recovery (%)	RT (min.)	Ratio	Qualifier
Extraction Standards						
$^{13}C_{12}$-2,3,7,8-TCDD	1.00	1.48	148	30:02	0.79	
$^{13}C_{12}$-1,2,3,7,8-PeCDD	1.00	1.64	164	33:28	1.58	
$^{13}C_{12}$-1,2,3,6,7,8-HxCDD	1.00	1.43	143	36:02	1.23	
$^{13}C_{12}$-1,2,3,4,6,7,8-HpCDD	1.00	1.57	157	39:08	1.05	
$^{13}C_{12}$-OCDD	2.00	2.71	136	43:06	0.84	
$^{13}C_{12}$-2,3,7,8-TCDF	1.00	1.47	147	29:06	0.82	
$^{13}C_{12}$-1,2,3,7,8-PeCDF	1.00	1.61	161	32:42	1.66	
$^{13}C_{12}$-1,2,3,6,7,8-HxCDF	1.00	1.46	146	35:22	0.52	
$^{13}C_{12}$-1,2,3,4,6,7,8-HpCDF	1.00	1.50	150	37:59	0.46	
Cleanup Standards						
$^{37}Cl_4$-2,3,7,8-TCDD	0.200	0.322	161	30:02		
$^{13}C_{12}$-2,3,4,7,8-PeCDF	0.200	0.340	170	33:17	1.64	
$^{13}C_{12}$-1,2,3,4,7,8-HxCDD	0.200	0.301	151	35:57	1.21	
$^{13}C_{12}$-1,2,3,4,7,8-HxCDF	0.200	0.350	175	35:16	0.51	
$^{13}C_{12}$-1,2,3,4,7,8,9-HpCDF	0.200	0.280	140	39:44	0.47	
Injection Standards						
$^{13}C_{12}$-1,2,3,4-TCDD	2.00			29:18	0.79	
$^{13}C_{12}$-1,2,3,7,8,9-HxCDD	2.00			36:15	1.21	

Laboratory Information

Sample ID: LMB10007-A

Extraction Date: 13-Oct-03
Analysis Date: 14-Oct-03

Analyzed by: _____
Date: 10/31/03

Sample Information

Matrix:	Water	
Weight / Volume:	10.0	mL
Solids / Lipids:	NA	%
Original pH :	NA	
Batch ID:	WG10007	
Filename:	a13oct03a_3-3	
Retchk:	a13oct03a_2-14	
Begin ConCal:	a13oct03a_2-14	
End ConCal:	a13oct03a_3-14	
Initial Cal:	m8290-100103b	

Reviewed by: _____
Date: 10/31/03

Analytical Results
for
Ongoing Precision Result (OPRD)

Analyte	Spiked	AMT	Recovery		Range %		OPR		%D	
	pg/ul	pg/ul	%	#	Lower	Upper	Rec(%)	#		#
2,3,7,8-TCDD	10.0	11.4	114		80.0	120	113		0.670	
1,2,3,7,8-PeCDD	50.0	54.7	109		80.0	120	109		0.627	
1,2,3,4,7,8-HxCDD	50.0	54.2	108		80.0	120	118		8.21	
1,2,3,6,7,8-HxCDD	50.0	61.9	124	#	80.0	120	120		3.27	
1,2,3,7,8,9-HxCDD	50.0	64.9	130	#	80.0	120	129	#	0.309	
1,2,3,4,6,7,8-HpCDD	50.0	53.8	108		80.0	120	108		0.0966	
OCDD	100	106	106		80.0	120	104		1.55	
2,3,7,8-TCDF	10.0	11.2	112		80.0	120	106		4.94	
1,2,3,7,8-PeCDF	50.0	57.5	115		80.0	120	106		7.94	
2,3,4,7,8-PeCDF	50.0	53.6	107		80.0	120	98.2		8.66	
1,2,3,4,7,8-HxCDF	50.0	57.1	114		80.0	120	111		3.24	
1,2,3,6,7,8-HxCDF	50.0	60.2	120 OKAY	#	80.0	120	112		7.18	
2,3,4,6,7,8-HxCDF	50.0	58.7	117		80.0	120	112		4.54	
1,2,3,7,8,9-HxCDF	50.0	55.7	111		80.0	120	110		1.55	
1,2,3,4,6,7,8-HpCDF	50.0	58.3	117		80.0	120	116		0.743	
1,2,3,4,7,8,9-HpCDF	50.0	53.6	107		80.0	120	108		0.499	
OCDF	100	110	110		80.0	120	108		1.61	

%D limit is 25%
= Outside URS limits
* = Ion Ratio Out

QC Information

OPR Project No:	OPRD10007
Extraction Date:	13-Oct-03
Analysis Date:	14-OCT-03
Method:	8290

Sample Information

Matrix:	Soil

File Information

OPRD Filename :	a13oct03a_3-2
Retchk:	a26oct03a_6-14
Begin ConCal:	a26oct03a_6-14
End ConCal:	a13oct03a_3-14
Initial Cal:	m8290-100103b

13SB9A

Method 8290

Results for MS/MSD

DP 558 0925

Analyte	Sample pg/g	Spike pg	MS pg/g	%REC (75-125)	MSD pg/g	%REC (75-125)	%RPD (20)
2,3,7,8-TCDD	ND	200	29.1	117	27.4	117	0.0619
1,2,3,7,8-PeCDD	0.656	1000	136	109	125	107	2.52
1,2,3,4,7,8-HxCDD	0.735	1000	138	111	133	113	2.25
1,2,3,6,7,8-HxCDD	2.24	1000	150	119	145	122	2.51
1,2,3,7,8,9-HxCDD	2.33	1000	157	125	160	135 #	7.87
1,2,3,4,6,7,8-HpCDD	50.0	1000	170	96.9	160	94.3	2.74
OCDD	1520	2000	2090	2300 #	1870	1500 #	42.2 # OKAY due to HxRule
2,3,7,8-TCDF	0.842	200	27.4	107	25.8	107	0.256
1,2,3,7,8-PeCDF	0.450	1000	135	109	129	110	1.40
2,3,4,7,8-PeCDF	0.574	1000	141	113	136	116	2.33
1,2,3,4,7,8-HxCDF	0.681	1000	149	120	138	118	1.75
1,2,3,6,7,8-HxCDF	0.534	1000	144	116	138	118	1.69
2,3,4,6,7,8-HxCDF	0.494	1000	152	122	147	126	2.60
1,2,3,7,8,9-HxCDF	ND	1000	144	116	161	138 #	17.1
1,2,3,4,6,7,8-HpCDF	5.11	1000	145	113	137	113	0.0688
1,2,3,4,7,8,9-HpCDF	0.460	1000	128	103	129	110	6.74
OCDF	11.2	2000	257	99.2	243	99.3	0.0932

Client Information

		Solids:	79.9	%
Project ID:	Coleman Evans	Sample amount:	10.1	g
Sample ID:	DP 558 0925	MS amount:	10.1	g
		MSD amount:	10.7	g

Laboratory Information

Project ID:	G296-180
Sample ID:	G296-180-2A
MS ID:	G296-180-3A
MSD ID:	G296-180-4A

Reviewed By: _____

Extraction by Modified Method 3540C

(Soxhlet with Dean-Stark Adapter - SDS)

Soil 1 of 6

Analytical Method: 8290 1613 8280
1668 680 Other_____

QC Date	QC Batch*	Prev. WG	Workgroup*	Logbook#	Page#
~~30~~-Oct-03	100037	~~10005~~ N/A	WG	10	007

10.13.03

#20	Sample Identification								
	Client* ID	Project* ID	Sample* ID	Container* ID	Sample Matrix	Sample Weight*	ES Amt.* (µL)	MX Amt. (µL)	Analyst (initials)
	N/A	N/A	LMB-10007	N/A	Soil	10.00	40	0	BK
1 10	G515	561	1	A	Soil	5.32	40	0	
2 11	G349	85	1	B	Soil	1.01	40	0	
3 12	G349	85	2	B	Soil	1.02	40	0	
4 13	G296	180	2	A	Soil	10.07	40	0	
5 14	G296	180	3	A-MS	Soil	10.10	40	40	
6 15	G296	180	4	A-MSD	Soil	10.72	40	40	
7 16	G296	180	5	A	Soil	10.00	40	0	
8 17	G515	563	1	A	Soil	5.09	40	0	
9 18	G301	134	1	A	Soil	5.12	40	0	
10 19	G301	134	2	A	Soil	5.19	40	0	
11 20	G301	134	3	A	Soil	5.30	40	0	
	N/A	N/A	OPR-10007	N/A	Soil	10.00	40	40	
	N/A	N/A	OPR-10007D	N/A	Soil	10.00	40	40	

10.14.03

Items	Lot #	Conc. (ng/µL)	Witness
Toluene	C4469		
Tridecane	SPL1-5		
Salt	43154324		
Thimbles	30466 10		
Extraction Std.	517-276	0.05	MM
Matrix Spike	517-277	0.005	MM

☐ Pre-Sox? ☑ Tridecane added?

Start Date/Time: 1500 10-13-03

Finish Date/Time: 800 10-14-03

Comments:

* = To be entered in the Prep Table.

DC7.083003.5

☑ Data in prep table?

247

Dry Weight Log

Soil 2 of 6

Sample #	tare*	total*	dry weight 1	dry weight 2*	dry weight 3*	Initials
6515561-1A	1.23 g	start time: 1400 date: ~~10-13-03~~ 10-13-03 12.08 g	time: 800 date: 10.14.03 10.07 g	time: 900 date: 10-14-03 10.07 g	time: date: g	PS
6296-180-2A	1.22 g	start time: 1400 date: 10.13.03 10.00 g	time: 800 date: 10.14.03 8.24 g	time: 900 date: 10-14-03 8.24 g	time: date: g	
6296-180-3A	1.23 g	start time: 1400 date: 10.13.03 935 10.58 g	time: 800 date: 10-14-03 8.71 g	time: 900 date: 10.14.03 80 8.70 g	time: date: g	
6296-180-4A	1.21 g	start time: 1400 ~~date: 10-13-03~~ time: ~~800~~ date: 10-1405 8.53 g	time: 900 date: 10.14.03 74 8.52 g	time: date: g		
6296180-5A	1.22 g	start time: 1400 date: 10-13-03 10.69 g	time: 800 date: 10-14-03 8.01 g	time: 900 date: 10.14.03 8.02 g	time: date: g	
6515-563-1A	1.23 g	start time: 1400 date: 10-13-03 16.14 g	time: 800 date: 10-14-03 8.02 g	time: 900 date: 10-14-03 8.02 g	time: date: g	
6291-134-1A	1.22 g	start time: 1400 date: 101303 10.72 g	time: 800 date: 10-14-03 9.41 g	time: 900 date: 10-14-03 9.42 g	time: date: g	

10.14.03

3 & 4 are missing same samples as 6296-180-2

*= Enter final weight in the Prep Table.

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Extract cleanup by modified method 3630/3620

Silica/florisil

Soil 3of6

	Sample Identification											
	Client ID	Project ID	Sample ID	Container ID	Train	CS Amt.* (µL)	Witness (initials)	Analyzed (%)	Analyst (initials)	Date	Method	Matrix
	N/A	N/A	LMB10007	A	1	✓40	BWS	100	MM	14-Oct-03	8290	Soil
A	G515	561	1	A	2	✓40	↓	100	↓	14-Oct-03	8290	Soil
A	G301	134	1	A	3	✓40	↓	100	↓	14-Oct-03	8290	Soil
A	G301	134	2	A	4	✓40	↓	100	↓	14-Oct-03	8290	Soil
B	G301	134	3	A	5	✓40	↓	100	↓	14-Oct-03	8290	Soil
B	G515	563	1	A	6	✓40	↓	100	↓	14-Oct-03	8290	Soil
B	G349	85	1	B	7	✓40	↓	100	↓	14-Oct-03	8290	Soil
B	G349	85	2	B	8	✓40	↓	100	↓	14-Oct-03	8290	Soil
C	G296	180	2	A	9	✓40	↓	100	↓	14-Oct-03	8290	Soil
C	G296	180	3	A	10	✓40	↓	100	↓	14-Oct-03	8290	Soil
C	N/A	N/A	OPR10007	A	11	✓40	↓	100	↓	14-Oct-03	8290	Soil
C	N/A	N/A	OPRD10007	A	12	✓40	↓	100	↓	14-Oct-03	8290	Soil

Item	Lot #'s	Conc. (ng/µL)
Hexane	CI346	
Methylene Chloride	CI119	
Acid Silica	SPL1-7	
Base Silica	7/18/03	
Silica	SPL1-1B	
Florisil	SPO2578	
Salt	42364305	
Tridecane	N/A	
Cleanup Std.	S18-1	0.01

Comments:

252

DC1.090203.6

* = to be entered in the Prep table.

Log Book: 15 Page: 010

Extract cleanup by modified method 3630/3620

Silica/florisil

Soil 4 of 6

	Sample Identification											
	Client ID	Project ID	Sample ID	Container ID	Train	CS Amt.* (µL)	Witness (initials)	Analyzed (%)	Analyst (initials)	Date	Method	Matrix
A	G296	180	4	A	1	✓40	BWS	100	MM	14-Oct-03	8290	Soil
	G296	180	5	A	2	✓40	↓	100	↓	14-Oct-03	8290	Soil
					3							
					4							
B					5							
					6							
					7							
					8				MM			
					9				10.14.03			
C					10							
					11							
					12							

Item	Lot #'s
Hexane	CI346
Methylene Chloride	CI119
Acid Silica	SPL1-7
Base Silica	7/18/03
Silica	SPL1-1B
Florisil	SPO2578
Salt	42364305
Tridecane	N/A
Cleanup Std.	518-1

Conc. (ng/µL)
0.01

Comments:

DC1.090203.6

* = to be entered in the Prep table.

Log Book: 15 Page: 011

Cleanup Observation Form

Soil 5of6

Reference: PCU Log

Log:	Page:
15	010

	Train					
	7	8	9	10	11	12
Silica	☐ Clear/Colorless ☐ Brown 2 ☐ ____ ____ ☐ ____ ____ Travel 1	☐ Clear/Colorless ☐ Brown 1 ☐ ____ ____ ☐ ____ ____ Travel 1	☐ Clear/Colorless ☐ Brown 2 ☐ ____ ____ ☐ ____ ____ Travel 2	☐ Clear/Colorless ☐ Brown 2 ☐ ____ ____ ☐ ____ ____ Travel 2	☐ Clear/Colorless ☐ ____ ____ ☐ ____ ____ ☐ ____ ____ Travel ____	☒ Clear/Colorless ☐ ____ ____ ☐ ____ ____ ☐ ____ ____ Travel ____
Acid	☐ Clear/Colorless ☐ purple 1 ☐ ____ ____ ☐ ____ ____ Travel 2	☐ Clear/Colorless ☐ purple 1 ☐ ____ ____ ☐ ____ ____ Travel 1	☐ Clear/Colorless ☐ purple 2 ☐ ____ ____ ☐ ____ ____ Travel 2	☐ Clear/Colorless ☐ purple 2 ☐ ____ ____ ☐ ____ ____ Travel 2	☐ Clear/Colorless ☐ Orange 1 ☐ ____ ____ ☐ ____ ____ Travel 1	☐ Clear/Colorless ☐ Orange 1 ☐ ____ ____ ☐ ____ ____ Travel 1
Base	☒ Clear/Colorless ☐ ____ ____ ☐ ____ ____ ☐ ____ ____ Travel ____	☒ Clear/Colorless ☐ ____ ____ ☐ ____ ____ ☐ ____ ____ Travel ____	☒ Clear/Colorless ☐ ____ ____ ☐ ____ ____ ☐ ____ ____ Travel ____	☒ Clear/Colorless ☐ ____ ____ ☐ ____ ____ ☐ ____ ____ Travel ____	☒ Clear/Colorless ☐ ____ ____ ☐ ____ ____ ☐ ____ ____ Travel ____	☒ Clear/Colorless ☐ ____ ____ ☐ ____ ____ ☐ ____ ____ Travel ____
Florisil	☒ Clear/Colorless ☐ ____ ____ ☐ ____ ____ ☐ ____ ____ Travel ____	☒ Clear/Colorless ☐ ____ ____ ☐ ____ ____ ☐ ____ ____ Travel ____	☒ Clear/Colorless ☐ ____ ____ ☐ ____ ____ ☐ ____ ____ Travel ____	☒ Clear/Colorless ☐ ____ ____ ☐ ____ ____ ☐ ____ ____ Travel ____	☒ Clear/Colorless ☐ ____ ____ ☐ ____ ____ ☐ ____ ____ Travel ____	☒ Clear/Colorless ☐ ____ ____ ☐ ____ ____ ☐ ____ ____ Travel ____
Extract	☒ Clear/Colorless ☐ ____ ____	☒ Clear/Colorless ☐ ____ ____	☒ Clear/Colorless ☐ ____ ____	☒ Clear/Colorless ☐ ____ ____	☒ Clear/Colorless ☐ ____ ____	☒ Clear/Colorless ☐ ____ ____
Sx	G349-85-1B	G349-85-2B	G296-180-2A	G296-180-3A	OPR10007-A	OPRD10007-A
Comments						

Cleanup Observation Form

Soil 6 of 6

Reference: PCU Log

Log:	Page:
15	011

	Train 1	Train 2	Train 3	Train 4	Train 5	Train 6
Silica	☐ Clear/Colorless ☐ Brown 2 ☐ Yellow 1 ☐ Travel 2	☐ Clear/Colorless ☐ Brown 1 ☐ ☐ Travel 1	☐ Clear/Colorless ☐ ☐ ☐ Travel	☐ Clear/Colorless ☐ ☐ ☐ Travel	☐ Clear/Colorless ☐ ☐ ☐ Travel	☐ Clear/Colorless ☐ ☐ ☐ Travel
Acid	☐ Clear/Colorless ☐ purple 3 ☐ ☐ Travel 2	☐ Clear/Colorless ☐ purple 2 ☐ ☐ Travel 1	☐ Clear/Colorless ☐ ☐ ☐ Travel	☐ Clear/Colorless ☐ ☐ ☐ Travel	☐ Clear/Colorless ☐ ☐ ☐ Travel	☐ Clear/Colorless ☐ ☐ ☐ Travel
Base	☒ Clear/Colorless ☐ ☐ ☐ Travel	☒ Clear/Colorless ☐ ☐ ☐ Travel	☐ Clear/Colorless ☐ ☐ ☐ Travel	☐ Clear/Colorless ☐ ☐ ☐ Travel	☐ Clear/Colorless ☐ ☐ ☐ Travel	☐ Clear/Colorless ☐ ☐ ☐ Travel
Florisil	☒ Clear/Colorless ☐ ☐ ☐ Travel	☒ Clear/Colorless ☐ ☐ ☐ Travel	☐ Clear/Colorless ☐ ☐ ☐ Travel	☐ Clear/Colorless ☐ ☐ ☐ Travel	☐ Clear/Colorless ☐ ☐ ☐ Travel	☐ Clear/Colorless ☐ ☐ ☐ Travel
Extract	☒ Clear/Colorless ☐	☒ Clear/Colorless ☐	☐ Clear/Colorless ☐	☐ Clear/Colorless ☐	☐ Clear/Colorless ☐	☐ Clear/Colorless ☐
Sx	G296-180-4A	G296-180-5A	--	--	--	--
Comments						MRH 10-14-03

☐ Continued on next page.

Method 8290 - Blank Results

LMB

MB for EQB

Analytical Data Summary Sheet

Analyte	Adj. MDL (ng/L)	Amount (ng/L)		Adj. RL (ng/L)	EMPC (ng/L)	RT (min.)	Ratio	Qualifier
2,3,7,8-TCDD	0.00493	0.00493	U	0.0100				
1,2,3,7,8-PeCDD	0.0221	0.0221	U	0.0500				
1,2,3,4,7,8-HxCDD	0.00986	0.00986	U	0.0500				
1,2,3,6,7,8-HxCDD	0.0142	0.0142	U	0.0500				
1,2,3,7,8,9-HxCDD	0.0132	0.0132	U	0.0500				
1,2,3,4,6,7,8-HpCDD	0.0124	0.0124	U	0.0500				
OCDD	0.0619	0.0619	U	0.100				
2,3,7,8-TCDF	0.00493	0.00493	U	0.0100				
1,2,3,7,8-PeCDF	0.0221	0.0221	U	0.0500				
2,3,4,7,8-PeCDF	0.0201	0.0201	U	0.0500				
1,2,3,4,7,8-HxCDF	0.0115	0.0115	U	0.0500				
1,2,3,6,7,8-HxCDF	0.0122	0.0122	U	0.0500				
2,3,4,6,7,8-HxCDF	0.0107	0.0107	U	0.0500				
1,2,3,7,8,9-HxCDF	0.0131	0.0131	U	0.0500				
1,2,3,4,6,7,8-HpCDF	0.00962	0.00962	U	0.0500				
1,2,3,4,7,8,9-HpCDF	0.00866	0.00866	U	0.0500				
OCDF	0.0165	0.0165	U	0.100				
Total TCDDs	0.00493	0.00493	U	0.0500				
Total PeCDDs	0.0221	0.0221	U	0.0500				
Total HxCDDs	0.00986	0.00986	U	0.0500				
Total HpCDDs	0.0124	0.0124	U	0.0500				
Total TCDFs	0.00493	0.00493	U	0.0500				
Total PeCDFs	0.0201	0.0201	U	0.0500				
Total HxCDFs	0.0107	0.0107	U	0.0500				
Total HpCDFs	0.00866	0.00866	U	0.0500				
ITEF TEQ (ND=0)		0			0			
ITEF TEQ (ND=½)		0.00475			0.00475			

Laboratory Information

Sample ID:	LMB10010-A
Extraction Date:	15-Oct-03
Analysis Date:	17-Oct-03

Sample Information

Matrix:	Water	
Weight / Volume:	500	mL
Solids / Lipids:	NA	%
Original pH :	5	
Batch ID:	WG10010	
Filename:	a15oct03a_4-6	
Retchk:	a15oct03a_3-14	
Begin ConCal:	a15oct03a_3-14	
End ConCal:	a15oct03a_4-14	
Initial Cal:	m8290-100103b	

Analytical Results
for
Ongoing Precision Result (OPRD)

LCS for EQB

LCSD LCS

Analyte	Spiked pg/ul	AMT pg/ul	Recovery %	#	Range % Lower	Range % Upper	OPR Rec(%)	#	%D	#
2,3,7,8-TCDD	5.00	5.29	106		80.0	120	124	#	15.4	
1,2,3,7,8-PeCDD	25.0	25.3	101		80.0	120	112		9.92	
1,2,3,4,7,8-HxCDD	25.0	23.7	95.0		80.0	120	110		14.3	
1,2,3,6,7,8-HxCDD	25.0	27.6	111		80.0	120	124	#	11.8	
1,2,3,7,8,9-HxCDD	25.0	28.7	115		80.0	120	130	#	12.5	
1,2,3,4,6,7,8-HpCD	25.0	24.6	98.5		80.0	120	109		10.4	
OCDD	50.0	47.1	94.2		80.0	120	106		11.9	
2,3,7,8-TCDF	5.00	5.00	100		80.0	120	115		13.9	
1,2,3,7,8-PeCDF	25.0	25.2	101		80.0	120	114		11.8	
2,3,4,7,8-PeCDF	25.0	24.4	97.7		80.0	120	107		8.62	
1,2,3,4,7,8-HxCDF	25.0	26.9	108		80.0	120	120		10.6	
1,2,3,6,7,8-HxCDF	25.0	27.1	109		80.0	120	123	#	12.5	
2,3,4,6,7,8-HxCDF	25.0	27.2	109		80.0	120	125	#	13.4	
1,2,3,7,8,9-HxCDF	25.0	25.1	100		80.0	120	116		14.2	
1,2,3,4,6,7,8-HpCDF	25.0	25.8	103		80.0	120	116		11.7	
1,2,3,4,7,8,9-HpCDF	25.0	23.1	92.6		80.0	120	107		14.1	
OCDF	50.0	51.3	103		80.0	120	115		11.1	

%D limit is 25%
= Outside URS limits
* = Ion Ratio Out

QC Information

OPR Project No:	OPRD10010
Extraction Date:	15-Oct-03
Analysis Date:	17-OCT-03
Method:	8290

Sample Information

Matrix:	Soil

File Information

OPRD Filename :	a15oct03a_4-5
Retchk:	a15oct03a_3-14
Begin ConCal:	a15oct03a_3-14
End ConCal:	a15oct03a_4-14
Initial Cal:	m8290-100103b

Extraction by Modified Method 3520C

EQB 1 of 5

(Continuous Liquid/Liquid - CLLE)

Analytical Method: (8290) 1613 8280 1613DW 1668 680 Other _____

QC Date	QC Batch*	Prev. WG	Workgroup*	Logbook#	Page#
15-Oct-03	10010	N/A	WG	10	010

	Sample Identification											
#/20	Client ID* ID	Project* ID	Sample*	Container*	Volume*	Sample*	pH*	ES Amt.*	MX Amt. (µL)	Tridecane (100 µL)	CS Amt. (µL)	Analyst (Initials)
	N/A	N/A	LMB10010	N/A	500	5.00	✓	↘ 20	0	✓	↘ 20	BLS
	G341	159	1	A	515	8	✓	↘ 20	0	✓	↘ 20	
	G341	159	2	A	507	8	✓	↘ 20	0	✓	↘ 20	
	G341	159	3	A	517	8	✓	↘ 20	0	✓	↘ 20	
	G341	159	4	A	505	8	✓	↘ 20	0	✓	↘ 20	
	G341	159	5	A	510	8	✓	↘ 20	0	✓	↘ 20	
	G341	159	6	A	505	8	✓	↘ 20	0	✓	↘ 20	
	G341	159	7	A	508	8	✓	↘ 20	0	✓	↘ 20	
	G341	159	8	A	507	8	✓	↘ 20	0	✓	↘ 20	
	G341	159	9	A	510	8	✓	↘ 20	0	✓	↘ 20	
	G341	159	10	A	518	8	✓	↘ 20	0	✓	↘ 20	
	G341	159	11	A	515	8	✓	↘ 20	0	✓	↘ 20	
	G341	159	12	A	508	8	✓	↘ 20	0	✓	↘ 20	
	G341	159	13	A	511	8	✓	↘ 20	0	✓	↘ 20	
	G341	159	14	A	512	8	✓	↘ 20	0	✓	↘ 20	
	G341	159	15	A	513	8	✓	↘ ** 20	0	✓	↘ 20	
	G341	159	16	A	512	8	✓	↘ 20	0	✓	↘ 20	
	G341	159	17	A	501	8	✓	↘ 20	0	✓	↘ 20	
	G341	159	18	A	510	8	✓	↘ 20	0	✓	↘ 20	
	G341	159	19	A-MS	509	8	✓	↘ 20	↘ 20	✓	↘ 20	
	G341	159	20	A-MSD	516	8	✓	↘ 20	↘ 20	✓	↘ 20	
▷	G296	180	1	A	500	6	✓	↘ 20	0	✓	↘ 20	
	N/A	N/A	OPR10010	N/A	500	5.00	✓	↘ 20	↘ 20	✓	↘ 20	
	N/A	N/A	OPRD10010	N/A	500	5.00	✓	↘ 20	↘ * 20	✓	↘ 20	

Items	Lot #	Conc. (ng/µL)	Witness
MeCl	CI 785		
Tridecane	SPLI-5		
Salt	43196331		
H_2SO_4	Y09046		
Extraction Std.	517-276	0.05	MPR
Matrix Spike	517-277	0.005	MPR
Clean-up Std.	518-1	0.01	MPR
DC61.081903.3	Δ 518-5	0.01 mg/kg	MPR

☐ Pre-Sox? ☑ Tridecane added?

Start Date/Time: 10-15-03 9:05

Finish Date/Time: 10-15-03 1335

Comments: * 8290 MX 0.05 ng/µL Lot # 518-7 ES
** 8290 ES 0.005 ng/µL Lot # 518-8 MX

MPR 10-15-03

* = To be entered in the Prep Table.

☑ Data in prep table?

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[redacted] Analytical Laboratories

Home | Login | Prep | [illegible]ples | Reports | Reference | Audit

WG10010

Sample ID	EXT	WG	Tare	Total	Final	Ext Date	%2ms	Final Vol	Init Vol	pH	ES Add	CS Add	% Moisture	QC Batch
G296-180-1		G1001	0	0	0	2003-10-15	100	20	500	6	1	0.2	0	10010
G341-159-1		G1001	0	0	0	2003-10-15	100	20	518	8	1	0.2	0	10010
G341-159-1		G1001	0	0	0	2003-10-15	100	20	515	8	1	0.2	0	10010
G341-159-1		G1001	0	0	0	2003-10-15	100	20	508	8	1	0.2	0	10010
G341-159-1		G1001	0	0	0	2003-10-15	100	20	511	8	1	0.2	0	10010
G341-159-1		G1001	0	0	0	2003-10-15	100	20	512	8	1	0.2	0	10010
G341-159-1		G1001	0	0	0	2003-10-15	100	20	513	8	1	0.2	0	10010
G341-159-1		G1001	0	0	0	2003-10-15	100	20	512	8	1	0.2	0	10010
G341-159-1		G1001	0	0	0	2003-10-15	100	20	501	8	1	0.2	0	10010
G341-159-1		G1001	0	0	0	2003-10-15	100	20	510	8	1	0.2	0	10010
G341-159-1		G1001	0	0	0	2003-10-15	100	20	509	8	1	0.2	0	10010
G341-159-1		G1001	0	0	0	2003-10-15	100	20	515	8	1	0.2	0	10010
G341-159-2		G1001	0	0	0	2003-10-15	100	20	516	8	1	0.2	0	10010
G341-159-2		G1001	0	0	0	2003-10-15	100	20	507	8	1	0.2	0	10010
G341-159-3		G1001	0	0	0	2003-10-15	100	20	517	8	1	0.2	0	10010
G341-159-4		G1001	0	0	0	2003-10-15	100	20	505	8	1	0.2	0	10010
G341-159-5		G1001	0	0	0	2003-10-15	100	20	510	8	1	0.2	0	10010
G341-159-6		G1001	0	0	0	2003-10-15	100	20	505	8	1	0.2	0	10010
G341-159-7		G1001	0	0	0	2003-10-15	100	20	508	8	1	0.2	0	10010
G341-159-8		G1001	0	0	0	2003-10-15	100	20	507	8	1	0.2	0	10010
G341-159-9		G1001	0	0	0	2003-10-15	100	20	510	8	1	0.2	0	10010
LMB10010	LMB	G1001	0	0	0	2003-10-15	100	20	500	5	1	0.2	0	10010

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EQB 3of5

Extract cleanup by modified method 3630/3620

Silica/florisil

	Sample Identification											
	Client ID	Project ID	Sample ID	Container ID	Train	CS Amt.* (µL)	Witness (initials)	Analyzed (%)	Analyst (initials)	Date	Method	Matrix
	N/A	N/A	LMB10010	A	1	0	N/A	100		15-Oct-03	8290	Water
A	G341	159	1	A	2	0	N/A	100		15-Oct-03	8290	Water
	G341	159	2	A	3	0	N/A	100		15-Oct-03	8290	Water
	G341	159	3	A	4	0	N/A	100		15-Oct-03	8290	Water
	G341	159	4	A	5	0	N/A	100		15-Oct-03	8290	Water
B	G341	159	5	A	6	0	N/A	100		15-Oct-03	8290	Water
	G341	159	6	A	7	0	N/A	100		15-Oct-03	8290	Water
	G341	159	7	A	8	0	N/A	100		15-Oct-03	8290	Water
	G341	159	8	A	9	0	N/A	100		15-Oct-03	8290	Water
C	G341	159	9	A	10	0	N/A	100		15-Oct-03	8290	Water
	N/A	N/A	OPR10010	A	11	0	N/A	100		15-Oct-03	8290	Water
	N/A	N/A	OPRD10010	A	12	0	N/A	100		15-Oct-03	8290	Water

Item	Lot #'s	Conc. (ng/µL)
Hexane	CI346	
Methylene Chloride	CI119	
Acid Silica	SPL1-7	
Base Silica	7/18/03	
Silica	SPL1-1B	
Florisil	SPO2578	
Salt	42364305	
Tridecane	N/A	
Cleanup Std.	N/A	

Comments:

DC1.090203.6

* = to be entered in the Prep table.

Log Book: 15 Page: 014

EQB 4 of 5

Extract cleanup by modified method 3630/3620
Silica/florisil

	Sample Identification										
	Client ID	Project ID	Sample ID	Container ID	Train	CS Amt.* (µL)	Witness (initials)	Analyzed (%)	Analyst (initials)	Date	Method	Matrix
A	G341	159	10	A	1	0	N/A	100	MM	16-Oct-03	8290	Water
	G341	159	11	A	2	0	N/A	100		16-Oct-03	8290	Water
	G341	159	12	A	3	0	N/A	100		16-Oct-03	8290	Water
	G341	159	13	A	4	0	N/A	100		16-Oct-03	8290	Water
B	G341	159	14	A	5	0	N/A	100		16-Oct-03	8290	Water
	G341	159	15	A	6	0	N/A	100		16-Oct-03	8290	Water
	G341	159	16	A	7	0	N/A	100		16-Oct-03	8290	Water
	G341	159	17	A	8	0	N/A	100		16-Oct-03	8290	Water
C	G341	159	18	A	9	0	N/A	100		16-Oct-03	8290	Water
	G341	159	19	A	10	0	N/A	100		16-Oct-03	8290	Water
	G341	159	20	A	11	0	N/A	100	✓	16-Oct-03	8290	Water
	G296	180	1	A	12	0	N/A	100		16-Oct-03	8290	Water

Item	Lot #'s
Hexane	CI346
Methylene Chloride	CI119
Acid Silica	SPL1-7
Base Silica	7/18/03
Silica	SPL1-1B
Florisil	SPO2578
Salt	42364305
Tridecane	N/A
Cleanup Std.	N/A

Conc. (ng/µL)

Comments:

187

DC1.090203.6

* = to be entered in the Prep table.

Log Book: 15 Page: 015

Cleanup Observation Form

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Reference: PCU Log

Log:	Page:
15	015

	Train					
	7	8	9	10	11	12
Silica	☐ Clear/Colorless ☐ _____ ___ ☐ _____ ___ ☐ _____ ___ Travel_____	☐ Clear/Colorless ☐ Brown 1 ☐ _____ ___ ☐ _____ ___ Travel 1	☐ Clear/Colorless ☐ _____ ___ ☐ _____ ___ ☐ _____ ___ Travel_____	☐ Clear/Colorless ☐ _____ ___ ☐ _____ ___ ☐ _____ ___ Travel_____	☐ _____ ___ ☐ _____ ___ ☐ _____ ___ Travel_____	☐ _____ ___ ☐ _____ ___ ☐ _____ ___ Travel_____
Acid	☐ Clear/Colorless ☐ _____ ___ ☐ _____ ___ ☐ _____ ___ Travel_____	☐ Clear/Colorless ☐ _____ ___ ☐ _____ ___ ☐ _____ ___ Travel_____	☐ Clear/Colorless ☐ _____ ___ ☐ _____ ___ ☐ _____ ___ Travel_____	☐ Clear/Colorless ☐ _____ ___ ☐ _____ ___ ☐ _____ ___ Travel_____	☐ Clear/Colorless ☐ _____ ___ ☐ _____ ___ ☐ _____ ___ Travel_____	☐ Clear/Colorless ☐ _____ ___ ☐ _____ ___ ☐ _____ ___ Travel_____
Base	☐ Clear/Colorless ☐ _____ ___ ☐ _____ ___ ☐ _____ ___ Travel_____	☐ Clear/Colorless ☐ _____ ___ ☐ _____ ___ ☐ _____ ___ Travel_____	☐ Clear/Colorless ☐ _____ ___ ☐ _____ ___ ☐ _____ ___ Travel_____	☐ Clear/Colorless ☐ _____ ___ ☐ _____ ___ ☐ _____ ___ Travel_____	☐ Clear/Colorless ☐ _____ ___ ☐ _____ ___ ☐ _____ ___ Travel_____	☐ Clear/Colorless ☐ _____ ___ ☐ _____ ___ ☐ _____ ___ Travel_____
Florisil	☐ Clear/Colorless ☐ _____ ___ ☐ _____ ___ ☐ _____ ___ Travel_____	☐ Clear/Colorless ☐ _____ ___ ☐ _____ ___ ☐ _____ ___ Travel_____	☐ Clear/Colorless ☐ _____ ___ ☐ _____ ___ ☐ _____ ___ Travel_____	☐ Clear/Colorless ☐ _____ ___ ☐ _____ ___ ☐ _____ ___ Travel_____	☐ Clear/Colorless ☐ _____ ___ ☐ _____ ___ ☐ _____ ___ Travel_____	☐ Clear/Colorless ☐ _____ ___ ☐ _____ ___ ☐ _____ ___ Travel_____
Extract	☐ Clear/Colorless ☐ _____ ___	☐ Clear/Colorless ☐ _____ ___	☐ Clear/Colorless ☐ _____ ___	☐ Clear/Colorless ☐ _____ ___	☐ Clear/Colorless ☐ _____ ___	☐ Clear/Colorless ☐ _____ ___
Sx	G341-159-16A	G341-159-17A	G341-159-18A	G341-159-19A	G341-159-20A	G296-180-1A
Comments						EB

Table 1. Concentration in ppt

PAL Project: G296-180

Analyte	LMB LMB10010-A_8290	EQB-4 G296-180-1A_8290	LMB LMB10007-A_8290	13SB9A G296-180-2A_8290	SBD9 G296-180-5A_8290
2,3,7,8-TCDD	(0.0100)	(0.0100)	(0.500)	(1.24)	(1.39)
1,2,3,7,8-PeCDD	(0.0500)	(0.0500)	(2.50)	[0.656]	(6.97)
1,2,3,4,7,8-HxCDD	(0.0500)	(0.0500)	(2.50)	0.735	[0.477]
1,2,3,6,7,8-HxCDD	(0.0500)	(0.0500)	(2.50)	2.24	1.04
1,2,3,7,8,9-HxCDD	(0.0500)	(0.0500)	(2.50)	2.33	[1.37]
1,2,3,4,6,7,8-HpCDD	(0.0500)	(0.0500)	(2.50)	50.0	40.6
OCDD	(0.100)	(0.100)	(5.00)	1520	2900
2,3,7,8-TCDF	(0.0100)	(0.0100)	(0.500)	0.842	0.220
1,2,3,7,8-PeCDF	(0.0500)	(0.0500)	(2.50)	0.450	(6.97)
2,3,4,7,8-PeCDF	(0.0500)	(0.0500)	(2.50)	0.574	(6.97)
1,2,3,4,7,8-HxCDF	(0.0500)	(0.0500)	(2.50)	0.681	[0.276]
1,2,3,6,7,8-HxCDF	(0.0500)	(0.0500)	(2.50)	0.534	0.243
2,3,4,6,7,8-HxCDF	(0.0500)	(0.0500)	(2.50)	0.494	(6.97)
1,2,3,7,8,9-HxCDF	(0.0500)	(0.0500)	(2.50)	(6.21)	(6.97)
1,2,3,4,6,7,8-HpCDF	(0.0500)	(0.0500)	(2.50)	5.11	2.14
1,2,3,4,7,8,9-HpCDF	(0.0500)	(0.0500)	(2.50)	[0.46]	(6.97)
OCDF	(0.100)	(0.100)	(5.00)	11.2	4.35
Total TCDDs	(0.0500)	(0.0500)	(2.50)	1.08	[0.399]
Total PeCDDs	(0.0500)	(0.0500)	(2.50)	3.82	2.57
Total HxCDDs	(0.0500)	(0.0500)	(2.50)	21.6	10.5
Total HpCDDs	(0.0500)	(0.0500)	(2.50)	96.8	93.9
Total TCDFs	(0.0500)	0.00768	(2.50)	7.11	1.07
Total PeCDFs	(0.0500)	(0.0500)	(2.50)	4.85	0.921
Total HxCDFs	(0.0500)	(0.0500)	(2.50)	8.31	2.18
Total HpCDFs	(0.0500)	(0.0500)	(2.50)	13.0	4.88
Total PCDD/Fs	0.0000	0.00768	0.0000	1690	3020
TEQ (ND=0)	0.0000	0.0000	0.0000	3.18	3.48
TEQ (ND=½)	0.00475	0.00461	0.196	3.43	3.89
TEQ w/EMPC (ND=0)	0.0000	0.0000	0.0000	3.51	3.69
TEQ w/EMPC (ND=½)	0.00475	0.00461	0.196	3.69	4.05

Note:
( ) = ND using DL value.
[ ] = EMPC value.

Table 2: Toxic Equivalency Factors

Analyte	World Health Organization	International-89	MADEP
2,3,7,8-TCDD	1	1	1
1,2,3,7,8-PeCDD	1	0.5	0.5
1,2,3,4,7,8-HxCDD	0.1	0.1	0.1
1,2,3,6,7,8-HxCDD	0.1	0.1	0.1
1,2,3,7,8,9-HxCDD	0.1	0.1	0.1
1,2,3,4,6,7,8-HpCDD	0.01	0.01	0.1
OCDD	0.0001	0.001	0.001
2,3,7,8-TCDF	0.1	0.1	0.1
1,2,3,7,8-PeCDF	0.05	0.05	0.5
2,3,4,7,8-PeCDF	0.5	0.5	0.5
1,2,3,4,7,8-HxCDF	0.1	0.1	0.1
1,2,3,6,7,8-HxCDF	0.1	0.1	0.1
2,3,4,6,7,8-HxCDF	0.1	0.1	0.1
1,2,3,7,8,9-HxCDF	0.1	0.1	0.1
1,2,3,4,6,7,8-HpCDF	0.01	0.01	0.1
1,2,3,4,7,8,9-HpCDF	0.01	0.01	0.1
OCDF	0.0001	0.001	0.001

G296-180

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1142

Project Number	Project Name
09604 317	RFAAP

Project Contact (Name and Phone Number): Darree Renne (804) 965 9000

Samplers: Brett Fisher / John Spangler

LAB: Paradigm

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, 8332)	Dioxin/Furan(8290)	TAL Metals (Including Mercury)	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	Paint Filter (9095B)	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
EQB-4	10/9/03 1620	5 ✓		X	4	F	U	2							X								

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
[signature]	10/9/03 1800				
Relinquished by:	Date/time	Received by: (for lab) [signature]	Date/Time 10/10/03 1605 3.6°C	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

Radford Army Ammunition Plant
Chain Of Custody Record

G296-480

№ 1146

Project Number	Project Name
09604.317	RFAAP

Project Contact (Name and Phone Number): Darren Rennie (804) 765 9000

Samplers: Brett Fisher / John Spayler

LAB: Paradigm

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, 8332)	Dioxin/Furan(8290)	TAL Metals (Including Mercury)	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	Paint Filter (9095B)	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
13589 A	10/9/03 1400	15		X	5	F	/	2							X								
5BD9	10/9/03	15		X	5	F	/	2							X								
13589A MS	10/9/03 1400	15		X	5	F	/	2							X								
13589A MSD	10/9/03 1400	15		X	5	P	/	2							X								

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
Brett Fisher	10/9/03 1800				
Relinquished by:	Date/time	Received by: (for lab) Julie Johnson	Date/Time 10/10/03 1005 3.6°C	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

6

Paradigm Analytical Laboratories

Cust Proj ID: Radford Army Ammunition Plant
Client Name: URS Greiner Woodward Clyde

G296-180

Due Date: 2003-10-31 17:00:00
Login Date: 2003-10-10 11:40:16

Sample ID		Cust Sample ID	PRI	Date Collected	Date Received	Date Due	Matrix	LOC	DEPT	Report	Analysis	Status
G296-180-1	A	EQB-4	STD	2003-10-09 16:20:00	2003-10-10	2003-10-31 17:00:00	Water	W2	17	Full	8290	PR::NEED
	B							W2	17		8290	
G296-180-2	A	13SB9A	STD	2003-10-09 14:00:00	2003-10-10	2003-10-31 17:00:00	Soil	W2	17	Full	8290	PR::NEED
	B							W2	17		8290	
G296-180-3	A	13SB9A MS	STD	2003-10-09 14:00:00	2003-10-10	2003-10-31 17:00:00	Soil	W2	17	Full	8290	PR::NEED
	B							W2	17		8290	
G296-180-4	A	13SB9A MSD	STD	2003-10-09 14:00:00	2003-10-10	2003-10-31 17:00:00	Soil	W2	17	Full	8290	PR::NEED
	B							W2	17		8290	
G296-180-5	A	SBD9	STD	2003-10-09 00:00:00	2003-10-10	2003-10-31 17:00:00	Soil	W2	17	Full	8290	PR::NEED
	B							W2	17		8290	

Sample Receipt Checklist (SRC)

Paradigm Analytical Labs

Clie[illegible] **JRS Greiner Woodward Clyde** Lab Proj. ID: **G296-180**

Client Proj. ID: **Radford Army Ammunition Plant**

1. X Shipped
__ Hand De[illegible]ered
Notes: _____

2. __ Proper, f[illegible] and complete documentation
(unique sa[illegible]le identification on durable label with indelible ink, location [illegible] collection, date/time of collection, collector's name, pre[illegible]rvation type, sample type (method/matrix))
X Acceptab[illegible] documentation (but, incomplete)
__ Unacceptable documentation
Notes: _____

3. __ Custody Tape on Container
X No Custody Tape
Notes: _____

4. X Samples Intact*
(are in appropriate container, are not damaged, and do not show signs of contamination)
__ Samples Broken / Leaking
__ VOA Vials Checked for Air Bubbles
Notes: _____

5. X Chilled on Receipt* Actual Temp.(s) in °C: 3.6
__ Ambient on Receipt
__ Walk-in on Ice; Coming down to temp.
__ Received out of temperature protocol
Notes: _____

6. X Sufficient Sample Submitted
__ Insufficient Sample Submitted
Notes: _____

7. X Samples Preserved Correctly*
(see preservative checklist where applicable)
__ Improper Preservative(s)
__ None recommended (N/A)
Notes: _____

8. X Received Within Holding Time
__ Not Received Within Holding Time
__ N/A
Notes: _____

9. X No Discrepancies Noted
__ Discrepancies Noted
Notes: _____

Comments: _____

* = Rejection of sample is required when not marked; Contact client services immediately for a resolution.

Inspected and Logged in by: _____

DC27.091503.3 Date / Time: Fri-10/10/03 12:01

Data Qualifying Codes

Two types of data qualifying codes or flags are applied in the course of the data review. The data validation flags indicate data that are not usable for decision-making, more than normally biased and/or variable, or not representative of field conditions. These codes and their definitions are presented below in the hierarchy stipulated in the USEPA Region III Modifications to the National Functional Guidelines for Data Review (September 1994).

Data Validation Flags

Flag	Interpretation
R	Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.
U	Not detected. The associated number indicates the approximate sample concentration is necessary to be detected.
B	Not detected substantially above the level reported in laboratory or field blanks.
N	Tentative Identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.
J	Analyte present. Reported value may not be accurate or precise.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
UL	Not detected, quantitation limit is probably higher.
NT	Not tested, no analytical result provided.

The other type of code used by URS is a "Reason Code". The reason code indicates the type of quality control failure that led to the application of the data validation flag.

Reason Codes

GC/MS Organics		GC and HPLC Organics		Inorganics and Conventionals	
Code	Interpretation	Code	Interpretation	Code	Interpretation
a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence
b	Bubble found in vial >6mm	b	Instrument performance failure	c	Calibration failure
c	Calibration failure; poor or unstable response	c	Calibration failure; poor or unstable response	d	MS/MSD imprecision
d	MS/MSD imprecision	d	MS/MSD imprecision	e	LCSD imprecision
e	LCSD imprecision	e	LCSD imprecision	f	Field duplicate imprecision
f	Field duplicate imprecision	f	Field duplicate imprecision	h	Holding time violation
h	Holding time violation	g	Dual column confirmation imprecision	k	Laboratory duplicate imprecision
i	Internal standard failure	h	Holding time violation	l	LCS recovery failure
j	Tuning failure or poor mass spectrometer performance	i	Internal standard failure	m	MS/MSD recovery failure
l	LCS recovery failure	l	LCS recovery failure	n	ICS failure
m	MS/MSD recovery failure	m	MS/MSD recovery failure	o	Calibration blank contamination
p	Poor chromatography	p	Poor chromatography	p	Preparation blank contamination
q	Concentration exceeded the linear range of the instrument	q	Concentration exceeded the linear range	q	Concentration exceeded the linear range
r	Linearity failure in initial calibration	r	Linearity failure in initial calibration	r	Linearity failure in calibration or MSA
s	Surrogate failure	s	Surrogate failure	s	Serial dilution failure
t	TIC	u	No confirmation column	v	Post-digestion spike failure
w	Identification criteria failure	w	Retention time failure	w	CRDL Standard Failure
x	Field blank contamination	x	Field blank contamination	x	Field blank contamination
y	Trip blank contamination	z	Method blank contamination	z	Laboratory storage blank contamination
z	Method blank contamination				

Severn Trent Laboratories, Inc.

Perchlorate

DATA VALIDATION REPORT - Level III Review

SDG No.: H3J110144 **Fraction:** Perchlorate

Lab: STL-Knoxville **Project Name:** Radford SSP

Reviewer: Andrea_Sansom **Date:** February 19, 2004

This report presents the findings of a review of the referenced data. The report consists of this summary, copies of data reports with data qualifying flags applied (as required), the completed data validation checklist, supporting documentation, and an explanation of the data qualifying flags employed. The review performed is based on the USEPA Region III Modifications to the National Functional Guidelines for Inorganic Data Review as pertains to the specifics of the analytical method employed and provisions of the approved project-specific QAPP.

Major Anomalies: None.

Minor Anomalies: None.

Correctable Anomalies: None.

Comments: The chain of custody erroneously displayed the identification of the sample collected on 10/10/2003 at 1300 as 13SW1. The label on the sample container correctly displayed the identification of this sample as 13SW3. As directed by the client, the laboratory used the identification from the container label.

All data are usable for their intended purpose based on the data reviewed.

Signed: Andrea Sansom

Andrea Sansom

SAMPLE SUMMARY

H3J110144

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
F2C73	001	13SW3	10/10/03	13:00
F2C75	002	SWD1	10/10/03	13:00
F2C76	003	13SW2	10/10/03	14:00

NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

URS

Client Sample ID: 13SW3

General Chemistry

Lot-Sample #...: H3J110144-001 **Work Order #...:** F2C73 **Matrix.....:** WG
Date Sampled...: 10/10/03 **Date Received..:** 10/11/03

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Perchlorate	ND	1.0	ug/L	KNOX 314.0 MOD	11/03-11/04/03	3309167

Dilution Factor: 1

URS

Client Sample ID: SWD1

General Chemistry

Lot-Sample #...: H3J110144-002 **Work Order #...:** F2C75 **Matrix.....:** WG
Date Sampled...: 10/10/03 **Date Received..:** 10/11/03

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Perchlorate	ND	1.0	ug/L	KNOX 314.0 MOD	11/03-11/04/03	3309167

Dilution Factor: 1

URS

Client Sample ID: 13SW2

General Chemistry

Lot-Sample #...: H3J110144-003 Work Order #...: F2C76 Matrix.....: WG
Date Sampled...: 10/10/03 Date Received..: 10/11/03

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Perchlorate	ND	1.0	ug/L	KNOX 314.0 MOD	11/03-11/04/03	3309167

Dilution Factor: 1

DATA ASSESSMENT WORKSHEET

Reviewer: AS
Date: 2/18//2003
DV Level: **II** **III** **IV** (circle 1)
Review Document:

Perchlorate

EPA method - Modified for USEPA Region III Modifications to NFGs (Inorganic)

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: STL-Knoxville
SDG No.: H3J110144
Test Name: Perchlorate
Method No.: E314.0

1.0 Laboratory Deliverables		**Yes**	**No**	**NA**
1.1a	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.1b	Do sample ID Numbers on COC match those in report?		x	
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. % solids	x		
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		
	Action: Resolve any discrepancies before proceding further.			

Notes:

2.0 Holding Times and Preservation		**Yes**	**No**	**NA**
2.1	Do sample collection, preservation, shipping, and storage condition meet the requirement of the relevant Project Controlling Documents (PCDs)?	x		
	Action: No chemical preservation required.			
2.2	Have technical holding times (28 days), determined from date of sampling to date of analysis (including dilution or reanalysis) been exceeded? If yes, apply J(+)/UJ(-) to all associated analytes.		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, apply J(+)/R(-) to all associated analytes.		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were required blanks (MB) prepared/submitted at the appropriate frequency? If not, note in DV report.	x		
3.2	Do any method blanks have positive results above the MDL? Action: If Yes, positive associated sample results less than 5X the concentration in the blank should be qualified "B" indicating the result is qualitatively suspect.		x	
3.3	After correcting for method blank contamination, do any field/equipment/trip blanks have positive results? If so, apply the same rules given above based on the highest blank value of those associated with the sample.			x

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are five standards included in the calibration curve? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.2	Are all initial calibration correlation coefficients within the control limits (i.e., r > 0.99)? If No, apply "R" to all non-detects; "J" to positive results for all samples associated with the calibration.	x		
4.3	Was a instrument performance check (IPC) analyzed at the matrix conductivity threshold (MCT)? If no, verify that the sample chromatagrams do not display this interference.	x		
4.4	Is the $Pd_{A/H}$ < 25%, % recovery between 80-120%, and the retention time shift < 5%. If No, apply R to all results for sample that display this type of interference.	x		
4.5	Has a continuing calibration verification been analyzed prior and after every 10 samples and at the end of the analysis sequence? Control limit: $\leq \pm$ 15%. If No, apply "R" to all non-detects; "J*" to positive results for all samples associated with the calibration. Positive results are to be used only qualitatively.	x		

Notes:

5.0 Matrix Spikes		Yes	No	NA
5.1	Was a matrix spike analyzed at required frequency per the PCDs?	x		
5.2	Is the %R for the matrix spike and matrix spike duplicate outside the QC limits?		x	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

13SW2

6.0 Laboratory Control Samples (LCS/LCSDs)		Yes	No	NA
6.1	Were LCS analyzed at required frequency per the PCDs?	x		
6.2	Are there any LCS and/or LCSD recoveries outside the QC limits (i.e., 85-115%)?		x	
	If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
6.3	Are there any RPD for LCS/LCSD recoveries outside the QC limits (i.e., 15%)?		x	
	Action: If Yes, J(+) only.			

Notes:

7.0 Field Duplicates		Yes	No	NA
7.1	Was a field duplicate submitted/analyzed at an appropriate frequency of one per ten?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
7.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes: SWD1 and 13SD3 are both non-detect

8.0 Laboratory Duplicates (matrix spike duplicate)		Yes	No	NA
8.1	Was a duplicate analyzed at the correct frequency?	x		
8.2	Are all analyte duplicate results within control limits? If No, J(+) only. Note in DV report any instance where one or another of the pair was positive while the other was negative.	x		

Notes:

9.0 Analyte Identification and Detection Limit Verification		Yes	No	NA
9.1	Do retention times in calibrations and samples fall within appropriately developed and applied windows? If not, look for uniform shifts. Failing that, flag all results "R" as qualitatively suspect.	x		
9.2	Verify quantitative results. Do manual calculations agree with reported values to within rounding error? If not, increase audit. If additional errors are found, require resubmission. Notify PM immediately.	x		
9.3	Do detection/reporting limits meet those required by the QAPP and were they properly adjusted for dilution factors and dry weight equivalent of wet weight aliquot)? If not, note affected sample Ids in DV report.	x		

Notes:

10.0 Data Completeness		Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit: 90%)	x		
10.1.1	Number of samples: 3			
10.1.2	Number of target compounds in each analysis: 1			
10.1.3	Number of results rejected and not reported: 0			
10.1.4	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)			
	% Completeness = 100%			

Notes:

STL Knoxville
Perchlorate Analysis – Conductivity Readings
SOP KNOX-WC-0014, current revision

Date: ~~DFW~~ 11/3/08 **Analyst:** DFW **Conductivity Meter ID:** FISHER (MODEL 09-326-2)

QC Check	Conductance (uS/cm) at 25° C	Acceptance Criteria
Blank	0.43	< 1 uS/cm
Standard KCl Solution (ID: WC-820)	1410.	1380 - 1440 uS/cm
IPC - 4571	4170.	±10% of original conductance (4170.)

	Lot Number	Work Order Number	Conductance (uS/cm) at 25° C	
1	H3J220112	F244M	625.	(pH ~ 7)
2		F244Q	595.	(pH ~ 7)
3		F244T	575.	(pH ~ 7)
4		F244V	468.	(pH ~ 7)
5		F244W	482.	(pH ~ 7)
6		F244X	558.	(pH ~ 7)
7		F2440	711.	(pH ~ 7)
8		F2441	540.	(pH ~ 7)
9	H3J110144	F2C73	135.0	(pH ~ 7)
10		F2C75	135.1	(pH ~ 7)
11		F2C76	140.5	(pH ~ 7)
12	H3J300174	F3Q89	79.4	(pH ~ 6)
13		F3QQF	99.7	(pH ~ 6)
14		F3QQH	100.9	(pH ~ 6)
15	H3J310137	F3T7G	1.46	(pH ~ 6)
16		F3T7W	95.6	(pH ~ 6)
17		F3T7D	100.7	(pH ~ 6)
18				
19				
20				

STL KNOXVILLE
DX 320 IC Runlog

Analyst: DFW
Date: 11/4/03

(BLANK + LCS/LCSD
Sample Preparation Date: 11/3-4/03)

Schedule Number: K04P.SEQ
Method: EPA 314.0
(J31PCAL2.MTH)

Run No.	Lot Number	Sample ID	Matrix	Bench Dilution	Initial Wt / Vol Final Vol
1	IPC/MCT	IPC-4571	H2O	1.0	—
2	ICB/METHOD	BLANK		1.0	100mL/10mL
3	ICCS-4PPB	ICWS-4560		1.0	—
4	LFB/LCS	-4573		1.0	100mL/10.mL
5	" /LCSD	-4574		1.0	
6	H3J110144	F2C73		1.0	
7		F2C75		1.0	
8		F2C76 (MS)		1.0	
9		(MS)		1.0	
10		(MSD)		1.0	
11	CCV=50ppb	ICWS-4562		1.0	—
12	CCB	BLANK		1.0	—
13	H3J300174	F3QP9		1.0	100mL/10mL
14		F3QQF		1.0	
15		F3QQH		1.0	
16	H3J310137	F3T76		1.0	
17		F3T7W		1.0	
18		F3T70		1.0	
19		(MS)		1.0	
20		(MSD)		1.0	
21	CCV=100PPB	ICWS-4563		1.0	—
22	CCB	BLANK		1.0	—
23					
24					
25					
26					
27					
28					
29					
30					
31					

Preventive Maintenance

Daily
- ✓ Check pump and gas pressure
- ✓ Check all lines for crimping, leaks and discoloration

As Needed
- ○ Change column and guard column
- ○ Change column and/or guard column bed support
- ○ Clean conductivity cell
- ○ De-gas pump head when flow is erratic

Other:
- Flow Rate = 1.00 mL/min
- Pressure = ~2415 PSI
- SRS = 300 mA
- Conductance = ~2.2 uS
- Eluent = Perc.-EI-653

MS/MSD Spike Information

Final Sample Volume = 100 ml. / Conc in 10mL

Compound	Spike ID/ppm	ml
Fluoride		
Chloride		
Nitrite-N		
Bromide		
Nitrate-N		
Phosphate-P		
Sulfate		
Perchlorate	ICWL-4558 / (10,000 ppb)	0.10

Comments: IPC/MCT = IPC-4571 A/H=26.6 RT = 15.541
LFB/LCS = ICWS-4573 A/A=25.9

PROJECT NARRATIVE
H3J110144

The results reported herein are applicable to the samples submitted for analysis only.

This report shall not be reproduced except in full, without the written approval of the laboratory.

The original chain of custody documentation is included with this report.

Sample Receipt

The sample ID given on the label and the chain of custody did not match. The client was notified (A. Sansom, 10/14/03) and instructed the laboratory to use the ID on the label.

Quality Control

Unless otherwise noted, all holding times and QC criteria were met and the test results shown in this report meet all applicable NELAC requirements.

STL Knoxville maintains the following certifications, approvals and accreditations: Arkansas DEQ Cert. # 03-049-0, California DHS ELAP Cert. #2423, Colorado DPHE, Connecticut DPH Cert. #PH-0223, Florida DOH Cert. #E87177, Georgia DNR Cert. #906, Hawaii DOH, Illinois EPA Cert. # 000687, Indiana DOH Cert. #C-TN-02, Kansas DHE Cert. # E-10349, Kentucky DEP Lab ID #90101, Louisiana DEQ Cert. #03079, Louisiana DOHH Cert. #LA030024, Maryland DHMH Cert. #277, Massachusetts DEP Cert. #M-TN009, Michigan DEQ Lab ID #9933, New Jersey DEP Cert. #TN001, New York DOH Lab #10781, North Carolina DPH Lab ID #21705, North Carolina DEHNR Cert. #64, Oklahoma DEQ ID #9415, Pennsylvania DEP Cert. # 68-576, South Carolina DHEC Lab ID #84001001, Tennessee DOH Lab ID #02014, Utah DOH Cert. #QUAN3, Virginia DGS Lab ID #00165, Washington DOE Lab #C120, Wisconsin DNR Lab ID #998044300, US Army Corps of Engineers, Naval Facilities Engineering Service Center, US EPA Perchlorate Approval and USDA Soil Permit #S-46424. This list of approvals is subject to change and does not imply that laboratory certification is available for all parameters reported in this environmental sample data report.

#35110144

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1110

Project Number: 09604317

Project Name: RFAAP

Project Contact (Name and Phone Number): Turner Renne (804) 965 9000

Samplers: Brett Fisher / John Spangler

LAB: STL Knoxville

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, 8332)	Dioxin/Furan(8290)	TAL Metals (Including Mercury)	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	Paint Filter (9095B)	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
13SW1	10/10/03 1300	S		X	1	F	U	1									X						
SWD1	10/10/03 —	S		X	1	F	U	1									X						
13SW2	10/10/03 1400	S		X	1	F	U	1									X						
13SW2MS	10/10/03 1400	S		X	1	F	U	1									X						
13SW2MSD	10/10/03 1400	S		X	1	F	U	1									X						
																							Rec'd temp. 3°c
																							Custody Seals intact
																							1 Cooler Fedex #
																							8329 42539642
																							MFH 10-11-03

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
[signature]	10/10/03 1800				
Relinquished by:	Date/time	Received by: (for lab) Matthew J. Howard	Date/Time 10-11-03, 09:15	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

STL KNOXVILLE
SAMPLE RECEIPT/CONDITION UPON RECEIPT ANOMALY CHECKLIST

CLIENT: _____ PROJECT: _____ Lot No.: 143J110149

TO BE COMPLETED BY SAMPLE RECEIPT ASSOCIATE:

	YES	NO	NA
1. Sample Receipt:			
a. Do sample container labels match COC? (IDs, Dates, Times)	—	✓	—
b. Is the cooler temperature within acceptance limits? (NOTE: North Carolina, 1668, 1613B: 0-4°C; VOST: 10°C)	✓	—	—
c. Were samples received with correct chemical preservative (excluding Encore)?	✓	—	—
d. Were custody seals present/intact on cooler and/or containers?	✓	—	
e. Were all of the samples listed on the COC received?	✓	—	—
f. Were all of the sample containers received intact?	✓	—	—
g. Were containers received for VOAs received without headspace?	—	—	✓
h. Were samples received in the appropriate containers?	✓	—	—
i. Did you check for residual chlorine, if necessary?	—	—	✓
j. Were samples received within 1/2 of the holding time?	✓	—	—
k. Were samples screened for radioactivity?	—		✓
l. For aqueous samples for SOG tests (i.e., 1613B, 1668A, 8290, LR PAHs), does the sample(s) have visible solids present?	—	—	✓
If yes, was SOG staff notified?	—		✓
m. Were client's sample documents (RFA/COC) received?	✓	—	—
n. Has the RFA/COC been relinquished? (Signed, Dated, Timed)	✓	—	—
o. Are test/parameters listed for each sample?	✓	—	—
p. Is the matrix of the samples noted?	✓	—	—
q. Is the date/time of sample collection noted?	✓	—	—
r. Is the client and project name/No. identified?	✓	—	—
s. Was the sampler identified on the RFA/COC?	✓	—	

SAMPLE RECEIVING ASSOCIATE: Matthew F. Howard DATE: 10-11-03

TO BE COMPLETED BY PROJECT MANAGER :

	YES	NO	NA
1. Project manager "Sample Greet":			
a. Quote number to be logged-in under 50903			
b. Informed Login associates of special instructions ?	—	—	X

PROJECT MANAGER : jm DATE: 10/13/03

Client Sample ID	Analysis Requested	Condition (See Legend)	Comments/Action
135w1	314.0	19	Sample ID: 135w3 use label

☒ Client informed on 10/14/03 by email. Person contacted: A Sansom.
☑ Noted actions in comments section above.
☐ No action necessary; process as is.
Project Manager: jm Date: 10/14/03

QA026R12.doc, 8/11/03

STL KNOXVILLE
SAMPLE RECEIPT/CONDITION UPON RECEIPT ANOMALY CHECKLIST
LEGEND

Lot No.: H3J160144

Item	Condition
Cooler:	1a Not received, COC available
	1b Leaking
	1c Other:_____
Temperature:	2a Temp Blank = _____
	2b Cooler Temp = _____
	(cooler temp should be used only if there is no temp blank)
Container:	3a Leaking
	3b Broken
	3c Extra
	3d No labels
	3e Headspace (VOA only)
	3f Other: _____
Samples:	4a Samples received but not on COC
	4b Samples not received but on COC
	4c Holding time expired
	4d Sample received with < ½ holding time remaining
	4e Sample preservative: _____
	4f Other: _____
Custody Seals:	5a None
	5b Not intact
	5c Other:_____
Chain of Custody (COC):	6a Not relinquished by client
	6b Incomplete information
	6c Other:_____
Container Labels:	(7a) Doesn't match COC
	7b Incomplete information
	7c Marking smeared
	7d Label torn
	7e Other:_____

Other (8): _____

_____

_____

_____

Data Qualifying Codes

Two types of data qualifying codes or flags are applied in the course of the data review. The data validation flags indicate data that are not usable for decision-making, more than normally biased and/or variable, or not representative of field conditions. These codes and their definitions are presented below in the hierarchy stipulated in the USEPA Region III Modifications to the National Functional Guidelines for Data Review (September 1994).

Data Validation Flags

Flag	Interpretation
R	Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.
U	Not detected. The associated number indicates the approximate sample concentration is necessary to be detected.
B	Not detected substantially above the level reported in laboratory or field blanks.
N	Tentative Identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.
J	Analyte present. Reported value may not be accurate or precise.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
UL	Not detected, quantitation limit is probably higher.
NT	Not tested, no analytical result provided.

The other type of code used by URS is a "Reason Code". The reason code indicates the type of quality control failure that led to the application of the data validation flag.

Reason Codes

GC/MS Organics		GC and HPLC Organics		Inorganics and Conventionals	
Code	Interpretation	Code	Interpretation	Code	Interpretation
a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence
b	Bubble found in vial >6mm	b	Instrument performance failure	c	Calibration failure
c	Calibration failure; poor or unstable response	c	Calibration failure; poor or unstable response	d	MS/MSD imprecision
d	MS/MSD imprecision	d	MS/MSD imprecision	e	LCSD imprecision
e	LCSD imprecision	e	LCSD imprecision	f	Field duplicate imprecision
f	Field duplicate imprecision	f	Field duplicate imprecision	h	Holding time violation
h	Holding time violation	g	Dual column confirmation imprecision	k	Laboratory duplicate imprecision
i	Internal standard failure	h	Holding time violation	l	LCS recovery failure
j	Tuning failure or poor mass spectrometer performance	i	Internal standard failure	m	MS/MSD recovery failure
l	LCS recovery failure	l	LCS recovery failure	n	ICS failure
m	MS/MSD recovery failure	m	MS/MSD recovery failure	o	Calibration blank contamination
p	Poor chromatography	p	Poor chromatography	p	Preparation blank contamination
q	Concentration exceeded the linear range of the instrument	q	Concentration exceeded the linear range	q	Concentration exceeded the linear range
r	Linearity failure in initial calibration	r	Linearity failure in initial calibration	r	Linearity failure in calibration or MSA
s	Surrogate failure	s	Surrogate failure	s	Serial dilution failure
t	TIC	u	No confirmation column	v	Post-digestion spike failure
w	Identification criteria failure	w	Retention time failure	w	CRDL Standard Failure
x	Field blank contamination	x	Field blank contamination	x	Field blank contamination
y	Trip blank contamination	z	Method blank contamination	z	Laboratory storage blank contamination
z	Method blank contamination				

APPENDIX K.2

ADDITIONAL INVESTIGATION SAMPLING – APRIL 2006
DATA VALIDATION REPORTS
AND LABORATORY ANALYTICAL DATA (FORM I)

TriMatrix Laboratories, Inc.

VOCs, SVOCs, Pesticides, PCBs, Explosives,
PETN, Nitroglycerin, Metals, and Cyanide

DATA VALIDATION REPORT - Level III Review

SDG No.: 36440-27 **Fraction:** _VOCs,_SVOCs,_Pest,_PCBs,_Explosives, _PETN,_Nitroglycerin,_Metals,_Hg,_& _CN

Lab: TriMatrix **Project Name:** Radford_SSP

Reviewer: LAM **Date:** June 29, 2006 (revision 1)

This report presents the findings of a review of the referenced data. The report consists of this summary, copies of data reports with data qualifying flags applied (as required), the completed data validation checklist, supporting documentation, and an explanation of the data qualifying flags employed. The review performed is based on the USEPA Region III Modifications to the National Functional Guidelines for Organic and Inorganic Data Review as pertains to the specifics of the analytical methods employed and provisions of the approved project-specific Quality Assurance Project Plan (QAPP).

Major Anomalies:

For the pesticide analyses, the second source calibration displayed a percent recovery greater than the upper control limit of 75% for methoxychlor at 128%. All associated field results were non-detect and were flagged "R,c."

For the PCB analyses, the laboratory control sample displayed a percent recovery less than the lower control limit of 63% for PCB-1016 at 56% on the confirmation column. All associated field sample results were non-detect and were flagged "R,l."

Minor Anomalies:

For the VOC analyses, cooler TM 1373 temperature was recorded at 10.1°C upon arrival. No data qualifying action was taken on temperature limit exceedance of 0.1°C.

The aqueous method blank displayed positive detections for acetone at 2.9 µg/L and methylene chloride at 0.55 µg/L. The associated equipment and trip blank results less than ten times the blank concentrations were flagged "B,z."

The soil method blanks displayed positive detections for acetone, 1,3-dichlorobenzene, 1,4-dichlorobenzene, 2-butanone, cyclohexane, ethylbenzene, methylene chloride, trichloroethene, toluene, and xylene (total). Positive results less than ten times the blank concentration were flagged "B,z" for acetone, methylene chloride, and 2-butanone in the associated field samples.

The matrix spike pair performed on sample FSB4A displayed percent recoveries less than the lower control limits for acetone (20%) and styrene (14%). The associated parent sample results were flagged "UJ,m", unless previously flagged for method blank contamination. The matrix spike duplicate displayed percent recoveries greater than the upper control limit (i.e., 140%) for acetone at 185%. The associated parent sample result was previously flagged for method blank contamination and no further data qualifying action was taken. The matrix spike duplicate performed on sample FSB4A displayed %RPDs greater than the control limit (i.e., 20%) for acetone (43%), 2-butanone (MEK) (32%), and styrene (122%). The associated parent sample results were previously flagged for method blank contamination and no further data qualifying action was required.

For the SVOC analyses, the aqueous method blank displayed a positive detection for di-n-butyl phthalate at 1.28 µg/L. The associated equipment blank result was non-detect, therefore, no data qualifying action was required.

The associated equipment blank EQBK-1 displayed positive detections for butyl benzyl phthalate, diethylphthalate, and bis(2-ethylhexyl)phthalate. The associated positive field sample results were greater than ten times the blank concentrations and no data qualifying action was required.

Sample ASB5-A displayed concentrations for di-n-butyl phthalate, 2,4-DNT, 2,6-DNT, bis(2-ethylhexyl)phthalate, and n-nitroso-diphenylamine that exceeded the calibration range of the instrument that were flagged "E" by the laboratory. These results were flagged "J,q." This sample was re-analyzed at a dilution factor of 100 with acceptable results for 2,4-DNT and di-n-butyl phthalate that should be used for data interpretation. Results for 2,6-DNT, bis(2-ethylhexly)phthalate, and n-nitroso-diphenylamine were diluted out of the sample. The sample was re-analyzed at a dilution factor of 10 with acceptable results for 2,6-DNT, bis(2-ethylhexyl)phthalate, and n-nitroso-diphenylamine that should be used for data interpretation.

The continuing calibration analyzed on 4/26/2006 at 1549 displayed a percent difference greater than the control limit (i.e. 20%) with a negative bias for 2,4-dinitrophenol at 40%. The continuing calibration analyzed on 4/27/2006 at 1016 displayed percent differences greater than the control limit with a negative bias for 2,4-dinitrophenol at 29% and hexachlorocyclopentadiene at 22.2%. The continuing calibration analyzed on 5/1/2006 at 1042 displayed a percent difference greater than the control limit with a negative bias for benzaldehyde at 28.4%. The associated field sample results were non-detect and were flagged "UJ,c."

The matrix spike pair performed on sample FSB4A displayed percent recoveries less than the lower control limit for 4-nitroaniline (51%/54%). The associated parent sample result was non-detect and was flagged "UJ,m."

The field duplicate pair ASB4-A/DUP-1 displayed results outside the control limits for bis(2-ethylhexyl)phthalate and n-nitroso-diphenylamine. These results were flagged "J,f" in these samples.

For the explosives analyses, the continuing calibration analyzed on 5/5/2006 at 1800 displayed a percent difference greater than the control limit of 15% for octahydro-1,3,5,7-tetranitro-1,3,5,7- with a negative bias at 23.0. The associated field sample result was non-detect and was flagged "UJ,c."

The relative percent differences between the two analytical column concentrations was greater than the control limit (i.e., 40%) for 2,6-DNT at 75% in sample ASB5-A. This compound was flagged "J,g" in this sample.

For the pesticide analyses, several of the continuing calibrations displayed percent differences greater than the control limit of 15% with positive biases. All associated field sample results were non-detect and no data qualifying action was required.

Sample ASB5-A displayed a surrogate percent recovery greater than the upper control limit of 150% for decachlorobiphenyl at 182%. No data qualifying action is required based on one surrogate failure. No data flags were applied.

The matrix spike pair performed on sample FSB4A displayed percent recoveries less than the lower control limit (i.e., 33%) for dieldrin (18%/25%). The associated parent sample result was positive and was flagged "J,m." The matrix spike duplicate displayed percent recoveries greater than the upper control limits for delta-BHC (159%) and heptachlor (159%). The associated parent sample results were non-detect and no data qualifying action was required.

The laboratory control sample displayed percent recoveries greater than the upper control limits for delta-BHC at 190% and heptachlor at 190%. All associated field sample results were non-detect and no data qualifying action was required.

The relative percent differences between the two analytical column concentrations were greater than the control limit (i.e., 40%) for dieldrin for samples FSB4A (106%), ASB4-A (108%), ASB4-B (200%), and DUP-1 (125%). These results were flagged "J,g", unless previously flagged for a matrix spike anomaly.

For the PCB analyses, the surrogate percent recovery in the laboratory control sample was less than the lower control limit for tetrachloro-m-xylene at 30% on the confirmation column. No data qualifying action was required since this was a quality control sample.

For the metals analyses by method 6020, cooler TM1373 containing samples ASB4-A, ASB4-B, ASB4-C, DUP-1, ASB5-A, and ASB5B were recorded at 10.1°C. Results for these samples were flagged "J/UJ,k."

The soil method blanks displayed positive detections for copper, nickel, and vanadium. The associated field sample results were greater than five times the blank concentrations and no data qualifying action was required. The aqueous method blank displayed a positive detection for antimony at 1.3 μg/L. The associated equipment blank EQBK-1 result for antimony was less than five times the blank concentration and was flagged "B,p." The continuing calibration blank also displayed a positive detection for antimony. The associated field sample results were greater than five times the associated calibration blank concentration and no data qualifying action was required.

The matrix spike duplicate performed on sample FSB4A displayed a percent recovery greater than the upper control limit (i.e., 125%) for vanadium at 142%. All associated field sample results were positive and were flagged "K,m," unless previously flagged for temperature limit exceedance.

The serial dilution performed on sample FSB4A displayed percent differences greater than the control limit (i.e., 10%) for copper at 16.1% and nickel at 12.9%. All associated field sample results were positive and were flagged "J,s", unless previously flagged for temperature limit exceedance.

For the metals analyses by method 6010, cooler TM1373 containing samples ASB4-A, ASB4-B, ASB4-C, DUP-1, ASB5-A, and ASB5B were recorded at 10.1°C. Results for these samples were flagged "J/UJ,k."

The soil method blanks displayed positive detections for barium, magnesium, and potassium. The associated field sample results were greater than five times the blank concentrations and no data qualifying action was required. The aqueous method blank displayed a positive detection for zinc. The associated equipment blank result was less than five times the method blank concentration and was flagged "B,p."

The matrix spike performed on sample FSB4A displayed percent recoveries less than the lower control limit (i.e., 75%) for calcium (-31%/-40%), magnesium (16%/22%), manganese (-628%/-92%), zinc (-268%/-20%), iron (-2000%/-2400%), and aluminum (2400%/2080%). All sample concentrations are more than four times the spike amount and no data qualifying action is required.

For the mercury analyses, cooler TM1373 containing samples ASB4-A, ASB4-B, ASB4-C, DUP-1, ASB5-A, and ASB5B were recorded at 10.1°C. Results for these samples were flagged "J/UJ,k."

Correctable Anomalies: None.

Comments: No anomalies were encountered if a given fraction was not mentioned. All data are usable, as qualified, for their intended purpose based on the data reviewed.

Signed: Lee A. Marek

Errata Sheet

Incorrect field sample IDs were assigned to three samples in SDG 36440-27:

Original Field Sample Name	Correct Field Sample Name	Laboratory Sample ID
FSB3A	FSB4A	0604361-01
FSB3B	FSB4B	0604361-02
FSB3C	FSB4C	0604361-03

With the exception of the SDG Narrative, Sample ID Summary forms, and Analysis Data Sheets (aka Form 1's) in which the original name has been replaced by the correct name, remaining instances of the original field sample name in the report have not been corrected but should be considered as changed.

SSP
Radford Army Ammunition Plant
Duplicate Statistics

ASB4-A and DUP-1

	Units	RL	5xRL	Sample Conc		Duplicate Conc		%RPD	Delta	4xRL	Pass/ Fail
VOCs											
Acetone	ug/kg	970	4850.0	380	J	380	J	0.0%	0	3880.0	P
Benzene	ug/kg	65	325.0	13	J	0		200.0%	13	260.0	P
Ethylbenzene	ug/kg	65	325.0	15	J	0		200.0%	15	260.0	P
Methyl Acetate	ug/kg	320	1600.0	85	J	89	J	4.6%	4	1280.0	P
Methylene Chloride	ug/kg	320	1600.0	94	J	97	J	3.1%	3	1280.0	P
Toluene	ug/kg	64	320.0	81		0		200.0%	81	256.0	P
Xylene (total)	ug/kg	190.0	950.0	100	J	0		200.0%	100	760.0	P
SVOCs											
Di-n-butyl Phthalate	ug/kg	22.0	110.0	150.00		100.0		40.0%	50	88	P
Diethyl Phthalate	ug/kg	22.0	110.0	26.00		6.8	J	117.1%	19.2	88	P
Di-n-octyl Phthalate	ug/kg	22.0	110.0	14.00	J	12.0	J	15.4%	2	88	P
Bis(2-ethylhexyl) Phthalate	ug/kg	88.0	440.0	160.00		310.0		63.8%	150	352	F
N-nitroso-diphenylamine	ug/kg	22.0	110.0	1000.00		340.0		98.5%	660	88	F
Pesticides											
Dieldrin	ug/kg	26.0	130.0	14.00	J	3.2	J	125.6%	10.8	104	P
PCBs											
PCB-1254	ug/kg	43.0	215.0	200.00		30.0	J	147.8%	170	172	P
Metals											
Aluminum	mg/kg	2500	12500	33000.0		28000.0		16.4%	5000	10000.00	P
Barium	mg/kg	5	25	67.0		57.0		16.1%	10	20	P
Beryllium	mg/kg	1	5	0.55	J	0.64	J	15.1%	0.09	4.000	P
Calcium	mg/kg	250	1250	2200.0		2100.0		4.7%	100	1000	P
Chromium	mg/kg	5	25	29.0		43.0		38.9%	14	20.0000	P
Cobalt	mg/kg	1	5	6.2		6.2		0.0%	0	4	P
Iron	mg/kg	1000	5000	40000.0		66000.0		49.1%	26000	4000.00	P
Magnesium	mg/kg	250	1250	2600.0		2400.0		8.0%	200	1000	P
Manganese	mg/kg	10	50	290.0		350.0		18.8%	60	40.00	P
Potassium	mg/kg	100	500	1600.0		1500.0		6.5%	100	400	P
Sodium	mg/kg	100	500	120.0		49.0	J	84.0%	71	400.00	P
Zinc	mg/kg	20	100	76.0		140.0		59.3%	64	80.00	P
Arsenic	mg/kg	0.40	2	2.0		1.7		16.2%	0.3	1.60	P
Cadmium	mg/kg	1	5	0.076	J	0.17	J	76.4%	0.094	4.00	P
Copper	mg/kg	20	100	460.0		560.0		19.6%	100	80	P
Lead	mg/kg	1	5	30.0		34.0		12.5%	4	4.000	P
Nickel	mg/kg	0.5	3	16.0		13.0		20.7%	3	2.000	P
Selenium	mg/kg	1	5	0.0		0.07	J	200.0%	0.07	4.000	P
Silver	mg/kg	3	15	0.1	J	0.065	J	42.4%	0.035	12.000	P
Thallium	mg/kg	0.5	3	0.32	J	0.24	J	28.6%	0.08	2.000	P
Vanadium	mg/kg	2	10	91.0		75.0		19.3%	16	8.000	P
Antimony	mg/kg	0.5	3	0.1	J	0.24	J	82.4%	0.14	2.000	P
Mercury	mg/kg	0.1	0.5	0.041	J	0.035	J	15.8%	0.006	0.400	P

Control limit

[sample]>5xRL use 50%
[sample]<5xRL use Delta <4X RL

SAMPLE ID SUMMARY

USEPA-8260B

REVISED KH 6/22/06

Laboratory: TriMatrix Laboratories, Inc.

SDG: 36440-27

Client: URS Group, Inc.

Project: RFAAP SSP Investigation

Client Sample Id:	Lab Sample Id:
FSB4A	0604361-01
FSB4B	0604361-02
FSB4C	0604361-03
EQBK-1	0604361-04
Trip blank	0604361-05
ASB4-A	0604426-01
ASB4-B	0604426-02
ASB4-C	0604426-03
DUP-1 → ASB4A	0604426-04
ASB5-A	0604426-05
ASB5-B	0604426-06

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

FSB4A

REVISED
KH 6/22/06

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604361-01 File ID: 36101.D

Sampled: 04/19/06 09:20 Prepared: 04/24/06 08:00 Analyzed: 04/27/06 13:23

Solids: 78.00 Preparation: 5030B Aqueous Purge & Initial/Final: 4.8 g / 5 mL

QC Batch: 0604822 Sequence: 6050109 Calibration: 6E01003 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	140	26	6.4	B
71-43-2	Benzene	1	6.4	6.4	0.25	U
74-97-5	Bromochloromethane	1	6.4	6.4	0.26	U
75-27-4	Bromodichloromethane	1	6.4	6.4	0.36	U
75-25-2	Bromoform	1	6.4	6.4	0.14	U
74-83-9	Bromomethane	1	1.2	6.4	0.40	J
75-15-0	Carbon Disulfide	1	6.4	6.4	0.37	U
56-23-5	Carbon Tetrachloride	1	6.4	6.4	0.47	U
108-90-7	Chlorobenzene	1	6.4	6.4	0.081	U
75-00-3	Chloroethane	1	6.4	6.4	0.68	U
67-66-3	Chloroform	1	6.4	6.4	0.33	U
74-87-3	Chloromethane	1	6.4	6.4	0.23	U
110-82-7	Cyclohexane	1	13	13	0.28	U
96-12-8	1,2-Dibromo-3-chloropropane	1	13	13	0.85	U
124-48-1	Dibromochloromethane	1	6.4	6.4	0.11	U
106-93-4	1,2-Dibromoethane	1	6.4	6.4	0.23	U
95-50-1	1,2-Dichlorobenzene	1	6.4	6.4	0.22	U
541-73-1	1,3-Dichlorobenzene	1	6.4	6.4	0.12	U
106-46-7	1,4-Dichlorobenzene	1	6.4	6.4	0.21	U
75-71-8	Dichlorodifluoromethane	1	6.4	6.4	0.47	U
75-34-3	1,1-Dichloroethane	1	6.4	6.4	0.64	U
107-06-2	1,2-Dichloroethane	1	6.4	6.4	0.17	U
75-35-4	1,1-Dichloroethene	1	6.4	6.4	0.63	U
156-59-2	cis-1,2-Dichloroethene	1	6.4	6.4	0.28	U
156-60-5	trans-1,2-Dichloroethene	1	6.4	6.4	0.21	U
78-87-5	1,2-Dichloropropane	1	6.4	6.4	0.37	U
10061-01-5	cis-1,3-Dichloropropene	1	6.4	6.4	0.34	U
10061-02-6	trans-1,3-Dichloropropene	1	6.4	6.4	0.36	U
100-41-4	Ethylbenzene	1	6.4	6.4	0.17	U
591-78-6	2-Hexanone	1	13	13	0.90	U
98-82-8	Isopropylbenzene	1	6.4	6.4	0.31	U
79-20-9	Methyl Acetate	1	26	26	0.47	U
1634-04-4	Methyl tert-Butyl Ether	1	6.4	6.4	0.32	U
108-87-2	Methylcyclohexane	1	13	13	0.41	U

B, Z

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

FSB4A

REVISED MD 6/22/06

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604361-01 File ID: 36101.D

Sampled: 04/19/06 09:20 Prepared: 04/24/06 08:00 Analyzed: 04/27/06 13:23

Solids: 78.00 Preparation: 5030B Aqueous Purge & Initial/Final: 4.8 g / 5 mL

QC Batch: 0604822 Sequence: 6050109 Calibration: 6E01003 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
75-09-2	Methylene Chloride	1	26	26	4.1	U
78-93-3	2-Butanone (MEK)	1	25	26	3.7	JB
108-10-1	4-Methyl-2-pentanone (MIBK)	1	13	13	0.82	U
100-42-5	Styrene	1	6.4	6.4	0.059	U
79-34-5	1,1,2,2-Tetrachloroethane	1	6.4	6.4	0.39	U
127-18-4	Tetrachloroethene	1	6.4	6.4	0.21	U
108-88-3	Toluene	1	6.4	6.4	0.52	U
87-61-6	1,2,3-Trichlorobenzene	1	6.4	6.4	0.50	U
120-82-1	1,2,4-Trichlorobenzene	1	6.4	6.4	0.50	U
71-55-6	1,1,1-Trichloroethane	1	6.4	6.4	0.52	U
79-00-5	1,1,2-Trichloroethane	1	6.4	6.4	0.49	U
79-01-6	Trichloroethene	1	6.4	6.4	0.16	U
75-69-4	Trichlorofluoromethane	1	6.4	6.4	0.49	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	6.4	6.4	0.43	U
75-01-4	Vinyl Chloride	1	6.4	6.4	0.16	U
1330-20-7	Xylene (Total)	1	6.4	6.4	0.32	U

B, Z

UJ, m

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	40.5	101	78 - 121	
1,2-Dichloroethane-d4	40.0	40.1	100	66 - 124	
Toluene-d8	40.0	40.3	101	85 - 114	
4-Bromofluorobenzene	40.0	40.5	101	69 - 119	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	238178	7.4	248647	7.38	
Chlorobenzene-d5	194093	17.41	205072	17.41	
1,4-Dichlorobenzene-d4	215207	22.43	234301	22.43	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

FSB4B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27

REVISED AH 6/22/06

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604361-02 File ID: 36102.D

Sampled: 04/19/06 09:40 Prepared: 04/24/06 08:00 Analyzed: 04/27/06 14:00

Solids: 83.00 Preparation: 5030B Aqueous Purge & Initial/Final: 4.8 g / 5 mL

QC Batch: 0604822 Sequence: 6050109 Calibration: 6E01003 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	37	24	6.0	B
71-43-2	Benzene	1	6.0	6.0	0.24	U
74-97-5	Bromochloromethane	1	6.0	6.0	0.25	U
75-27-4	Bromodichloromethane	1	6.0	6.0	0.34	U
75-25-2	Bromoform	1	6.0	6.0	0.13	U
74-83-9	Bromomethane	1	6.0	6.0	0.38	U
75-15-0	Carbon Disulfide	1	6.0	6.0	0.35	U
56-23-5	Carbon Tetrachloride	1	6.0	6.0	0.44	U
108-90-7	Chlorobenzene	1	6.0	6.0	0.076	U
75-00-3	Chloroethane	1	6.0	6.0	0.64	U
67-66-3	Chloroform	1	6.0	6.0	0.31	U
74-87-3	Chloromethane	1	6.0	6.0	0.21	U
110-82-7	Cyclohexane	1	12	12	0.27	U
96-12-8	1,2-Dibromo-3-chloropropane	1	12	12	0.80	U
124-48-1	Dibromochloromethane	1	6.0	6.0	0.10	U
106-93-4	1,2-Dibromoethane	1	6.0	6.0	0.22	U
95-50-1	1,2-Dichlorobenzene	1	6.0	6.0	0.21	U
541-73-1	1,3-Dichlorobenzene	1	6.0	6.0	0.11	U
106-46-7	1,4-Dichlorobenzene	1	6.0	6.0	0.20	U
75-71-8	Dichlorodifluoromethane	1	6.0	6.0	0.44	U
75-34-3	1,1-Dichloroethane	1	6.0	6.0	0.60	U
107-06-2	1,2-Dichloroethane	1	6.0	6.0	0.16	U
75-35-4	1,1-Dichloroethene	1	6.0	6.0	0.59	U
156-59-2	cis-1,2-Dichloroethene	1	6.0	6.0	0.26	U
156-60-5	trans-1,2-Dichloroethene	1	6.0	6.0	0.20	U
78-87-5	1,2-Dichloropropane	1	6.0	6.0	0.35	U
10061-01-5	cis-1,3-Dichloropropene	1	6.0	6.0	0.32	U
10061-02-6	trans-1,3-Dichloropropene	1	6.0	6.0	0.34	U
100-41-4	Ethylbenzene	1	6.0	6.0	0.16	U
591-78-6	2-Hexanone	1	12	12	0.84	U
98-82-8	Isopropylbenzene	1	6.0	6.0	0.29	U
79-20-9	Methyl Acetate	1	24	24	0.45	U
1634-04-4	Methyl tert-Butyl Ether	1	6.0	6.0	0.30	U
108-87-2	Methylcyclohexane	1	12	12	0.38	U

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ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

FSB4B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27

REVISED KH 6/22/06

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604361-02 File ID: 36102.D

Sampled: 04/19/06 09:40 Prepared: 04/24/06 08:00 Analyzed: 04/27/06 14:00

Solids: 83.00 Preparation: 5030B Aqueous Purge & Initial/Final: 4.8 g / 5 mL

QC Batch: 0604822 Sequence: 6050109 Calibration: 6E01003 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
75-09-2	Methylene Chloride	1	24	24	3.8	U
78-93-3	2-Butanone (MEK)	1	6.4	24	3.4	JB
108-10-1	4-Methyl-2-pentanone (MIBK)	1	12	12	0.77	U
100-42-5	Styrene	1	6.0	6.0	0.055	U
79-34-5	1,1,2,2-Tetrachloroethane	1	6.0	6.0	0.36	U
127-18-4	Tetrachloroethene	1	6.0	6.0	0.20	U
108-88-3	Toluene	1	6.0	6.0	0.48	U
87-61-6	1,2,3-Trichlorobenzene	1	6.0	6.0	0.47	U
120-82-1	1,2,4-Trichlorobenzene	1	6.0	6.0	0.47	U
71-55-6	1,1,1-Trichloroethane	1	6.0	6.0	0.49	U
79-00-5	1,1,2-Trichloroethane	1	6.0	6.0	0.46	U
79-01-6	Trichloroethene	1	6.0	6.0	0.15	U
75-69-4	Trichlorofluoromethane	1	6.0	6.0	0.46	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	6.0	6.0	0.40	U
75-01-4	Vinyl Chloride	1	6.0	6.0	0.15	U
1330-20-7	Xylene (Total)	1	6.0	6.0	0.30	U

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System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	38.6	96	78 - 121	
1,2-Dichloroethane-d4	40.0	38.9	97	66 - 124	
Toluene-d8	40.0	38.8	97	85 - 114	
4-Bromofluorobenzene	40.0	40.3	101	69 - 119	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	239855	7.39	248647	7.38	
Chlorobenzene-d5	192955	17.41	205072	17.41	
1,4-Dichlorobenzene-d4	216872	22.43	234301	22.43	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

FSB4C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27 4MD REVISED KH 6/22/06

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604361-03 File ID: 36103.D

Sampled: 04/19/06 10:00 Prepared: 04/24/06 08:00 Analyzed: 04/27/06 14:37

Solids: 86.00 Preparation: 5030B Aqueous Purge & Initial/Final: 5.4 g / 5 mL

QC Batch: 0604822 Sequence: 6050109 Calibration: 6E01003 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	110	22	5.3	B
71-43-2	Benzene	1	5.4	5.4	0.21	U
74-97-5	Bromochloromethane	1	5.4	5.4	0.22	U
75-27-4	Bromodichloromethane	1	5.4	5.4	0.31	U
75-25-2	Bromoform	1	5.4	5.4	0.12	U
74-83-9	Bromomethane	1	5.4	5.4	0.34	U
75-15-0	Carbon Disulfide	1	0.71	5.4	0.31	J
56-23-5	Carbon Tetrachloride	1	5.4	5.4	0.39	U
108-90-7	Chlorobenzene	1	5.4	5.4	0.068	U
75-00-3	Chloroethane	1	5.4	5.4	0.57	U
67-66-3	Chloroform	1	5.4	5.4	0.27	U
74-87-3	Chloromethane	1	5.4	5.4	0.19	U
110-82-7	Cyclohexane	1	11	11	0.24	U
96-12-8	1,2-Dibromo-3-chloropropane	1	11	11	0.71	U
124-48-1	Dibromochloromethane	1	5.4	5.4	0.089	U
106-93-4	1,2-Dibromoethane	1	5.4	5.4	0.20	U
95-50-1	1,2-Dichlorobenzene	1	5.4	5.4	0.19	U
541-73-1	1,3-Dichlorobenzene	1	5.4	5.4	0.099	U
106-46-7	1,4-Dichlorobenzene	1	5.4	5.4	0.18	U
75-71-8	Dichlorodifluoromethane	1	5.4	5.4	0.39	U
75-34-3	1,1-Dichloroethane	1	5.4	5.4	0.54	U
107-06-2	1,2-Dichloroethane	1	5.4	5.4	0.15	U
75-35-4	1,1-Dichloroethene	1	5.4	5.4	0.53	U
156-59-2	cis-1,2-Dichloroethene	1	5.4	5.4	0.23	U
156-60-5	trans-1,2-Dichloroethene	1	5.4	5.4	0.18	U
78-87-5	1,2-Dichloropropane	1	5.4	5.4	0.31	U
10061-01-5	cis-1,3-Dichloropropene	1	5.4	5.4	0.28	U
10061-02-6	trans-1,3-Dichloropropene	1	5.4	5.4	0.30	U
100-41-4	Ethylbenzene	1	5.4	5.4	0.14	U
591-78-6	2-Hexanone	1	11	11	0.75	U
98-82-8	Isopropylbenzene	1	5.4	5.4	0.26	U
79-20-9	Methyl Acetate	1	22	22	0.40	U
1634-04-4	Methyl tert-Butyl Ether	1	5.4	5.4	0.27	U
108-87-2	Methylcyclohexane	1	11	11	0.34	U

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ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

FSB4C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27 4MD REVISED Ian 6/22/07

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604361-03 File ID: 36103.D

Sampled: 04/19/06 10:00 Prepared: 04/24/06 08:00 Analyzed: 04/27/06 14:37

Solids: 86.00 Preparation: 5030B Aqueous Purge & Initial/Final: 5.4 g / 5 mL

QC Batch: 0604822 Sequence: 6050109 Calibration: 6E01003 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
75-09-2	Methylene Chloride	1	22	22	3.4	U
78-93-3	2-Butanone (MEK)	1	15	22	3.1	JB
108-10-1	4-Methyl-2-pentanone (MIBK)	1	11	11	0.69	U
100-42-5	Styrene	1	5.4	5.4	0.050	U
79-34-5	1,1,2,2-Tetrachloroethane	1	5.4	5.4	0.33	U
127-18-4	Tetrachloroethene	1	5.4	5.4	0.18	U
108-88-3	Toluene	1	5.4	5.4	0.43	U
87-61-6	1,2,3-Trichlorobenzene	1	5.4	5.4	0.42	U
120-82-1	1,2,4-Trichlorobenzene	1	5.4	5.4	0.42	U
71-55-6	1,1,1-Trichloroethane	1	5.4	5.4	0.44	U
79-00-5	1,1,2-Trichloroethane	1	5.4	5.4	0.41	U
79-01-6	Trichloroethene	1	5.4	5.4	0.14	U
75-69-4	Trichlorofluoromethane	1	5.4	5.4	0.41	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	5.4	5.4	0.36	U
75-01-4	Vinyl Chloride	1	5.4	5.4	0.14	U
1330-20-7	Xylene (Total)	1	5.4	5.4	0.27	U

B,Z

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	38.2	96	78 - 121	
1,2-Dichloroethane-d4	40.0	37.9	95	66 - 124	
Toluene-d8	40.0	39.0	98	85 - 114	
4-Bromofluorobenzene	40.0	38.9	97	69 - 119	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	239305	7.39	248647	7.38	
Chlorobenzene-d5	186318	17.41	205072	17.41	
1,4-Dichlorobenzene-d4	198496	22.43	234301	22.43	

* Values outside of QC limits

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ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

EQBK-1

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-27
4MD REVISED KAH 6/7/06
Client: URS Group, Inc.
Project: RFAAP SSP Investigation
Matrix: Water
Laboratory ID: 0604361-04
File ID: 36104.D
Sampled: 04/19/06 15:15
Prepared: 04/24/06 09:00
Analyzed: 04/24/06 19:11
Solids:
Preparation: 5030B Aqueous Purge &
Initial/Final: 5 mL / 5 mL
QC Batch: 0604474
Sequence: 6050232
Calibration: 6E02009
Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
67-64-1	Acetone	1	2.7	20	1.1	JB
71-43-2	Benzene	1	1.0	1.0	0.065	U
74-97-5	Bromochloromethane	1	1.0	1.0	0.13	U
75-27-4	Bromodichloromethane	1	1.0	1.0	0.11	U
75-25-2	Bromoform	1	1.0	1.0	0.15	U
74-83-9	Bromomethane	1	1.0	1.0	0.25	U
75-15-0	Carbon Disulfide	1	5.0	5.0	0.21	U
56-23-5	Carbon Tetrachloride	1	1.0	1.0	0.081	U
108-90-7	Chlorobenzene	1	1.0	1.0	0.11	U
75-00-3	Chloroethane	1	1.0	1.0	0.16	U
67-66-3	Chloroform	1	1.0	1.0	0.17	U
74-87-3	Chloromethane	1	1.0	1.0	0.18	U
110-82-7	Cyclohexane	1	5.0	5.0	0.16	U
96-12-8	1,2-Dibromo-3-chloropropane	1	5.0	5.0	0.59	U
124-48-1	Dibromochloromethane	1	1.0	1.0	0.13	U
106-93-4	1,2-Dibromoethane	1	1.0	1.0	0.086	U
95-50-1	1,2-Dichlorobenzene	1	1.0	1.0	0.29	U
541-73-1	1,3-Dichlorobenzene	1	1.0	1.0	0.15	U
106-46-7	1,4-Dichlorobenzene	1	1.0	1.0	0.26	U
75-71-8	Dichlorodifluoromethane	1	1.0	1.0	0.19	U
75-34-3	1,1-Dichloroethane	1	1.0	1.0	0.16	U
107-06-2	1,2-Dichloroethane	1	1.0	1.0	0.086	U
75-35-4	1,1-Dichloroethene	1	1.0	1.0	0.13	U
156-59-2	cis-1,2-Dichloroethene	1	1.0	1.0	0.16	U
156-60-5	trans-1,2-Dichloroethene	1	1.0	1.0	0.15	U
78-87-5	1,2-Dichloropropane	1	1.0	1.0	0.17	U
10061-01-5	cis-1,3-Dichloropropene	1	1.0	1.0	0.072	U
10061-02-6	trans-1,3-Dichloropropene	1	1.0	1.0	0.087	U
100-41-4	Ethylbenzene	1	1.0	1.0	0.11	U
591-78-6	2-Hexanone	1	20	20	0.40	U
98-82-8	Isopropylbenzene	1	1.0	1.0	0.078	U
79-20-9	Methyl Acetate	1	10	10	0.39	U
1634-04-4	Methyl tert-Butyl Ether	1	1.0	1.0	0.074	U
108-87-2	Methylcyclohexane	1	5.0	5.0	0.18	U

B, Z

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

EQBK-1

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-27
4MD
REVISED KH 6/7/06
Client: URS Group, Inc.
Project: RFAAP SSP Investigation
Matrix: Water
Laboratory ID: 0604361-04
File ID: 36104.D
Sampled: 04/19/06 15:15
Prepared: 04/24/06 09:00
Analyzed: 04/24/06 19:11
Solids:
Preparation: 5030B Aqueous Purge &
Initial/Final: 5 mL / 5 mL
QC Batch: 0604474
Sequence: 6050232
Calibration: 6E02009
Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
75-09-2	Methylene Chloride	1	0.74	4.0	0.21	JB
78-93-3	2-Butanone (MEK)	1	20	20	0.57	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	20	20	0.19	U
100-42-5	Styrene	1	1.0	1.0	0.043	U
79-34-5	1,1,2,2-Tetrachloroethane	1	1.0	1.0	0.12	U
127-18-4	Tetrachloroethene	1	1.0	1.0	0.13	U
108-88-3	Toluene	1	1.0	1.0	0.26	U
87-61-6	1,2,3-Trichlorobenzene	1	1.0	1.0	0.32	U
120-82-1	1,2,4-Trichlorobenzene	1	2.0	2.0	0.36	U
71-55-6	1,1,1-Trichloroethane	1	1.0	1.0	0.15	U
79-00-5	1,1,2-Trichloroethane	1	1.0	1.0	0.11	U
79-01-6	Trichloroethene	1	1.0	1.0	0.14	U
75-69-4	Trichlorofluoromethane	1	1.0	1.0	0.16	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	1.0	1.0	0.15	U
75-01-4	Vinyl Chloride	1	1.0	1.0	0.15	U
1330-20-7	Xylene (Total)	1	3.0	3.0	0.25	U

B,Z

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	40.6	102	79 - 124	
1,2-Dichloroethane-d4	40.0	43.8	110	75 - 128	
Toluene-d8	40.0	41.6	104	87 - 113	
4-Bromofluorobenzene	40.0	40.4	101	70 - 121	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	615345	5.16	701947	5.16	
Chlorobenzene-d5	654017	8.1	733019	8.1	
1,4-Dichlorobenzene-d4	363424	10.39	431445	10.39	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

Trip blank

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27 4MD REVISED CLH 6/7/06

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Water Laboratory ID: 0604361-05 File ID: 36405.D

Sampled: 04/19/06 00:00 Prepared: 04/24/06 09:00 Analyzed: 04/24/06 19:49

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0604474 Sequence: 6050232 Calibration: 6E02009 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
67-64-1	Acetone	1	1.9	20	1.1	JB
71-43-2	Benzene	1	1.0	1.0	0.065	U
74-97-5	Bromochloromethane	1	1.0	1.0	0.13	U
75-27-4	Bromodichloromethane	1	1.0	1.0	0.11	U
75-25-2	Bromoform	1	1.0	1.0	0.15	U
74-83-9	Bromomethane	1	1.0	1.0	0.25	U
75-15-0	Carbon Disulfide	1	5.0	5.0	0.21	U
56-23-5	Carbon Tetrachloride	1	1.0	1.0	0.081	U
108-90-7	Chlorobenzene	1	1.0	1.0	0.11	U
75-00-3	Chloroethane	1	1.0	1.0	0.16	U
67-66-3	Chloroform	1	1.0	1.0	0.17	U
74-87-3	Chloromethane	1	1.0	1.0	0.18	U
110-82-7	Cyclohexane	1	5.0	5.0	0.16	U
96-12-8	1,2-Dibromo-3-chloropropane	1	5.0	5.0	0.59	U
124-48-1	Dibromochloromethane	1	1.0	1.0	0.13	U
106-93-4	1,2-Dibromoethane	1	1.0	1.0	0.086	U
95-50-1	1,2-Dichlorobenzene	1	1.0	1.0	0.29	U
541-73-1	1,3-Dichlorobenzene	1	1.0	1.0	0.15	U
106-46-7	1,4-Dichlorobenzene	1	1.0	1.0	0.26	U
75-71-8	Dichlorodifluoromethane	1	1.0	1.0	0.19	U
75-34-3	1,1-Dichloroethane	1	1.0	1.0	0.16	U
107-06-2	1,2-Dichloroethane	1	1.0	1.0	0.086	U
75-35-4	1,1-Dichloroethene	1	1.0	1.0	0.13	U
156-59-2	cis-1,2-Dichloroethene	1	1.0	1.0	0.16	U
156-60-5	trans-1,2-Dichloroethene	1	1.0	1.0	0.15	U
78-87-5	1,2-Dichloropropane	1	1.0	1.0	0.17	U
10061-01-5	cis-1,3-Dichloropropene	1	1.0	1.0	0.072	U
10061-02-6	trans-1,3-Dichloropropene	1	1.0	1.0	0.087	U
100-41-4	Ethylbenzene	1	1.0	1.0	0.11	U
591-78-6	2-Hexanone	1	20	20	0.40	U
98-82-8	Isopropylbenzene	1	1.0	1.0	0.078	U
79-20-9	Methyl Acetate	1	10	10	0.39	U
1634-04-4	Methyl tert-Butyl Ether	1	1.0	1.0	0.074	U
108-87-2	Methylcyclohexane	1	5.0	5.0	0.18	U

B, Z

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

Trip blank

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27

4MD REVISED KH 6/7/06

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Water Laboratory ID: 0604361-05 File ID: 36405.D

Sampled: 04/19/06 00:00 Prepared: 04/24/06 09:00 Analyzed: 04/24/06 19:49

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0604474 Sequence: 6050232 Calibration: 6E02009 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
75-09-2	Methylene Chloride	1	0.65	4.0	0.21	JB
78-93-3	2-Butanone (MEK)	1	20	20	0.57	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	20	20	0.19	U
100-42-5	Styrene	1	1.0	1.0	0.043	U
79-34-5	1,1,2,2-Tetrachloroethane	1	1.0	1.0	0.12	U
127-18-4	Tetrachloroethene	1	1.0	1.0	0.13	U
108-88-3	Toluene	1	1.0	1.0	0.26	U
87-61-6	1,2,3-Trichlorobenzene	1	1.0	1.0	0.32	U
120-82-1	1,2,4-Trichlorobenzene	1	2.0	2.0	0.36	U
71-55-6	1,1,1-Trichloroethane	1	1.0	1.0	0.15	U
79-00-5	1,1,2-Trichloroethane	1	1.0	1.0	0.11	U
79-01-6	Trichloroethene	1	1.0	1.0	0.14	U
75-69-4	Trichlorofluoromethane	1	1.0	1.0	0.16	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	1.0	1.0	0.15	U
75-01-4	Vinyl Chloride	1	1.0	1.0	0.15	U
1330-20-7	Xylene (Total)	1	3.0	3.0	0.25	U

B, Z

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	41.1	103	79 - 124	
1,2-Dichloroethane-d4	40.0	43.1	108	75 - 128	
Toluene-d8	40.0	41.5	104	87 - 113	
4-Bromofluorobenzene	40.0	40.2	100	70 - 121	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	614724	5.16	701947	5.16	
Chlorobenzene-d5	649939	8.1	733019	8.1	
1,4-Dichlorobenzene-d4	362344	10.39	431445	10.39	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

ASB4-A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27 4MD

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-01 File ID: 42601.D

Sampled: 04/20/06 11:30 Prepared: 04/27/06 08:00 Analyzed: 04/27/06 13:27

Solids: 78.00 Preparation: 5030B Aqueous Purge & Initial/Final: 10 g / 500 mL

QC Batch: 0604900 Sequence: 6050235 Calibration: 6E02011 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	380	960	73	J
71-43-2	Benzene	1	13	64	4.2	J
74-97-5	Bromochloromethane	1	64	64	8.6	U
75-27-4	Bromodichloromethane	1	64	64	7.1	U
75-25-2	Bromoform	1	64	64	9.7	U
74-83-9	Bromomethane	1	64	64	16	U
75-15-0	Carbon Disulfide	1	320	320	13	U
56-23-5	Carbon Tetrachloride	1	64	64	5.2	U
108-90-7	Chlorobenzene	1	64	64	7.3	U
75-00-3	Chloroethane	1	64	64	10	U
67-66-3	Chloroform	1	64	64	11	U
74-87-3	Chloromethane	1	64	64	12	U
110-82-7	Cyclohexane	1	320	320	10	U
96-12-8	1,2-Dibromo-3-chloropropane	1	320	320	38	U
124-48-1	Dibromochloromethane	1	64	64	8.2	U
106-93-4	1,2-Dibromoethane	1	64	64	7.0	U
95-50-1	1,2-Dichlorobenzene	1	64	64	19	U
541-73-1	1,3-Dichlorobenzene	1	64	64	9.6	U
106-46-7	1,4-Dichlorobenzene	1	64	64	16	U
75-71-8	Dichlorodifluoromethane	1	64	64	12	U
75-34-3	1,1-Dichloroethane	1	64	64	10	U
107-06-2	1,2-Dichloroethane	1	64	64	5.5	U
75-35-4	1,1-Dichloroethene	1	64	64	8.5	U
156-59-2	cis-1,2-Dichloroethene	1	64	64	10	U
156-60-5	trans-1,2-Dichloroethene	1	64	64	9.6	U
78-87-5	1,2-Dichloropropane	1	64	64	11	U
10061-01-5	cis-1,3-Dichloropropene	1	64	64	4.6	U
10061-02-6	trans-1,3-Dichloropropene	1	64	64	5.6	U
100-41-4	Ethylbenzene	1	15	64	7.0	J
591-78-6	2-Hexanone	1	3200	3200	26	U
98-82-8	Isopropylbenzene	1	64	64	5.0	U
79-20-9	Methyl Acetate	1	85	320	25	J
1634-04-4	Methyl tert-Butyl Ether	1	64	64	4.7	U
108-87-2	Methylcyclohexane	1	320	320	11	U

B, Z

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

ASB4-A

REVISED JAH 6/7/06

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-01 File ID: 42601.D

Sampled: 04/20/06 11:30 Prepared: 04/27/06 08:00 Analyzed: 04/27/06 13:27

Solids: 78.00 Preparation: 5030B Aqueous Purge & Initial/Final: 10 g / 500 mL

QC Batch: 0604900 Sequence: 6050235 Calibration: 6E02011 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
75-09-2	Methylene Chloride	1	94	320	13	JB
78-93-3	2-Butanone (MEK)	1	3200	3200	37	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	3200	3200	12	U
100-42-5	Styrene	1	64	64	2.8	U
79-34-5	1,1,2,2-Tetrachloroethane	1	64	64	7.6	U
127-18-4	Tetrachloroethene	1	64	64	8.6	U
108-88-3	Toluene	1	81	64	16	
87-61-6	1,2,3-Trichlorobenzene	1	64	64	21	U
120-82-1	1,2,4-Trichlorobenzene	1	130	130	23	U
71-55-6	1,1,1-Trichloroethane	1	64	64	9.7	U
79-00-5	1,1,2-Trichloroethane	1	64	64	7.3	U
79-01-6	Trichloroethene	1	64	64	9.1	U
75-69-4	Trichlorofluoromethane	1	64	64	11	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	64	64	9.8	U
75-01-4	Vinyl Chloride	1	64	64	9.2	U
1330-20-7	Xylene (Total)	1	100	190	16	J

B,Z

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	35.5	89	78 - 121	
1,2-Dichloroethane-d4	40.0	41.3	103	66 - 124	
Toluene-d8	40.0	37.0	92	85 - 114	
4-Bromofluorobenzene	40.0	38.2	96	69 - 119	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	800039	5.16	728977	5.16	
Chlorobenzene-d5	670528	8.1	657482	8.1	
1,4-Dichlorobenzene-d4	354163	10.39	375023	10.39	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

ASB4-B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27 4MD

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-02 File ID: 42602.D

Sampled: 04/20/06 12:00 Prepared: 04/27/06 08:00 Analyzed: 04/27/06 14:05

Solids: 78.00 Preparation: 5030B Aqueous Purge & Initial/Final: 10 g / 500 mL

QC Batch: 0604900 Sequence: 6050235 Calibration: 6E02011 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	390	960	73	J
71-43-2	Benzene	1	64	64	4.2	U
74-97-5	Bromochloromethane	1	64	64	8.6	U
75-27-4	Bromodichloromethane	1	64	64	7.1	U
75-25-2	Bromoform	1	64	64	9.7	U
74-83-9	Bromomethane	1	64	64	16	U
75-15-0	Carbon Disulfide	1	320	320	13	U
56-23-5	Carbon Tetrachloride	1	64	64	5.2	U
108-90-7	Chlorobenzene	1	64	64	7.3	U
75-00-3	Chloroethane	1	64	64	10	U
67-66-3	Chloroform	1	64	64	11	U
74-87-3	Chloromethane	1	64	64	12	U
110-82-7	Cyclohexane	1	320	320	10	U
96-12-8	1,2-Dibromo-3-chloropropane	1	320	320	38	U
124-48-1	Dibromochloromethane	1	64	64	8.2	U
106-93-4	1,2-Dibromoethane	1	64	64	7.0	U
95-50-1	1,2-Dichlorobenzene	1	64	64	19	U
541-73-1	1,3-Dichlorobenzene	1	64	64	9.6	U
106-46-7	1,4-Dichlorobenzene	1	64	64	16	U
75-71-8	Dichlorodifluoromethane	1	64	64	12	U
75-34-3	1,1-Dichloroethane	1	64	64	10	U
107-06-2	1,2-Dichloroethane	1	64	64	5.5	U
75-35-4	1,1-Dichloroethene	1	64	64	8.5	U
156-59-2	cis-1,2-Dichloroethene	1	64	64	10	U
156-60-5	trans-1,2-Dichloroethene	1	64	64	9.6	U
78-87-5	1,2-Dichloropropane	1	64	64	11	U
10061-01-5	cis-1,3-Dichloropropene	1	64	64	4.6	U
10061-02-6	trans-1,3-Dichloropropene	1	64	64	5.6	U
100-41-4	Ethylbenzene	1	64	64	7.0	U
591-78-6	2-Hexanone	1	3200	3200	26	U
98-82-8	Isopropylbenzene	1	64	64	5.0	U
79-20-9	Methyl Acetate	1	190	320	25	J
1634-04-4	Methyl tert-Butyl Ether	1	64	64	4.7	U
108-87-2	Methylcyclohexane	1	320	320	11	U

B, Z

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

ASB4-B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27

REVISED RJH 6/7/06

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-02 File ID: 42602.D

Sampled: 04/20/06 12:00 Prepared: 04/27/06 08:00 Analyzed: 04/27/06 14:05

Solids: 78.00 Preparation: 5030B Aqueous Purge & Initial/Final: 10 g / 500 mL

QC Batch: 0604900 Sequence: 6050235 Calibration: 6E02011 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
75-09-2	Methylene Chloride	1	99	320	13	JB
78-93-3	2-Butanone (MEK)	1	3200	3200	37	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	3200	3200	12	U
100-42-5	Styrene	1	64	64	2.8	U
79-34-5	1,1,2,2-Tetrachloroethane	1	64	64	7.6	U
127-18-4	Tetrachloroethene	1	64	64	8.6	U
108-88-3	Toluene	1	64	64	16	U
87-61-6	1,2,3-Trichlorobenzene	1	64	64	21	U
120-82-1	1,2,4-Trichlorobenzene	1	130	130	23	U
71-55-6	1,1,1-Trichloroethane	1	64	64	9.7	U
79-00-5	1,1,2-Trichloroethane	1	64	64	7.3	U
79-01-6	Trichloroethene	1	64	64	9.1	U
75-69-4	Trichlorofluoromethane	1	64	64	11	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	64	64	9.8	U
75-01-4	Vinyl Chloride	1	64	64	9.2	U
1330-20-7	Xylene (Total)	1	190	190	16	U

B, Z

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	35.3	88	78 - 121	
1,2-Dichloroethane-d4	40.0	41.8	104	66 - 124	
Toluene-d8	40.0	37.3	93	85 - 114	
4-Bromofluorobenzene	40.0	38.2	96	69 - 119	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	780910	5.16	728977	5.16	
Chlorobenzene-d5	667115	8.1	657482	8.1	
1,4-Dichlorobenzene-d4	349890	10.39	375023	10.39	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

ASB4-C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27 4MD

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-03 File ID: 42603.D

Sampled: 04/20/06 12:25 Prepared: 04/27/06 08:00 Analyzed: 04/27/06 14:42

Solids: 67.00 Preparation: 5030B Aqueous Purge & Initial/Final: 10 g / 500 mL

QC Batch: 0604900 Sequence: 6050235 Calibration: 6E02011 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	460	1100	85	J
71-43-2	Benzene	1	75	75	4.9	U
74-97-5	Bromochloromethane	1	75	75	10	U
75-27-4	Bromodichloromethane	1	75	75	8.3	U
75-25-2	Bromoform	1	75	75	11	U
74-83-9	Bromomethane	1	75	75	19	U
75-15-0	Carbon Disulfide	1	370	370	16	U
56-23-5	Carbon Tetrachloride	1	75	75	6.0	U
108-90-7	Chlorobenzene	1	75	75	8.5	U
75-00-3	Chloroethane	1	75	75	12	U
67-66-3	Chloroform	1	75	75	12	U
74-87-3	Chloromethane	1	75	75	14	U
110-82-7	Cyclohexane	1	370	370	12	U
96-12-8	1,2-Dibromo-3-chloropropane	1	370	370	44	U
124-48-1	Dibromochloromethane	1	75	75	9.5	U
106-93-4	1,2-Dibromoethane	1	75	75	8.1	U
95-50-1	1,2-Dichlorobenzene	1	75	75	22	U
541-73-1	1,3-Dichlorobenzene	1	75	75	11	U
106-46-7	1,4-Dichlorobenzene	1	75	75	19	U
75-71-8	Dichlorodifluoromethane	1	75	75	14	U
75-34-3	1,1-Dichloroethane	1	75	75	12	U
107-06-2	1,2-Dichloroethane	1	75	75	6.4	U
75-35-4	1,1-Dichloroethene	1	75	75	9.9	U
156-59-2	cis-1,2-Dichloroethene	1	75	75	12	U
156-60-5	trans-1,2-Dichloroethene	1	75	75	11	U
78-87-5	1,2-Dichloropropane	1	75	75	13	U
10061-01-5	cis-1,3-Dichloropropene	1	75	75	5.4	U
10061-02-6	trans-1,3-Dichloropropene	1	75	75	6.5	U
100-41-4	Ethylbenzene	1	75	75	8.2	U
591-78-6	2-Hexanone	1	3700	3700	30	U
98-82-8	Isopropylbenzene	1	75	75	5.9	U
79-20-9	Methyl Acetate	1	81	370	29	J
1634-04-4	Methyl tert-Butyl Ether	1	75	75	5.5	U
108-87-2	Methylcyclohexane	1	370	370	13	U

B, Z

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

ASB4-C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27 4MD

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-03 File ID: 42603.D

Sampled: 04/20/06 12:25 Prepared: 04/27/06 08:00 Analyzed: 04/27/06 14:42

Solids: 67.00 Preparation: 5030B Aqueous Purge & Initial/Final: 10 g / 500 mL

QC Batch: 0604900 Sequence: 6050235 Calibration: 6E02011 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
75-09-2	Methylene Chloride	1	110	370	16	JB
78-93-3	2-Butanone (MEK)	1	3700	3700	43	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	3700	3700	14	U
100-42-5	Styrene	1	75	75	3.2	U
79-34-5	1,1,2,2-Tetrachloroethane	1	75	75	8.9	U
127-18-4	Tetrachloroethene	1	75	75	10	U
108-88-3	Toluene	1	75	75	19	U
87-61-6	1,2,3-Trichlorobenzene	1	75	75	24	U
120-82-1	1,2,4-Trichlorobenzene	1	150	150	27	U
71-55-6	1,1,1-Trichloroethane	1	75	75	11	U
79-00-5	1,1,2-Trichloroethane	1	75	75	8.4	U
79-01-6	Trichloroethene	1	75	75	11	U
75-69-4	Trichlorofluoromethane	1	75	75	12	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	75	75	11	U
75-01-4	Vinyl Chloride	1	75	75	11	U
1330-20-7	Xylene (Total)	1	220	220	19	U

B, Z

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	34.1	85	78 - 121	
1,2-Dichloroethane-d4	40.0	42.0	105	66 - 124	
Toluene-d8	40.0	36.9	92	85 - 114	
4-Bromofluorobenzene	40.0	38.2	96	69 - 119	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	812065	5.16	728977	5.16	
Chlorobenzene-d5	687189	8.1	657482	8.1	
1,4-Dichlorobenzene-d4	357647	10.39	375023	10.39	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

DUP-1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27 4MD

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-04 File ID: 42604.D

Sampled: 04/20/06 00:00 Prepared: 04/27/06 08:00 Analyzed: 04/27/06 15:20

Solids: 77.00 Preparation: 5030B Aqueous Purge & Initial/Final: 10 g / 500 mL

QC Batch: 0604900 Sequence: 6050235 Calibration: 6E02011 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	380	970	74	J
71-43-2	Benzene	1	65	65	4.2	U
74-97-5	Bromochloromethane	1	65	65	8.7	U
75-27-4	Bromodichloromethane	1	65	65	7.2	U
75-25-2	Bromoform	1	65	65	9.8	U
74-83-9	Bromomethane	1	65	65	16	U
75-15-0	Carbon Disulfide	1	320	320	14	U
56-23-5	Carbon Tetrachloride	1	65	65	5.2	U
108-90-7	Chlorobenzene	1	65	65	7.4	U
75-00-3	Chloroethane	1	65	65	10	U
67-66-3	Chloroform	1	65	65	11	U
74-87-3	Chloromethane	1	65	65	12	U
110-82-7	Cyclohexane	1	320	320	11	U
96-12-8	1,2-Dibromo-3-chloropropane	1	320	320	38	U
124-48-1	Dibromochloromethane	1	65	65	8.3	U
106-93-4	1,2-Dibromoethane	1	65	65	7.1	U
95-50-1	1,2-Dichlorobenzene	1	65	65	19	U
541-73-1	1,3-Dichlorobenzene	1	65	65	9.7	U
106-46-7	1,4-Dichlorobenzene	1	65	65	16	U
75-71-8	Dichlorodifluoromethane	1	65	65	12	U
75-34-3	1,1-Dichloroethane	1	65	65	10	U
107-06-2	1,2-Dichloroethane	1	65	65	5.6	U
75-35-4	1,1-Dichloroethene	1	65	65	8.6	U
156-59-2	cis-1,2-Dichloroethene	1	65	65	10	U
156-60-5	trans-1,2-Dichloroethene	1	65	65	9.7	U
78-87-5	1,2-Dichloropropane	1	65	65	11	U
10061-01-5	cis-1,3-Dichloropropene	1	65	65	4.7	U
10061-02-6	trans-1,3-Dichloropropene	1	65	65	5.6	U
100-41-4	Ethylbenzene	1	65	65	7.1	U
591-78-6	2-Hexanone	1	3200	3200	26	U
98-82-8	Isopropylbenzene	1	65	65	5.1	U
79-20-9	Methyl Acetate	1	89	320	25	J
1634-04-4	Methyl tert-Butyl Ether	1	65	65	4.8	U
108-87-2	Methylcyclohexane	1	320	320	12	U

B, Z

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

DUP-1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27 4MD

Client: URS Group, Inc. Project: RFAAP SSP Investigation

REVISED RLH 6/7/06

Matrix: Soil Laboratory ID: 0604426-04 File ID: 42604.D

Sampled: 04/20/06 00:00 Prepared: 04/27/06 08:00 Analyzed: 04/27/06 15:20

Solids: 77.00 Preparation: 5030B Aqueous Purge & Initial/Final: 10 g / 500 mL

QC Batch: 0604900 Sequence: 6050235 Calibration: 6E02011 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
75-09-2	Methylene Chloride	1	97	320	14	JB
78-93-3	2-Butanone (MEK)	1	3200	3200	37	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	3200	3200	12	U
100-42-5	Styrene	1	65	65	2.8	U
79-34-5	1,1,2,2-Tetrachloroethane	1	65	65	7.7	U
127-18-4	Tetrachloroethene	1	65	65	8.7	U
108-88-3	Toluene	1	65	65	17	U
87-61-6	1,2,3-Trichlorobenzene	1	65	65	21	U
120-82-1	1,2,4-Trichlorobenzene	1	130	130	23	U
71-55-6	1,1,1-Trichloroethane	1	65	65	9.9	U
79-00-5	1,1,2-Trichloroethane	1	65	65	7.4	U
79-01-6	Trichloroethene	1	65	65	9.2	U
75-69-4	Trichlorofluoromethane	1	65	65	11	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	65	65	9.9	U
75-01-4	Vinyl Chloride	1	65	65	9.4	U
1330-20-7	Xylene (Total)	1	190	190	16	U

B, Z

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	34.5	86	78 - 121	
1,2-Dichloroethane-d4	40.0	41.9	105	66 - 124	
Toluene-d8	40.0	37.3	93	85 - 114	
4-Bromofluorobenzene	40.0	37.8	94	69 - 119	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	799700	5.16	728977	5.16	
Chlorobenzene-d5	674167	8.1	657482	8.1	
1,4-Dichlorobenzene-d4	355321	10.39	375023	10.39	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

ASB5-A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27 4MD

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-05 File ID: 42605.D

Sampled: 04/20/06 13:30 Prepared: 04/27/06 08:00 Analyzed: 04/27/06 15:57

Solids: 79.00 Preparation: 5030B Aqueous Purge & Initial/Final: 10 g / 500 mL

QC Batch: 0604900 Sequence: 6050235 Calibration: 6E02011 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	420	950	72	J
71-43-2	Benzene	1	63	63	4.1	U
74-97-5	Bromochloromethane	1	63	63	8.5	U
75-27-4	Bromodichloromethane	1	63	63	7.1	U
75-25-2	Bromoform	1	63	63	9.6	U
74-83-9	Bromomethane	1	63	63	16	U
75-15-0	Carbon Disulfide	1	320	320	13	U
56-23-5	Carbon Tetrachloride	1	63	63	5.1	U
108-90-7	Chlorobenzene	1	63	63	7.2	U
75-00-3	Chloroethane	1	63	63	10	U
67-66-3	Chloroform	1	63	63	11	U
74-87-3	Chloromethane	1	63	63	12	U
110-82-7	Cyclohexane	1	320	320	10	U
96-12-8	1,2-Dibromo-3-chloropropane	1	320	320	37	U
124-48-1	Dibromochloromethane	1	63	63	8.1	U
106-93-4	1,2-Dibromoethane	1	63	63	6.9	U
95-50-1	1,2-Dichlorobenzene	1	63	63	18	U
541-73-1	1,3-Dichlorobenzene	1	63	63	9.4	U
106-46-7	1,4-Dichlorobenzene	1	63	63	16	U
75-71-8	Dichlorodifluoromethane	1	63	63	12	U
75-34-3	1,1-Dichloroethane	1	63	63	10	U
107-06-2	1,2-Dichloroethane	1	63	63	5.5	U
75-35-4	1,1-Dichloroethene	1	63	63	8.4	U
156-59-2	cis-1,2-Dichloroethene	1	63	63	9.9	U
156-60-5	trans-1,2-Dichloroethene	1	63	63	9.5	U
78-87-5	1,2-Dichloropropane	1	63	63	11	U
10061-01-5	cis-1,3-Dichloropropene	1	63	63	4.6	U
10061-02-6	trans-1,3-Dichloropropene	1	63	63	5.5	U
100-41-4	Ethylbenzene	1	63	63	6.9	U
591-78-6	2-Hexanone	1	3200	3200	25	U
98-82-8	Isopropylbenzene	1	63	63	5.0	U
79-20-9	Methyl Acetate	1	140	320	25	J
1634-04-4	Methyl tert-Butyl Ether	1	63	63	4.7	U
108-87-2	Methylcyclohexane	1	320	320	11	U

B,Z

00217

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

ASB5-A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-27
4M REVISED PLH 6/7/06
Client: URS Group, Inc.
Project: RFAAP SSP Investigation
Matrix: Soil
Laboratory ID: 0604426-05
File ID: 42605.D
Sampled: 04/20/06 13:30
Prepared: 04/27/06 08:00
Analyzed: 04/27/06 15:57
Solids: 79.00
Preparation: 5030B Aqueous Purge &
Initial/Final: 10 g / 500 mL
QC Batch: 0604900
Sequence: 6050235
Calibration: 6E02011
Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
75-09-2	Methylene Chloride	1	94	320	13	JB
78-93-3	2-Butanone (MEK)	1	3200	3200	36	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	3200	3200	12	U
100-42-5	Styrene	1	63	63	2.7	U
79-34-5	1,1,2,2-Tetrachloroethane	1	63	63	7.5	U
127-18-4	Tetrachloroethene	1	63	63	8.5	U
108-88-3	Toluene	1	63	63	16	U
87-61-6	1,2,3-Trichlorobenzene	1	63	63	20	U
120-82-1	1,2,4-Trichlorobenzene	1	130	130	23	U
71-55-6	1,1,1-Trichloroethane	1	63	63	9.6	U
79-00-5	1,1,2-Trichloroethane	1	63	63	7.2	U
79-01-6	Trichloroethene	1	63	63	9.0	U
75-69-4	Trichlorofluoromethane	1	63	63	10	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	63	63	9.7	U
75-01-4	Vinyl Chloride	1	63	63	9.1	U
1330-20-7	Xylene (Total)	1	190	190	16	U

B, Z

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	33.3	83	78 - 121	
1,2-Dichloroethane-d4	40.0	42.2	106	66 - 124	
Toluene-d8	40.0	37.4	94	85 - 114	
4-Bromofluorobenzene	40.0	38.5	96	69 - 119	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	824777	5.16	728977	5.16	
Chlorobenzene-d5	698702	8.1	657482	8.1	
1,4-Dichlorobenzene-d4	370635	10.39	375023	10.39	

* Values outside of QC limits

00218

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

ASB5-B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27 4MD

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-06 File ID: 42606.D

Sampled: 04/20/06 13:50 Prepared: 04/27/06 08:00 Analyzed: 04/27/06 16:34

Solids: 73.00 Preparation: 5030B Aqueous Purge & Initial/Final: 10 g / 500 mL

QC Batch: 0604900 Sequence: 6050235 Calibration: 6E02011 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	370	1000	78	J
71-43-2	Benzene	1	68	68	4.5	U
74-97-5	Bromochloromethane	1	68	68	9.2	U
75-27-4	Bromodichloromethane	1	68	68	7.6	U
75-25-2	Bromoform	1	68	68	10	U
74-83-9	Bromomethane	1	68	68	17	U
75-15-0	Carbon Disulfide	1	340	340	14	U
56-23-5	Carbon Tetrachloride	1	68	68	5.5	U
108-90-7	Chlorobenzene	1	68	68	7.8	U
75-00-3	Chloroethane	1	68	68	11	U
67-66-3	Chloroform	1	68	68	11	U
74-87-3	Chloromethane	1	68	68	12	U
110-82-7	Cyclohexane	1	340	340	11	U
96-12-8	1,2-Dibromo-3-chloropropane	1	340	340	40	U
124-48-1	Dibromochloromethane	1	68	68	8.7	U
106-93-4	1,2-Dibromoethane	1	68	68	7.4	U
95-50-1	1,2-Dichlorobenzene	1	68	68	20	U
541-73-1	1,3-Dichlorobenzene	1	68	68	10	U
106-46-7	1,4-Dichlorobenzene	1	68	68	17	U
75-71-8	Dichlorodifluoromethane	1	68	68	13	U
75-34-3	1,1-Dichloroethane	1	68	68	11	U
107-06-2	1,2-Dichloroethane	1	68	68	5.9	U
75-35-4	1,1-Dichloroethene	1	68	68	9.0	U
156-59-2	cis-1,2-Dichloroethene	1	68	68	11	U
156-60-5	trans-1,2-Dichloroethene	1	68	68	10	U
78-87-5	1,2-Dichloropropane	1	68	68	12	U
10061-01-5	cis-1,3-Dichloropropene	1	68	68	4.9	U
10061-02-6	trans-1,3-Dichloropropene	1	68	68	5.9	U
100-41-4	Ethylbenzene	1	68	68	7.5	U
591-78-6	2-Hexanone	1	3400	3400	28	U
98-82-8	Isopropylbenzene	1	68	68	5.4	U
79-20-9	Methyl Acetate	1	76	340	27	J
1634-04-4	Methyl tert-Butyl Ether	1	68	68	5.0	U
108-87-2	Methylcyclohexane	1	340	340	12	U

B, Z

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

ASB5-B

REVISED KLH 6/7/06

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-06 File ID: 42606.D

Sampled: 04/20/06 13:50 Prepared: 04/27/06 08:00 Analyzed: 04/27/06 16:34

Solids: 73.00 Preparation: 5030B Aqueous Purge & Initial/Final: 10 g / 500 mL

QC Batch: 0604900 Sequence: 6050235 Calibration: 6E02011 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
75-09-2	Methylene Chloride	1	100	340	14	JB
78-93-3	2-Butanone (MEK)	1	3400	3400	39	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	3400	3400	13	U
100-42-5	Styrene	1	68	68	3.0	U
79-34-5	1,1,2,2-Tetrachloroethane	1	68	68	8.1	U
127-18-4	Tetrachloroethene	1	68	68	9.2	U
108-88-3	Toluene	1	68	68	18	U
87-61-6	1,2,3-Trichlorobenzene	1	68	68	22	U
120-82-1	1,2,4-Trichlorobenzene	1	140	140	25	U
71-55-6	1,1,1-Trichloroethane	1	68	68	10	U
79-00-5	1,1,2-Trichloroethane	1	68	68	7.8	U
79-01-6	Trichloroethene	1	68	68	9.7	U
75-69-4	Trichlorofluoromethane	1	68	68	11	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	68	68	10	U
75-01-4	Vinyl Chloride	1	68	68	9.9	U
1330-20-7	Xylene (Total)	1	210	210	17	U

B,Z

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	34.2	86	78 - 121	
1,2-Dichloroethane-d4	40.0	41.9	105	66 - 124	
Toluene-d8	40.0	37.6	94	85 - 114	
4-Bromofluorobenzene	40.0	38.1	95	69 - 119	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	804704	5.16	728977	5.16	
Chlorobenzene-d5	677812	8.1	657482	8.1	
1,4-Dichlorobenzene-d4	349800	10.39	375023	10.39	

* Values outside of QC limits

SAMPLE ID SUMMARY

USEPA-8270C

REVISED
KAN 6/22/06

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-27

Client: URS Group, Inc.
Project: RFAAP SSP Investigation

Client Sample Id:	Lab Sample Id:
FSB4A	0604361-01
FSB4B	0604361-02
FSB4C	0604361-03
EQBK-1	0604361-04
ASB4-A	0604426-01
ASB4-B	0604426-02
ASB4-C	0604426-03
DUP-1 → ASB4A	0604426-04
ASB5-A	0604426-05
ASB5-A	0604426-05RE1
ASB5-A	0604426-05RE2
ASB5-B	0604426-06

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

FSB4A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-27 4MD
REVISED KMN 6/22/06
Client: URS Group, Inc.
Project: RFAAP SSP Investigation
Matrix: Soil
Laboratory ID: 0604361-01
File ID: 60436101.D
Sampled: 04/19/06 09:20
Prepared: 04/26/06 09:30
Analyzed: 04/27/06 11:37
Solids: 78.00
Preparation: 3550B Sonication
Initial/Final: 30 g / 1 mL
QC Batch: 0604631
Sequence: 6050110
Calibration: 6D28021
Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
83-32-9	Acenaphthene	1	22	22	1.7	U
208-96-8	Acenaphthylene	1	22	22	1.7	U
98-86-2	Acetophenone	1	44	44	12	U
120-12-7	Anthracene	1	5.1	22	2.1	J
1912-24-9	Atrazine	1	22	22	2.5	U
100-52-7	Benzaldehyde	1	22	22	2.4	U
56-55-3	Benzo(a)anthracene	1	20	22	3.9	J
50-32-8	Benzo(a)pyrene	1	16	22	3.9	J
205-99-2	Benzo(b)fluoranthene	1	35	22	3.9	
191-24-2	Benzo(g,h,i)perylene	1	87	87	27	U
207-08-9	Benzo(k)fluoranthene	1	6.3	22	2.8	J
92-52-4	1,1'-Biphenyl	1	22	22	2.1	U
101-55-3	4-Bromophenyl Phenyl Ether	1	22	22	1.7	U
85-68-7	Butyl Benzyl Phthalate	1	29	87	27	J
105-60-2	Caprolactam	1	87	87	19	U
86-74-8	Carbazole	1	3.9	22	2.1	J
59-50-7	4-Chloro-3-methylphenol	1	22	22	2.3	U
106-47-8	4-Chloroaniline	1	87	87	16	U
111-91-1	Bis(2-chloroethoxy)methane	1	22	22	1.3	U
111-44-4	Bis(2-chloroethyl) Ether	1	22	22	1.2	U
108-60-1	Bis(2-chloroisopropyl) Ether	1	22	22	1.1	U
91-58-7	2-Chloronaphthalene	1	22	22	1.6	U
95-57-8	2-Chlorophenol	1	22	22	1.8	U
7005-72-3	4-Chlorophenyl Phenyl Ether	1	22	22	1.8	U
218-01-9	Chrysene	1	24	22	3.6	
53-70-3	Dibenz(a,h)anthracene	1	87	87	27	U
132-64-9	Dibenzofuran	1	22	22	1.6	U
84-74-2	Di-n-butyl Phthalate	1	34	22	3.4	
120-83-2	2,4-Dichlorophenol	1	22	22	1.3	U
91-94-1	3,3´-Dichlorobenzidine	1	440	440	140	U
84-66-2	Diethyl Phthalate	1	10	22	2.0	J
105-67-9	2,4-Dimethylphenol	1	87	87	19	U
131-11-3	Dimethyl Phthalate	1	22	22	1.9	U
534-52-1	4,6-Dinitro-2-methylphenol	1	22	22	1.3	U

00494

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

FSB4A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27

REVISED CW 6/22/06

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604361-01 File ID: 60436101.D

Sampled: 04/19/06 09:20 Prepared: 04/26/06 09:30 Analyzed: 04/27/06 11:37

Solids: 78.00 Preparation: 3550B Sonication Initial/Final: 30 g / 1 mL

QC Batch: 0604631 Sequence: 6050110 Calibration: 6D28021 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q	
51-28-5	2,4-Dinitrophenol	1	44	44	4.5	U	UJ,c
606-20-2	2,6-Dinitrotoluene	1	22	22	1.7	U	
121-14-2	2,4-Dinitrotoluene	1	44	44	14	U	
117-84-0	Di-n-octyl Phthalate	1	12	22	2.6	J	
117-81-7	Bis(2-ethylhexyl) Phthalate	1	60	87	25	J	
206-44-0	Fluoranthene	1	27	22	2.4		
86-73-7	Fluorene	1	22	22	2.0	U	
118-74-1	Hexachlorobenzene	1	22	22	1.9	U	
87-68-3	Hexachlorobutadiene	1	22	22	1.6	U	
77-47-4	Hexachlorocyclopentadiene	1	44	44	14	U	UJ,c
67-72-1	Hexachloroethane	1	22	22	1.3	U	
193-39-5	Indeno(1,2,3-cd)pyrene	1	87	87	25	U	
78-59-1	Isophorone	1	22	22	1.9	U	
91-57-6	2-Methylnaphthalene	1	22	22	1.9	U	
106-44-5	4-Methylphenol	1	22	22	1.6	U	
95-48-7	2-Methylphenol	1	22	22	1.3	U	
91-20-3	Naphthalene	1	22	22	2.2	U	
99-09-2	3-Nitroaniline	1	87	87	22	U	
88-74-4	2-Nitroaniline	1	87	87	19	U	
100-01-6	4-Nitroaniline	1	87	87	16	U	UJ,m
98-95-3	Nitrobenzene	1	22	22	2.3	U	
88-75-5	2-Nitrophenol	1	22	22	1.8	U	
100-02-7	4-Nitrophenol	1	110	110	35	U	
86-30-6	N-Nitroso-diphenylamine	1	22	22	1.5	U	
621-64-7	N-Nitroso-di-n-propylamine	1	22	22	2.0	U	
87-86-5	Pentachlorophenol	1	44	44	2.8	U	
85-01-8	Phenanthrene	1	18	22	2.3	J	
108-95-2	Phenol	1	22	22	2.2	U	
129-00-0	Pyrene	1	32	22	2.6		
95-95-4	2,4,5-Trichlorophenol	1	44	44	12	U	
88-06-2	2,4,6-Trichlorophenol	1	22	22	1.3	U	
95-94-3	1,2,4,5-Tetrachlorobenzene	1	22	22	1.0	U	

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% REC.	QC Limits	Q
2-Fluorophenol	855	728	85	29 - 115	

00495

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

FSB4A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-27
4MD REVISED ICH 6/22/06
Client: URS Group, Inc.
Project: RFAAP SSP Investigation
Matrix: Soil
Laboratory ID: 0604361-01
File ID: 60436101.D
Sampled: 04/19/06 09:20
Prepared: 04/26/06 09:30
Analyzed: 04/27/06 11:37
Solids: 78.00
Preparation: 3550B Sonication
Initial/Final: 30 g / 1 mL
QC Batch: 0604631
Sequence: 6050110
Calibration: 6D28021
Instrument: 195

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% REC.	QC Limits	Q
Phenol-d6	855	717	84	38 - 107	
Nitrobenzene-d5	427	353	83	40 - 132	
2-Fluorobiphenyl	427	371	87	50 - 118	
2,4,6-Tribromophenol	855	734	86	22 - 113	
o-Terphenyl	427	349	82	41 - 125	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	34613	4.84	30959	4.83	
Naphthalene-d8	143792	6.33	124095	6.33	
Acenaphthene-d10	75678	8.32	65522	8.33	
Phenanthrene-d10	109246	9.98	97808	9.98	
Chrysene-d12	68949	12.92	75679	12.92	
Perylene-d12	46118	14.4	47773	14.39	

* Values outside of QC limits

004496

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

FSB4B

REVISED
4MD KH 6/22/06

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604361-02 File ID: 60436102.D

Sampled: 04/19/06 09:40 Prepared: 04/26/06 09:30 Analyzed: 04/27/06 12:04

Solids: 83.00 Preparation: 3550B Sonication Initial/Final: 30 g / 1 mL

QC Batch: 0604631 Sequence: 6050110 Calibration: 6D28021 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
83-32-9	Acenaphthene	1	20	20	1.6	U
208-96-8	Acenaphthylene	1	20	20	1.6	U
98-86-2	Acetophenone	1	41	41	11	U
120-12-7	Anthracene	1	20	20	2.0	U
1912-24-9	Atrazine	1	20	20	2.3	U
100-52-7	Benzaldehyde	1	20	20	2.3	U
56-55-3	Benzo(a)anthracene	1	20	20	3.7	U
50-32-8	Benzo(a)pyrene	1	20	20	3.7	U
205-99-2	Benzo(b)fluoranthene	1	20	20	3.6	U
191-24-2	Benzo(g,h,i)perylene	1	82	82	26	U
207-08-9	Benzo(k)fluoranthene	1	20	20	2.6	U
92-52-4	1,1'-Biphenyl	1	20	20	2.0	U
101-55-3	4-Bromophenyl Phenyl Ether	1	20	20	1.6	U
85-68-7	Butyl Benzyl Phthalate	1	82	82	26	U
105-60-2	Caprolactam	1	82	82	18	U
86-74-8	Carbazole	1	20	20	2.0	U
59-50-7	4-Chloro-3-methylphenol	1	20	20	2.2	U
106-47-8	4-Chloroaniline	1	82	82	15	U
111-91-1	Bis(2-chloroethoxy)methane	1	20	20	1.2	U
111-44-4	Bis(2-chloroethyl) Ether	1	20	20	1.2	U
108-60-1	Bis(2-chloroisopropyl) Ether	1	20	20	1.0	U
91-58-7	2-Chloronaphthalene	1	20	20	1.5	U
95-57-8	2-Chlorophenol	1	20	20	1.7	U
7005-72-3	4-Chlorophenyl Phenyl Ether	1	20	20	1.7	U
218-01-9	Chrysene	1	20	20	3.4	U
53-70-3	Dibenz(a,h)anthracene	1	82	82	25	U
132-64-9	Dibenzofuran	1	20	20	1.5	U
84-74-2	Di-n-butyl Phthalate	1	39	20	3.2	
120-83-2	2,4-Dichlorophenol	1	20	20	1.3	U
91-94-1	3,3´-Dichlorobenzidine	1	410	410	140	U
84-66-2	Diethyl Phthalate	1	8.2	20	1.9	J
105-67-9	2,4-Dimethylphenol	1	82	82	18	U
131-11-3	Dimethyl Phthalate	1	20	20	1.8	U
534-52-1	4,6-Dinitro-2-methylphenol	1	20	20	1.2	U

005516

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

FSB4B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27 4MD

Client: URS Group, Inc. Project: RFAAP SSP Investigation

REVISED 10/4 6/22/06

Matrix: Soil Laboratory ID: 0604361-02 File ID: 60436102.D

Sampled: 04/19/06 09:40 Prepared: 04/26/06 09:30 Analyzed: 04/27/06 12:04

Solids: 83.00 Preparation: 3550B Sonication Initial/Final: 30 g / 1 mL

QC Batch: 0604631 Sequence: 6050110 Calibration: 6D28021 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q	
51-28-5	2,4-Dinitrophenol	1	41	41	4.3	U	UJ,c
606-20-2	2,6-Dinitrotoluene	1	20	20	1.6	U	
121-14-2	2,4-Dinitrotoluene	1	41	41	13	U	
117-84-0	Di-n-octyl Phthalate	1	20	20	2.4	U	
117-81-7	Bis(2-ethylhexyl) Phthalate	1	47	82	24	J	
206-44-0	Fluoranthene	1	20	20	2.2	U	
86-73-7	Fluorene	1	20	20	1.8	U	
118-74-1	Hexachlorobenzene	1	20	20	1.8	U	
87-68-3	Hexachlorobutadiene	1	20	20	1.5	U	
77-47-4	Hexachlorocyclopentadiene	1	41	41	13	U	UJ,c
67-72-1	Hexachloroethane	1	20	20	1.2	U	
193-39-5	Indeno(1,2,3-cd)pyrene	1	82	82	23	U	
78-59-1	Isophorone	1	20	20	1.8	U	
91-57-6	2-Methylnaphthalene	1	20	20	1.8	U	
106-44-5	4-Methylphenol	1	20	20	1.5	U	
95-48-7	2-Methylphenol	1	20	20	1.2	U	
91-20-3	Naphthalene	1	20	20	2.1	U	
99-09-2	3-Nitroaniline	1	82	82	21	U	
88-74-4	2-Nitroaniline	1	82	82	18	U	
100-01-6	4-Nitroaniline	1	82	82	15	U	
98-95-3	Nitrobenzene	1	20	20	2.2	U	
88-75-5	2-Nitrophenol	1	20	20	1.7	U	
100-02-7	4-Nitrophenol	1	100	100	33	U	
86-30-6	N-Nitroso-diphenylamine	1	20	20	1.4	U	
621-64-7	N-Nitroso-di-n-propylamine	1	20	20	1.9	U	
87-86-5	Pentachlorophenol	1	41	41	2.6	U	
85-01-8	Phenanthrene	1	20	20	2.1	U	
108-95-2	Phenol	1	20	20	2.1	U	
129-00-0	Pyrene	1	20	20	2.5	U	
95-95-4	2,4,5-Trichlorophenol	1	41	41	11	U	
88-06-2	2,4,6-Trichlorophenol	1	20	20	1.2	U	
95-94-3	1,2,4,5-Tetrachlorobenzene	1	20	20	0.96	U	

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% REC.	QC Limits	Q
2-Fluorophenol	803	603	75	29 - 115	

00517

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

FSB4B

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-27 4MD
Client: URS Group, Inc.
Project: RFAAP SSP Investigation
REVISED MH 6/22/06
Matrix: Soil
Laboratory ID: 0604361-02
File ID: 60436102.D
Sampled: 04/19/06 09:40
Prepared: 04/26/06 09:30
Analyzed: 04/27/06 12:04
Solids: 83.00
Preparation: 3550B Sonication
Initial/Final: 30 g / 1 mL
QC Batch: 0604631
Sequence: 6050110
Calibration: 6D28021
Instrument: 195

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% REC.	QC Limits	Q
Phenol-d6	803	628	78	38 - 107	
Nitrobenzene-d5	402	299	74	40 - 132	
2-Fluorobiphenyl	402	327	81	50 - 118	
2,4,6-Tribromophenol	803	608	76	22 - 113	
o-Terphenyl	402	341	85	41 - 125	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	36835	4.84	30959	4.83	
Naphthalene-d8	153760	6.33	124095	6.33	
Acenaphthene-d10	80395	8.33	65522	8.33	
Phenanthrene-d10	114751	9.99	97808	9.98	
Chrysene-d12	81886	12.92	75679	12.92	
Perylene-d12	52442	14.4	47773	14.39	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

FSB4C

REVISED KH 6/22/06

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-27 4MD
Client: URS Group, Inc.
Project: RFAAP SSP Investigation
Matrix: Soil
Laboratory ID: 0604361-03
File ID: 60436103.d
Sampled: 04/19/06 10:00
Prepared: 04/26/06 09:30
Analyzed: 04/27/06 12:30
Solids: 86.00
Preparation: 3550B Sonication
Initial/Final: 30 g / 1 mL
QC Batch: 0604631
Sequence: 6050110
Calibration: 6D28021
Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
83-32-9	Acenaphthene	1	20	20	1.6	U
208-96-8	Acenaphthylene	1	20	20	1.5	U
98-86-2	Acetophenone	1	40	40	11	U
120-12-7	Anthracene	1	20	20	1.9	U
1912-24-9	Atrazine	1	20	20	2.2	U
100-52-7	Benzaldehyde	1	20	20	2.2	U
56-55-3	Benzo(a)anthracene	1	20	20	3.5	U
50-32-8	Benzo(a)pyrene	1	20	20	3.5	U
205-99-2	Benzo(b)fluoranthene	1	3.7	20	3.5	J
191-24-2	Benzo(g,h,i)perylene	1	79	79	25	U
207-08-9	Benzo(k)fluoranthene	1	20	20	2.5	U
92-52-4	1,1'-Biphenyl	1	20	20	1.9	U
101-55-3	4-Bromophenyl Phenyl Ether	1	20	20	1.5	U
85-68-7	Butyl Benzyl Phthalate	1	79	79	25	U
105-60-2	Caprolactam	1	79	79	17	U
86-74-8	Carbazole	1	20	20	1.9	U
59-50-7	4-Chloro-3-methylphenol	1	20	20	2.1	U
106-47-8	4-Chloroaniline	1	79	79	14	U
111-91-1	Bis(2-chloroethoxy)methane	1	20	20	1.2	U
111-44-4	Bis(2-chloroethyl) Ether	1	20	20	1.1	U
108-60-1	Bis(2-chloroisopropyl) Ether	1	20	20	0.99	U
91-58-7	2-Chloronaphthalene	1	20	20	1.4	U
95-57-8	2-Chlorophenol	1	20	20	1.6	U
7005-72-3	4-Chlorophenyl Phenyl Ether	1	20	20	1.6	U
218-01-9	Chrysene	1	20	20	3.2	U
53-70-3	Dibenz(a,h)anthracene	1	79	79	24	U
132-64-9	Dibenzofuran	1	20	20	1.4	U
84-74-2	Di-n-butyl Phthalate	1	8.8	20	3.1	J
120-83-2	2,4-Dichlorophenol	1	20	20	1.2	U
91-94-1	3,3´-Dichlorobenzidine	1	400	400	130	U
84-66-2	Diethyl Phthalate	1	7.7	20	1.8	J
105-67-9	2,4-Dimethylphenol	1	79	79	17	U
131-11-3	Dimethyl Phthalate	1	20	20	1.7	U
534-52-1	4,6-Dinitro-2-methylphenol	1	20	20	1.1	U

00526

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

FSB4C

REVISED
UH 6/22/06

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-27
Client: URS Group, Inc.
Project: RFAAP SSP Investigation
Matrix: Soil
Laboratory ID: 0604361-03
File ID: 60436103.d
Sampled: 04/19/06 10:00
Prepared: 04/26/06 09:30
Analyzed: 04/27/06 12:30
Solids: 86.00
Preparation: 3550B Sonication
Initial/Final: 30 g / 1 mL
QC Batch: 0604631
Sequence: 6050110
Calibration: 6D28021
Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q	
51-28-5	2,4-Dinitrophenol	1	40	40	4.1	U	UJ,C
606-20-2	2,6-Dinitrotoluene	1	20	20	1.5	U	
121-14-2	2,4-Dinitrotoluene	1	40	40	13	U	
117-84-0	Di-n-octyl Phthalate	1	20	20	2.3	U	
117-81-7	Bis(2-ethylhexyl) Phthalate	1	510	79	23		
206-44-0	Fluoranthene	1	2.2	20	2.2	J	
86-73-7	Fluorene	1	20	20	1.8	U	
118-74-1	Hexachlorobenzene	1	20	20	1.7	U	
87-68-3	Hexachlorobutadiene	1	20	20	1.5	U	
77-47-4	Hexachlorocyclopentadiene	1	40	40	13	U	UJ,C
67-72-1	Hexachloroethane	1	20	20	1.2	U	
193-39-5	Indeno(1,2,3-cd)pyrene	1	79	79	22	U	
78-59-1	Isophorone	1	20	20	1.7	U	
91-57-6	2-Methylnaphthalene	1	20	20	1.8	U	
106-44-5	4-Methylphenol	1	20	20	1.4	U	
95-48-7	2-Methylphenol	1	20	20	1.2	U	
91-20-3	Naphthalene	1	20	20	2.0	U	
99-09-2	3-Nitroaniline	1	79	79	20	U	
88-74-4	2-Nitroaniline	1	79	79	17	U	
100-01-6	4-Nitroaniline	1	79	79	14	U	
98-95-3	Nitrobenzene	1	20	20	2.1	U	
88-75-5	2-Nitrophenol	1	20	20	1.7	U	
100-02-7	4-Nitrophenol	1	99	99	32	U	
86-30-6	N-Nitroso-diphenylamine	1	20	20	1.4	U	
621-64-7	N-Nitroso-di-n-propylamine	1	20	20	1.8	U	
87-86-5	Pentachlorophenol	1	40	40	2.5	U	
85-01-8	Phenanthrene	1	20	20	2.0	U	
108-95-2	Phenol	1	20	20	2.0	U	
129-00-0	Pyrene	1	2.8	20	2.4	J	
95-95-4	2,4,5-Trichlorophenol	1	40	40	11	U	
88-06-2	2,4,6-Trichlorophenol	1	20	20	1.2	U	
95-94-3	1,2,4,5-Tetrachlorobenzene	1	20	20	0.93	U	

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% REC.	QC Limits	Q
2-Fluorophenol	775	545	70	29 - 115	

00527

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

FSB4C

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-27
4M REVISED 6/22/06
Client: URS Group, Inc.
Project: RFAAP SSP Investigation
Matrix: Soil
Laboratory ID: 0604361-03
File ID: 60436103.d
Sampled: 04/19/06 10:00
Prepared: 04/26/06 09:30
Analyzed: 04/27/06 12:30
Solids: 86.00
Preparation: 3550B Sonication
Initial/Final: 30 g / 1 mL
QC Batch: 0604631
Sequence: 6050110
Calibration: 6D28021
Instrument: 195

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% REC.	QC Limits	Q
Phenol-d6	775	568	73	38 - 107	
Nitrobenzene-d5	388	270	70	40 - 132	
2-Fluorobiphenyl	388	285	73	50 - 118	
2,4,6-Tribromophenol	775	589	76	22 - 113	
o-Terphenyl	388	337	87	41 - 125	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	35062	4.84	30959	4.83	
Naphthalene-d8	146590	6.33	124095	6.33	
Acenaphthene-d10	76768	8.33	65522	8.33	
Phenanthrene-d10	114881	9.98	97808	9.98	
Chrysene-d12	80115	12.92	75679	12.92	
Perylene-d12	52836	14.39	47773	14.39	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

EQBK-1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27 4MB REVISED KLH 6/7/06

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Water Laboratory ID: 0604361-04 File ID: 60436104.D

Sampled: 04/19/06 15:15 Prepared: 04/24/06 09:08 Analyzed: 04/26/06 17:21

Solids: Preparation: 3510C Liquid-Liquid Initial/Final: 1020 mL / 1 mL

QC Batch: 0604457 Sequence: 6042857 Calibration: 6D28021 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
83-32-9	Acenaphthene	1	5.0	5.0	0.021	U
208-96-8	Acenaphthylene	1	5.0	5.0	0.038	U
98-86-2	Acetophenone	1	5.0	5.0	0.033	U
120-12-7	Anthracene	1	5.0	5.0	0.030	U
1912-24-9	Atrazine	1	5.0	5.0	0.087	U
100-52-7	Benzaldehyde	1	5.0	5.0	0.056	U
56-55-3	Benzo(a)anthracene	1	5.0	5.0	0.058	U
50-32-8	Benzo(a)pyrene	1	5.0	5.0	0.031	U
205-99-2	Benzo(b)fluoranthene	1	5.0	5.0	0.038	U
191-24-2	Benzo(g,h,i)perylene	1	5.0	5.0	0.030	U
207-08-9	Benzo(k)fluoranthene	1	5.0	5.0	0.048	U
92-52-4	1,1'-Biphenyl	1	5.0	5.0	0.024	U
101-55-3	4-Bromophenyl Phenyl Ether	1	5.0	5.0	0.039	U
85-68-7	Butyl Benzyl Phthalate	1	0.77	5.0	0.76	J
105-60-2	Caprolactam	1	5.0	5.0	0.77	U
86-74-8	Carbazole	1	5.0	5.0	0.032	U
59-50-7	4-Chloro-3-methylphenol	1	5.0	5.0	0.024	U
106-47-8	4-Chloroaniline	1	5.0	5.0	0.93	U
111-91-1	Bis(2-chloroethoxy)methane	1	5.0	5.0	0.022	U
111-44-4	Bis(2-chloroethyl) Ether	1	5.0	5.0	0.039	U
108-60-1	Bis(2-chloroisopropyl) Ether	1	5.0	5.0	0.047	U
91-58-7	2-Chloronaphthalene	1	5.0	5.0	0.012	U
95-57-8	2-Chlorophenol	1	5.0	5.0	0.028	U
7005-72-3	4-Chlorophenyl Phenyl Ether	1	5.0	5.0	0.029	U
218-01-9	Chrysene	1	5.0	5.0	0.030	U
53-70-3	Dibenz(a,h)anthracene	1	5.0	5.0	0.019	U
132-64-9	Dibenzofuran	1	5.0	5.0	0.014	U
84-74-2	Di-n-butyl Phthalate	1	5.0	5.0	0.81	U
120-83-2	2,4-Dichlorophenol	1	5.0	5.0	0.022	U
91-94-1	3,3´-Dichlorobenzidine	1	5.0	5.0	0.048	U
84-66-2	Diethyl Phthalate	1	0.41	5.0	0.052	J
105-67-9	2,4-Dimethylphenol	1	5.0	5.0	0.54	U
131-11-3	Dimethyl Phthalate	1	5.0	5.0	0.020	U
534-52-1	4,6-Dinitro-2-methylphenol	1	5.0	5.0	0.24	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

EQBK-1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27 4MD

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Water Laboratory ID: 0604361-04 File ID: 60436104.D

Sampled: 04/19/06 15:15 Prepared: 04/24/06 09:08 Analyzed: 04/26/06 17:21

Solids: Preparation: 3510C Liquid-Liquid Extı Initial/Final: 1020 mL / 1 mL

QC Batch: 0604457 Sequence: 6042857 Calibration: 6D28021 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
51-28-5	2,4-Dinitrophenol	1	10	10	0.21	U UJ,c
606-20-2	2,6-Dinitrotoluene	1	5.0	5.0	0.075	U
121-14-2	2,4-Dinitrotoluene	1	5.0	5.0	0.036	U
117-84-0	Di-n-octyl Phthalate	1	5.0	5.0	0.041	U
117-81-7	Bis(2-ethylhexyl) Phthalate	1	2.8	5.0	0.50	J
206-44-0	Fluoranthene	1	5.0	5.0	0.033	U
86-73-7	Fluorene	1	5.0	5.0	0.027	U
118-74-1	Hexachlorobenzene	1	5.0	5.0	0.033	U
87-68-3	Hexachlorobutadiene	1	5.0	5.0	0.015	U
77-47-4	Hexachlorocyclopentadiene	1	5.0	5.0	0.24	U
67-72-1	Hexachloroethane	1	5.0	5.0	0.029	U
193-39-5	Indeno(1,2,3-cd)pyrene	1	5.0	5.0	0.021	U
78-59-1	Isophorone	1	5.0	5.0	0.025	U
91-57-6	2-Methylnaphthalene	1	5.0	5.0	0.022	U
106-44-5	4-Methylphenol	1	5.0	5.0	0.38	U
95-48-7	2-Methylphenol	1	5.0	5.0	0.45	U
91-20-3	Naphthalene	1	5.0	5.0	0.022	U
99-09-2	3-Nitroaniline	1	5.0	5.0	0.71	U
88-74-4	2-Nitroaniline	1	5.0	5.0	0.28	U
100-01-6	4-Nitroaniline	1	5.0	5.0	0.45	U
98-95-3	Nitrobenzene	1	5.0	5.0	0.053	U
88-75-5	2-Nitrophenol	1	5.0	5.0	0.038	U
100-02-7	4-Nitrophenol	1	10	10	0.44	U
86-30-6	N-Nitroso-diphenylamine	1	5.0	5.0	0.037	U
621-64-7	N-Nitroso-di-n-propylamine	1	5.0	5.0	0.037	U
87-86-5	Pentachlorophenol	1	10	10	0.061	U
85-01-8	Phenanthrene	1	5.0	5.0	0.033	U
108-95-2	Phenol	1	5.0	5.0	0.055	U
129-00-0	Pyrene	1	5.0	5.0	0.044	U
95-95-4	2,4,5-Trichlorophenol	1	5.0	5.0	0.030	U
88-06-2	2,4,6-Trichlorophenol	1	5.0	5.0	0.025	U
95-94-3	1,2,4,5-Tetrachlorobenzene	1	5.0	5.0	0.025	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
2-Fluorophenol	19.6	10.4	53	16 - 69	

: 00540

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

EQBK-1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27 4MD

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Water Laboratory ID: 0604361-04 File ID: 60436104.D

Sampled: 04/19/06 15:15 Prepared: 04/24/06 09:08 Analyzed: 04/26/06 17:21

Solids: Preparation: 3510C Liquid-Liquid Extı Initial/Final: 1020 mL / 1 mL

QC Batch: 0604457 Sequence: 6042857 Calibration: 6D28021 Instrument: 195

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Phenol-d6	19.6	6.98	36	11 - 49	
Nitrobenzene-d5	9.80	8.61	88	26 - 116	
2-Fluorobiphenyl	9.80	6.97	71	37 - 123	
2,4,6-Tribromophenol	19.6	16.9	86	32 - 127	
o-Terphenyl	9.80	9.08	93	30 - 119	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	33165	4.83	32099	4.83	
Naphthalene-d8	135771	6.33	133560	6.33	
Acenaphthene-d10	72018	8.32	68846	8.33	
Phenanthrene-d10	109479	9.98	104453	9.98	
Chrysene-d12	88687	12.92	83526	12.92	
Perylene-d12	65086	14.39	56966	14.38	

* Values outside of QC limits

: 005541

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

ASB4-A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27 4MD

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-01 File ID: 60442601.D

Sampled: 04/20/06 11:30 Prepared: 04/26/06 09:30 Analyzed: 04/27/06 13:06

Solids: 78.00 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0604631 Sequence: 6050110 Calibration: 6D28021 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
83-32-9	Acenaphthene	1	22	22	1.7	U
208-96-8	Acenaphthylene	1	22	22	1.7	U
98-86-2	Acetophenone	1	44	44	12	U
120-12-7	Anthracene	1	22	22	2.1	U
1912-24-9	Atrazine	1	22	22	2.5	U
100-52-7	Benzaldehyde	1	22	22	2.4	U
56-55-3	Benzo(a)anthracene	1	22	22	3.9	U
50-32-8	Benzo(a)pyrene	1	22	22	3.9	U
205-99-2	Benzo(b)fluoranthene	1	22	22	3.9	U
191-24-2	Benzo(g,h,i)perylene	1	87	87	27	U
207-08-9	Benzo(k)fluoranthene	1	22	22	2.8	U
92-52-4	1,1'-Biphenyl	1	22	22	2.1	U
101-55-3	4-Bromophenyl Phenyl Ether	1	22	22	1.7	U
85-68-7	Butyl Benzyl Phthalate	1	87	87	27	U
105-60-2	Caprolactam	1	87	87	19	U
86-74-8	Carbazole	1	22	22	2.1	U
59-50-7	4-Chloro-3-methylphenol	1	22	22	2.3	U
106-47-8	4-Chloroaniline	1	87	87	16	U
111-91-1	Bis(2-chloroethoxy)methane	1	22	22	1.3	U
111-44-4	Bis(2-chloroethyl) Ether	1	22	22	1.2	U
108-60-1	Bis(2-chloroisopropyl) Ether	1	22	22	1.1	U
91-58-7	2-Chloronaphthalene	1	22	22	1.6	U
95-57-8	2-Chlorophenol	1	22	22	1.8	U
7005-72-3	4-Chlorophenyl Phenyl Ether	1	22	22	1.8	U
218-01-9	Chrysene	1	22	22	3.6	U
53-70-3	Dibenz(a,h)anthracene	1	87	87	27	U
132-64-9	Dibenzofuran	1	22	22	1.6	U
84-74-2	Di-n-butyl Phthalate	1	150	22	3.4	
120-83-2	2,4-Dichlorophenol	1	22	22	1.3	U
91-94-1	3,3'-Dichlorobenzidine	1	440	440	140	U
84-66-2	Diethyl Phthalate	1	26	22	2.0	
105-67-9	2,4-Dimethylphenol	1	87	87	19	U
131-11-3	Dimethyl Phthalate	1	22	22	1.9	U
534-52-1	4,6-Dinitro-2-methylphenol	1	22	22	1.3	U

: 00545

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

ASB4-A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27 4MD

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-01 File ID: 60442601.D

Sampled: 04/20/06 11:30 Prepared: 04/26/06 09:30 Analyzed: 04/27/06 13:06

Solids: 78.00 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0604631 Sequence: 6050110 Calibration: 6D28021 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
51-28-5	2,4-Dinitrophenol	1	44	44	4.5	U UJ,c
606-20-2	2,6-Dinitrotoluene	1	22	22	1.7	U
121-14-2	2,4-Dinitrotoluene	1	44	44	14	U
117-84-0	Di-n-octyl Phthalate	1	14	22	2.6	J
117-81-7	Bis(2-ethylhexyl) Phthalate	1	160	87	25	J,f
206-44-0	Fluoranthene	1	22	22	2.4	U
86-73-7	Fluorene	1	22	22	2.0	U
118-74-1	Hexachlorobenzene	1	22	22	1.9	U
87-68-3	Hexachlorobutadiene	1	22	22	1.6	U
77-47-4	Hexachlorocyclopentadiene	1	44	44	14	U UJ,c
67-72-1	Hexachloroethane	1	22	22	1.3	U
193-39-5	Indeno(1,2,3-cd)pyrene	1	87	87	25	U
78-59-1	Isophorone	1	22	22	1.9	U
91-57-6	2-Methylnaphthalene	1	22	22	1.9	U
106-44-5	4-Methylphenol	1	22	22	1.6	U
95-48-7	2-Methylphenol	1	22	22	1.3	U
91-20-3	Naphthalene	1	22	22	2.2	U
99-09-2	3-Nitroaniline	1	87	87	22	U
88-74-4	2-Nitroaniline	1	87	87	19	U
100-01-6	4-Nitroaniline	1	87	87	16	U
98-95-3	Nitrobenzene	1	22	22	2.3	U
88-75-5	2-Nitrophenol	1	22	22	1.8	U
100-02-7	4-Nitrophenol	1	110	110	35	U
86-30-6	N-Nitroso-diphenylamine	1	1000	22	1.5	J,f
621-64-7	N-Nitroso-di-n-propylamine	1	22	22	2.0	U
87-86-5	Pentachlorophenol	1	44	44	2.8	U
85-01-8	Phenanthrene	1	22	22	2.3	U
108-95-2	Phenol	1	22	22	2.2	U
129-00-0	Pyrene	1	22	22	2.6	U
95-95-4	2,4,5-Trichlorophenol	1	44	44	12	U
88-06-2	2,4,6-Trichlorophenol	1	22	22	1.3	U
95-94-3	1,2,4,5-Tetrachlorobenzene	1	22	22	1.0	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% REC.	QC Limits	Q
2-Fluorophenol	855	664	78	29 - 115	

: 00550

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

ASB4-A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27 4MD

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-01 File ID: 60442601.D

Sampled: 04/20/06 11:30 Prepared: 04/26/06 09:30 Analyzed: 04/27/06 13:06

Solids: 78.00 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0604631 Sequence: 6050110 Calibration: 6D28021 Instrument: 195

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% REC.	QC Limits	Q
Phenol-d6	855	670	78	38 - 107	
Nitrobenzene-d5	427	334	78	40 - 132	
2-Fluorobiphenyl	427	350	82	50 - 118	
2,4,6-Tribromophenol	855	678	79	22 - 113	
o-Terphenyl	427	350	82	41 - 125	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	37972	4.84	30959	4.83	
Naphthalene-d8	152864	6.33	124095	6.33	
Acenaphthene-d10	81164	8.33	65522	8.33	
Phenanthrene-d10	117548	9.99	97808	9.98	
Chrysene-d12	72969	12.93	75679	12.92	
Perylene-d12	47648	14.4	47773	14.39	

* Values outside of QC limits

00551

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

ASB4-B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27 4MD

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-02 File ID: 60442602.D

Sampled: 04/20/06 12:00 Prepared: 04/26/06 09:30 Analyzed: 04/27/06 13:32

Solids: 78.00 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0604631 Sequence: 6050110 Calibration: 6D28021 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
83-32-9	Acenaphthene	1	22	22	1.7	U
208-96-8	Acenaphthylene	1	22	22	1.7	U
98-86-2	Acetophenone	1	44	44	12	U
120-12-7	Anthracene	1	22	22	2.1	U
1912-24-9	Atrazine	1	22	22	2.5	U
100-52-7	Benzaldehyde	1	22	22	2.4	U
56-55-3	Benzo(a)anthracene	1	22	22	3.9	U
50-32-8	Benzo(a)pyrene	1	22	22	3.9	U
205-99-2	Benzo(b)fluoranthene	1	22	22	3.9	U
191-24-2	Benzo(g,h,i)perylene	1	87	87	27	U
207-08-9	Benzo(k)fluoranthene	1	22	22	2.8	U
92-52-4	1,1'-Biphenyl	1	22	22	2.1	U
101-55-3	4-Bromophenyl Phenyl Ether	1	22	22	1.7	U
85-68-7	Butyl Benzyl Phthalate	1	87	87	27	U
105-60-2	Caprolactam	1	87	87	19	U
86-74-8	Carbazole	1	22	22	2.1	U
59-50-7	4-Chloro-3-methylphenol	1	22	22	2.3	U
106-47-8	4-Chloroaniline	1	87	87	16	U
111-91-1	Bis(2-chloroethoxy)methane	1	22	22	1.3	U
111-44-4	Bis(2-chloroethyl) Ether	1	22	22	1.2	U
108-60-1	Bis(2-chloroisopropyl) Ether	1	22	22	1.1	U
91-58-7	2-Chloronaphthalene	1	22	22	1.6	U
95-57-8	2-Chlorophenol	1	22	22	1.8	U
7005-72-3	4-Chlorophenyl Phenyl Ether	1	22	22	1.8	U
218-01-9	Chrysene	1	22	22	3.6	U
53-70-3	Dibenz(a,h)anthracene	1	87	87	27	U
132-64-9	Dibenzofuran	1	22	22	1.6	U
84-74-2	Di-n-butyl Phthalate	1	470	22	3.4	
120-83-2	2,4-Dichlorophenol	1	22	22	1.3	U
91-94-1	3,3´-Dichlorobenzidine	1	440	440	140	U
84-66-2	Diethyl Phthalate	1	8.4	22	2.0	J
105-67-9	2,4-Dimethylphenol	1	87	87	19	U
131-11-3	Dimethyl Phthalate	1	22	22	1.9	U
534-52-1	4,6-Dinitro-2-methylphenol	1	22	22	1.3	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

ASB4-B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27 4MD

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-02 File ID: 60442602.D

Sampled: 04/20/06 12:00 Prepared: 04/26/06 09:30 Analyzed: 04/27/06 13:32

Solids: 78.00 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0604631 Sequence: 6050110 Calibration: 6D28021 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
51-28-5	2,4-Dinitrophenol	1	44	44	4.5	U UJ,C
606-20-2	2,6-Dinitrotoluene	1	22	22	1.7	U
121-14-2	2,4-Dinitrotoluene	1	44	44	14	U
117-84-0	Di-n-octyl Phthalate	1	13	22	2.6	J
117-81-7	Bis(2-ethylhexyl) Phthalate	1	420	87	25	
206-44-0	Fluoranthene	1	22	22	2.4	U
86-73-7	Fluorene	1	22	22	2.0	U
118-74-1	Hexachlorobenzene	1	22	22	1.9	U
87-68-3	Hexachlorobutadiene	1	22	22	1.6	U
77-47-4	Hexachlorocyclopentadiene	1	44	44	14	U UJ,C
67-72-1	Hexachloroethane	1	22	22	1.3	U
193-39-5	Indeno(1,2,3-cd)pyrene	1	87	87	25	U
78-59-1	Isophorone	1	22	22	1.9	U
91-57-6	2-Methylnaphthalene	1	22	22	1.9	U
106-44-5	4-Methylphenol	1	22	22	1.6	U
95-48-7	2-Methylphenol	1	22	22	1.3	U
91-20-3	Naphthalene	1	22	22	2.2	U
99-09-2	3-Nitroaniline	1	87	87	22	U
88-74-4	2-Nitroaniline	1	87	87	19	U
100-01-6	4-Nitroaniline	1	87	87	16	U
98-95-3	Nitrobenzene	1	22	22	2.3	U
88-75-5	2-Nitrophenol	1	22	22	1.8	U
100-02-7	4-Nitrophenol	1	110	110	35	U
86-30-6	N-Nitroso-diphenylamine	1	150	22	1.5	
621-64-7	N-Nitroso-di-n-propylamine	1	22	22	2.0	U
87-86-5	Pentachlorophenol	1	44	44	2.8	U
85-01-8	Phenanthrene	1	22	22	2.3	U
108-95-2	Phenol	1	22	22	2.2	U
129-00-0	Pyrene	1	22	22	2.6	U
95-95-4	2,4,5-Trichlorophenol	1	44	44	12	U
88-06-2	2,4,6-Trichlorophenol	1	22	22	1.3	U
95-94-3	1,2,4,5-Tetrachlorobenzene	1	22	22	1.0	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% REC.	QC Limits	Q
2-Fluorophenol	855	666	78	29 - 115	

00562

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

ASB4-B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27 4MD

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-02 File ID: 60442602.D

Sampled: 04/20/06 12:00 Prepared: 04/26/06 09:30 Analyzed: 04/27/06 13:32

Solids: 78.00 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0604631 Sequence: 6050110 Calibration: 6D28021 Instrument: 195

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% REC.	QC Limits	Q
Phenol-d6	855	681	80	38 - 107	
Nitrobenzene-d5	427	304	71	40 - 132	
2-Fluorobiphenyl	427	320	75	50 - 118	
2,4,6-Tribromophenol	855	658	77	22 - 113	
o-Terphenyl	427	389	91	41 - 125	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	33936	4.84	30959	4.83	
Naphthalene-d8	145610	6.33	124095	6.33	
Acenaphthene-d10	76455	8.33	65522	8.33	
Phenanthrene-d10	111935	9.99	97808	9.98	
Chrysene-d12	68494	12.92	75679	12.92	
Perylene-d12	51016	14.4	47773	14.39	

* Values outside of QC limits

: 00563

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

ASB4-C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27 4MD

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-03 File ID: 60442603.D

Sampled: 04/20/06 12:25 Prepared: 04/26/06 09:30 Analyzed: 04/27/06 13:58

Solids: 67.00 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0604631 Sequence: 6050110 Calibration: 6D28021 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
83-32-9	Acenaphthene	1	25	25	2.0	U
208-96-8	Acenaphthylene	1	25	25	2.0	U
98-86-2	Acetophenone	1	51	51	14	U
120-12-7	Anthracene	1	25	25	2.4	U
1912-24-9	Atrazine	1	25	25	2.9	U
100-52-7	Benzaldehyde	1	25	25	2.8	U
56-55-3	Benzo(a)anthracene	1	25	25	4.5	U
50-32-8	Benzo(a)pyrene	1	25	25	4.6	U
205-99-2	Benzo(b)fluoranthene	1	25	25	4.5	U
191-24-2	Benzo(g,h,i)perylene	1	100	100	32	U
207-08-9	Benzo(k)fluoranthene	1	25	25	3.2	U
92-52-4	1,1'-Biphenyl	1	25	25	2.4	U
101-55-3	4-Bromophenyl Phenyl Ether	1	25	25	2.0	U
85-68-7	Butyl Benzyl Phthalate	1	100	100	32	U
105-60-2	Caprolactam	1	100	100	22	U
86-74-8	Carbazole	1	25	25	2.5	U
59-50-7	4-Chloro-3-methylphenol	1	25	25	2.7	U
106-47-8	4-Chloroaniline	1	100	100	18	U
111-91-1	Bis(2-chloroethoxy)methane	1	25	25	1.5	U
111-44-4	Bis(2-chloroethyl) Ether	1	25	25	1.4	U
108-60-1	Bis(2-chloroisopropyl) Ether	1	25	25	1.3	U
91-58-7	2-Chloronaphthalene	1	25	25	1.9	U
95-57-8	2-Chlorophenol	1	25	25	2.1	U
7005-72-3	4-Chlorophenyl Phenyl Ether	1	25	25	2.1	U
218-01-9	Chrysene	1	25	25	4.2	U
53-70-3	Dibenz(a,h)anthracene	1	100	100	31	U
132-64-9	Dibenzofuran	1	25	25	1.9	U
84-74-2	Di-n-butyl Phthalate	1	9.8	25	3.9	J
120-83-2	2,4-Dichlorophenol	1	25	25	1.6	U
91-94-1	3,3'-Dichlorobenzidine	1	510	510	170	U
84-66-2	Diethyl Phthalate	1	7.7	25	2.3	J
105-67-9	2,4-Dimethylphenol	1	100	100	22	U
131-11-3	Dimethyl Phthalate	1	25	25	2.2	U
534-52-1	4,6-Dinitro-2-methylphenol	1	25	25	1.5	U

006573

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

ASB4-C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27 4MD

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-03 File ID: 60442603.D

Sampled: 04/20/06 12:25 Prepared: 04/26/06 09:30 Analyzed: 04/27/06 13:58

Solids: 67.00 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0604631 Sequence: 6050110 Calibration: 6D28021 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
51-28-5	2,4-Dinitrophenol	1	51	51	5.3	U UJ,c
606-20-2	2,6-Dinitrotoluene	1	25	25	2.0	U
121-14-2	2,4-Dinitrotoluene	1	51	51	16	U
117-84-0	Di-n-octyl Phthalate	1	25	25	3.0	U
117-81-7	Bis(2-ethylhexyl) Phthalate	1	38	100	29	J
206-44-0	Fluoranthene	1	25	25	2.8	U
86-73-7	Fluorene	1	25	25	2.3	U
118-74-1	Hexachlorobenzene	1	25	25	2.2	U
87-68-3	Hexachlorobutadiene	1	25	25	1.9	U
77-47-4	Hexachlorocyclopentadiene	1	51	51	17	U UJ,c
67-72-1	Hexachloroethane	1	25	25	1.5	U
193-39-5	Indeno(1,2,3-cd)pyrene	1	100	100	29	U
78-59-1	Isophorone	1	25	25	2.2	U
91-57-6	2-Methylnaphthalene	1	25	25	2.3	U
106-44-5	4-Methylphenol	1	25	25	1.8	U
95-48-7	2-Methylphenol	1	25	25	1.5	U
91-20-3	Naphthalene	1	25	25	2.6	U
99-09-2	3-Nitroaniline	1	100	100	26	U
88-74-4	2-Nitroaniline	1	100	100	22	U
100-01-6	4-Nitroaniline	1	100	100	19	U
98-95-3	Nitrobenzene	1	25	25	2.7	U
88-75-5	2-Nitrophenol	1	25	25	2.1	U
100-02-7	4-Nitrophenol	1	130	130	41	U
86-30-6	N-Nitroso-diphenylamine	1	25	25	1.8	U
621-64-7	N-Nitroso-di-n-propylamine	1	25	25	2.3	U
87-86-5	Pentachlorophenol	1	51	51	3.3	U
85-01-8	Phenanthrene	1	25	25	2.6	U
108-95-2	Phenol	1	25	25	2.6	U
129-00-0	Pyrene	1	25	25	3.0	U
95-95-4	2,4,5-Trichlorophenol	1	51	51	14	U
88-06-2	2,4,6-Trichlorophenol	1	25	25	1.5	U
95-94-3	1,2,4,5-Tetrachlorobenzene	1	25	25	1.2	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% REC.	QC Limits	Q
2-Fluorophenol	995	767	77	29 - 115	

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

ASB4-C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27 4MD

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-03 File ID: 60442603.D

Sampled: 04/20/06 12:25 Prepared: 04/26/06 09:30 Analyzed: 04/27/06 13:58

Solids: 67.00 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0604631 Sequence: 6050110 Calibration: 6D28021 Instrument: 195

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% REC.	QC Limits	Q
Phenol-d6	995	789	79	38 - 107	
Nitrobenzene-d5	498	381	77	40 - 132	
2-Fluorobiphenyl	498	387	78	50 - 118	
2,4,6-Tribromophenol	995	780	78	22 - 113	
o-Terphenyl	498	431	87	41 - 125	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	34038	4.84	30959	4.83	
Naphthalene-d8	142882	6.33	124095	6.33	
Acenaphthene-d10	76076	8.33	65522	8.33	
Phenanthrene-d10	116518	9.99	97808	9.98	
Chrysene-d12	88786	12.92	75679	12.92	
Perylene-d12	57703	14.39	47773	14.39	

* Values outside of QC limits

: 66575

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

DUP-1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27 4MD

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-04 File ID: 60442604.D

Sampled: 04/20/06 00:00 Prepared: 04/26/06 09:30 Analyzed: 04/27/06 14:24

Solids: 77.00 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0604631 Sequence: 6050110 Calibration: 6D28021 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
83-32-9	Acenaphthene	1	22	22	1.7	U
208-96-8	Acenaphthylene	1	22	22	1.7	U
98-86-2	Acetophenone	1	44	44	12	U
120-12-7	Anthracene	1	22	22	2.1	U
1912-24-9	Atrazine	1	22	22	2.5	U
100-52-7	Benzaldehyde	1	22	22	2.5	U
56-55-3	Benzo(a)anthracene	1	22	22	3.9	U
50-32-8	Benzo(a)pyrene	1	22	22	4.0	U
205-99-2	Benzo(b)fluoranthene	1	22	22	3.9	U
191-24-2	Benzo(g,h,i)perylene	1	88	88	28	U
207-08-9	Benzo(k)fluoranthene	1	22	22	2.8	U
92-52-4	1,1'-Biphenyl	1	22	22	2.1	U
101-55-3	4-Bromophenyl Phenyl Ether	1	22	22	1.7	U
85-68-7	Butyl Benzyl Phthalate	1	88	88	28	U
105-60-2	Caprolactam	1	88	88	19	U
86-74-8	Carbazole	1	22	22	2.1	U
59-50-7	4-Chloro-3-methylphenol	1	22	22	2.3	U
106-47-8	4-Chloroaniline	1	88	88	16	U
111-91-1	Bis(2-chloroethoxy)methane	1	22	22	1.3	U
111-44-4	Bis(2-chloroethyl) Ether	1	22	22	1.2	U
108-60-1	Bis(2-chloroisopropyl) Ether	1	22	22	1.1	U
91-58-7	2-Chloronaphthalene	1	22	22	1.6	U
95-57-8	2-Chlorophenol	1	22	22	1.8	U
7005-72-3	4-Chlorophenyl Phenyl Ether	1	22	22	1.8	U
218-01-9	Chrysene	1	22	22	3.6	U
53-70-3	Dibenz(a,h)anthracene	1	88	88	27	U
132-64-9	Dibenzofuran	1	22	22	1.6	U
84-74-2	Di-n-butyl Phthalate	1	100	22	3.4	
120-83-2	2,4-Dichlorophenol	1	22	22	1.4	U
91-94-1	3,3´-Dichlorobenzidine	1	440	440	150	U
84-66-2	Diethyl Phthalate	1	6.8	22	2.0	J
105-67-9	2,4-Dimethylphenol	1	88	88	19	U
131-11-3	Dimethyl Phthalate	1	22	22	1.9	U
534-52-1	4,6-Dinitro-2-methylphenol	1	22	22	1.3	U

: 00583

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

DUP-1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27 4MD

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-04 File ID: 60442604.D

Sampled: 04/20/06 00:00 Prepared: 04/26/06 09:30 Analyzed: 04/27/06 14:24

Solids: 77.00 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0604631 Sequence: 6050110 Calibration: 6D28021 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
51-28-5	2,4-Dinitrophenol	1	44	44	4.6	U UJ,C
606-20-2	2,6-Dinitrotoluene	1	22	22	1.7	U
121-14-2	2,4-Dinitrotoluene	1	44	44	14	U
117-84-0	Di-n-octyl Phthalate	1	12	22	2.6	J
117-81-7	Bis(2-ethylhexyl) Phthalate	1	310	88	25	J,F
206-44-0	Fluoranthene	1	22	22	2.4	U
86-73-7	Fluorene	1	22	22	2.0	U
118-74-1	Hexachlorobenzene	1	22	22	1.9	U
87-68-3	Hexachlorobutadiene	1	22	22	1.6	U
77-47-4	Hexachlorocyclopentadiene	1	44	44	14	U UJ,C
67-72-1	Hexachloroethane	1	22	22	1.3	U
193-39-5	Indeno(1,2,3-cd)pyrene	1	88	88	25	U
78-59-1	Isophorone	1	22	22	1.9	U
91-57-6	2-Methylnaphthalene	1	22	22	2.0	U
106-44-5	4-Methylphenol	1	22	22	1.6	U
95-48-7	2-Methylphenol	1	22	22	1.3	U
91-20-3	Naphthalene	1	22	22	2.3	U
99-09-2	3-Nitroaniline	1	88	88	22	U
88-74-4	2-Nitroaniline	1	88	88	19	U
100-01-6	4-Nitroaniline	1	88	88	16	U
98-95-3	Nitrobenzene	1	22	22	2.4	U
88-75-5	2-Nitrophenol	1	22	22	1.9	U
100-02-7	4-Nitrophenol	1	110	110	36	U
86-30-6	N-Nitroso-diphenylamine	1	340	22	1.6	J,F
621-64-7	N-Nitroso-di-n-propylamine	1	22	22	2.0	U
87-86-5	Pentachlorophenol	1	44	44	2.8	U
85-01-8	Phenanthrene	1	22	22	2.3	U
108-95-2	Phenol	1	22	22	2.3	U
129-00-0	Pyrene	1	22	22	2.6	U
95-95-4	2,4,5-Trichlorophenol	1	44	44	12	U
88-06-2	2,4,6-Trichlorophenol	1	22	22	1.3	U
95-94-3	1,2,4,5-Tetrachlorobenzene	1	22	22	1.0	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% REC.	QC Limits	Q
2-Fluorophenol	866	636	73	29 - 115	

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

DUP-1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27 4MD

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-04 File ID: 60442604.D

Sampled: 04/20/06 00:00 Prepared: 04/26/06 09:30 Analyzed: 04/27/06 14:24

Solids: 77.00 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0604631 Sequence: 6050110 Calibration: 6D28021 Instrument: 195

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% REC.	QC Limits	Q
Phenol-d6	866	639	74	38 - 107	
Nitrobenzene-d5	433	321	74	40 - 132	
2-Fluorobiphenyl	433	334	77	50 - 118	
2,4,6-Tribromophenol	866	631	73	22 - 113	
o-Terphenyl	433	367	85	41 - 125	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	37274	4.84	30959	4.83	
Naphthalene-d8	152275	6.33	124095	6.33	
Acenaphthene-d10	81028	8.33	65522	8.33	
Phenanthrene-d10	120746	9.99	97808	9.98	
Chrysene-d12	84714	12.92	75679	12.92	
Perylene-d12	54247	14.4	47773	14.39	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

ASB5-A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27 4MD

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-05 File ID: 60442605.D

Sampled: 04/20/06 13:30 Prepared: 04/26/06 09:30 Analyzed: 04/27/06 14:50

Solids: 79.00 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0604631 Sequence: 6050110 Calibration: 6D28021 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
83-32-9	Acenaphthene	1	6.6	22	1.7	J
208-96-8	Acenaphthylene	1	21	22	1.7	J
98-86-2	Acetophenone	1	43	43	12	U
120-12-7	Anthracene	1	21	22	2.1	J
1912-24-9	Atrazine	1	22	22	2.4	U
100-52-7	Benzaldehyde	1	22	22	2.4	U
56-55-3	Benzo(a)anthracene	1	72	22	3.8	
50-32-8	Benzo(a)pyrene	1	22	22	3.9	
205-99-2	Benzo(b)fluoranthene	1	120	22	3.8	
191-24-2	Benzo(g,h,i)perylene	1	86	86	27	U
207-08-9	Benzo(k)fluoranthene	1	36	22	2.7	
92-52-4	1,1'-Biphenyl	1	2.2	22	2.1	J
101-55-3	4-Bromophenyl Phenyl Ether	1	22	22	1.7	U
85-68-7	Butyl Benzyl Phthalate	1	160	86	27	
105-60-2	Caprolactam	1	86	86	18	U
86-74-8	Carbazole	1	22	22	2.1	U
59-50-7	4-Chloro-3-methylphenol	1	22	22	2.3	U
106-47-8	4-Chloroaniline	1	86	86	15	U
111-91-1	Bis(2-chloroethoxy)methane	1	22	22	1.3	U
111-44-4	Bis(2-chloroethyl) Ether	1	22	22	1.2	U
108-60-1	Bis(2-chloroisopropyl) Ether	1	22	22	1.1	U
91-58-7	2-Chloronaphthalene	1	22	22	1.6	U
95-57-8	2-Chlorophenol	1	22	22	1.7	U
7005-72-3	4-Chlorophenyl Phenyl Ether	1	22	22	1.7	U
218-01-9	Chrysene	1	87	22	3.5	
53-70-3	Dibenz(a,h)anthracene	1	86	86	26	U
132-64-9	Dibenzofuran	1	22	22	1.6	U
~~84-74-2~~	~~Di-n-butyl Phthalate~~	~~1~~	~~44000~~	~~22~~	~~3.3~~	~~E~~ JQ
120-83-2	2,4-Dichlorophenol	1	22	22	1.3	U
91-94-1	3,3'-Dichlorobenzidine	1	430	430	140	U
84-66-2	Diethyl Phthalate	1	24	22	1.9	
105-67-9	2,4-Dimethylphenol	1	86	86	19	U
131-11-3	Dimethyl Phthalate	1	210	22	1.9	
534-52-1	4,6-Dinitro-2-methylphenol	1	22	22	1.2	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

ASB5-A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27 4MD

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-05 File ID: 60442605.D

Sampled: 04/20/06 13:30 Prepared: 04/26/06 09:30 Analyzed: 04/27/06 14:50

Solids: 79.00 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0604631 Sequence: 6050110 Calibration: 6D28021 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
51-28-5	2,4-Dinitrophenol	1	43	43	4.5	U UJ, c
~~606-20-2~~	~~2,6-Dinitrotoluene~~	~~1~~	~~1200~~	~~22~~	~~1.7~~	~~E~~ J, q
~~121-14-2~~	~~2,4-Dinitrotoluene~~	~~1~~	~~14000~~	~~43~~	~~14~~	~~E~~ J, q
117-84-0	Di-n-octyl Phthalate	1	55	22	2.5	
~~117-81-7~~	~~Bis(2-ethylhexyl) Phthalate~~	~~1~~	~~4400~~	~~86~~	~~25~~	~~E~~ J, q
206-44-0	Fluoranthene	1	430	22	2.4	
86-73-7	Fluorene	1	14	22	1.9	J
118-74-1	Hexachlorobenzene	1	22	22	1.9	U
87-68-3	Hexachlorobutadiene	1	22	22	1.6	U
77-47-4	Hexachlorocyclopentadiene	1	43	43	14	U UJ, c
67-72-1	Hexachloroethane	1	22	22	1.3	U
193-39-5	Indeno(1,2,3-cd)pyrene	1	86	86	24	U
78-59-1	Isophorone	1	22	22	1.9	U
91-57-6	2-Methylnaphthalene	1	4.9	22	1.9	J
106-44-5	4-Methylphenol	1	22	22	1.5	U
95-48-7	2-Methylphenol	1	22	22	1.3	U
91-20-3	Naphthalene	1	22	22	2.2	U
99-09-2	3-Nitroaniline	1	86	86	22	U
88-74-4	2-Nitroaniline	1	86	86	19	U
100-01-6	4-Nitroaniline	1	86	86	16	U
98-95-3	Nitrobenzene	1	22	22	2.3	U
88-75-5	2-Nitrophenol	1	22	22	1.8	U
100-02-7	4-Nitrophenol	1	110	110	35	U
~~86-30-6~~	~~N-Nitroso-diphenylamine~~	~~1~~	~~1900~~	~~22~~	~~1.5~~	~~E~~ J, q
621-64-7	N-Nitroso-di-n-propylamine	1	22	22	1.9	U
87-86-5	Pentachlorophenol	1	100	43	2.8	
85-01-8	Phenanthrene	1	160	22	2.2	
108-95-2	Phenol	1	22	22	2.2	U
129-00-0	Pyrene	1	240	22	2.6	
95-95-4	2,4,5-Trichlorophenol	1	43	43	12	U
88-06-2	2,4,6-Trichlorophenol	1	22	22	1.3	U
95-94-3	1,2,4,5-Tetrachlorobenzene	1	22	22	1.0	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% REC.	QC Limits	Q
2-Fluorophenol	844	667	79	29 - 115	

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

ASB5-A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27 4MD

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-05 File ID: 60442605.D

Sampled: 04/20/06 13:30 Prepared: 04/26/06 09:30 Analyzed: 04/27/06 14:50

Solids: 79.00 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0604631 Sequence: 6050110 Calibration: 6D28021 Instrument: 195

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% REC.	QC Limits	Q
Phenol-d6	844	641	76	38 - 107	
Nitrobenzene-d5	422	335	79	40 - 132	
2-Fluorobiphenyl	422	354	84	50 - 118	
2,4,6-Tribromophenol	844	578	68	22 - 113	
o-Terphenyl	422	311	74	41 - 125	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	32429	4.84	30959	4.83	
Naphthalene-d8	130460	6.33	124095	6.33	
Acenaphthene-d10	64259	8.34	65522	8.33	
Phenanthrene-d10	95838	10	97808	9.98	
Chrysene-d12	78031	12.94	75679	12.92	
Perylene-d12	48275	14.43	47773	14.39	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

ASB5-A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27 4MD

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-05RE2 File ID: 0442605D.D

Sampled: 04/20/06 13:30 Prepared: 04/26/06 09:30 Analyzed: 05/01/06 17:15

Solids: 79.00 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0604631 Sequence: 6050131 Calibration: 6D28021 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
83-32-9	Acenaphthene	10	220	220	17	U
208-96-8	Acenaphthylene	10	18	220	17	J
98-86-2	Acetophenone	10	430	430	120	U
120-12-7	Anthracene	10	24	220	21	J
1912-24-9	Atrazine	10	220	220	24	U
100-52-7	Benzaldehyde	10	220	220	24	U UJ,c
56-55-3	Benzo(a)anthracene	10	49	220	38	J
50-32-8	Benzo(a)pyrene	10	220	220	39	U
205-99-2	Benzo(b)fluoranthene	10	220	220	38	U
191-24-2	Benzo(g,h,i)perylene	10	860	860	270	U
207-08-9	Benzo(k)fluoranthene	10	220	220	27	U
92-52-4	1,1'-Biphenyl	10	220	220	21	U
101-55-3	4-Bromophenyl Phenyl Ether	10	220	220	17	U
85-68-7	Butyl Benzyl Phthalate	10	860	860	270	U
105-60-2	Caprolactam	10	860	860	180	U
86-74-8	Carbazole	10	220	220	21	U
59-50-7	4-Chloro-3-methylphenol	10	220	220	23	U
106-47-8	4-Chloroaniline	10	860	860	150	U
111-91-1	Bis(2-chloroethoxy)methane	10	220	220	13	U
111-44-4	Bis(2-chloroethyl) Ether	10	220	220	12	U
108-60-1	Bis(2-chloroisopropyl) Ether	10	220	220	11	U
91-58-7	2-Chloronaphthalene	10	220	220	16	U
95-57-8	2-Chlorophenol	10	220	220	17	U
7005-72-3	4-Chlorophenyl Phenyl Ether	10	220	220	17	U
218-01-9	Chrysene	10	130	220	35	J
53-70-3	Dibenz(a,h)anthracene	10	860	860	260	U
132-64-9	Dibenzofuran	10	220	220	16	U
~~84-74-2~~	~~Di-n-butyl Phthalate~~	~~10~~	~~49000~~	~~220~~	~~33~~	~~E~~ J,q
120-83-2	2,4-Dichlorophenol	10	220	220	13	U
91-94-1	3,3'-Dichlorobenzidine	10	4300	4300	1400	U
84-66-2	Diethyl Phthalate	10	35	220	19	J
105-67-9	2,4-Dimethylphenol	10	860	860	190	U
131-11-3	Dimethyl Phthalate	10	180	220	19	J
534-52-1	4,6-Dinitro-2-methylphenol	10	220	220	12	U

Use samples marked w/ ✓ only

00638

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

ASB5-A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27 4MD

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-05RE2 File ID: 0442605D.D

Sampled: 04/20/06 13:30 Prepared: 04/26/06 09:30 Analyzed: 05/01/06 17:15

Solids: 79.00 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0604631 Sequence: 6050131 Calibration: 6D28021 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
51-28-5	2,4-Dinitrophenol	10	430	430	45	U
606-20-2	2,6-Dinitrotoluene	10	940	220	17	
~~121-14-2~~	~~2,4-Dinitrotoluene~~	~~10~~	~~13000~~	~~430~~	~~140~~	~~E~~ J,9
117-84-0	Di-n-octyl Phthalate	10	160	220	25	J
117-81-7	Bis(2-ethylhexyl) Phthalate	10	5700	860	250	
206-44-0	Fluoranthene	10	430	220	24	
86-73-7	Fluorene	10	220	220	19	U
118-74-1	Hexachlorobenzene	10	220	220	19	U
87-68-3	Hexachlorobutadiene	10	220	220	16	U
77-47-4	Hexachlorocyclopentadiene	10	430	430	140	U
67-72-1	Hexachloroethane	10	220	220	13	U
193-39-5	Indeno(1,2,3-cd)pyrene	10	860	860	240	U
78-59-1	Isophorone	10	220	220	19	U
91-57-6	2-Methylnaphthalene	10	220	220	19	U
106-44-5	4-Methylphenol	10	220	220	15	U
95-48-7	2-Methylphenol	10	220	220	13	U
91-20-3	Naphthalene	10	220	220	22	U
99-09-2	3-Nitroaniline	10	860	860	220	U
88-74-4	2-Nitroaniline	10	860	860	190	U
100-01-6	4-Nitroaniline	10	860	860	160	U
98-95-3	Nitrobenzene	10	220	220	23	U
88-75-5	2-Nitrophenol	10	220	220	18	U
100-02-7	4-Nitrophenol	10	1100	1100	350	U
86-30-6	N-Nitroso-diphenylamine	10	2900	220	15	
621-64-7	N-Nitroso-di-n-propylamine	10	220	220	19	U
87-86-5	Pentachlorophenol	10	430	430	28	U
85-01-8	Phenanthrene	10	150	220	22	J
108-95-2	Phenol	10	220	220	22	U
129-00-0	Pyrene	10	270	220	26	
95-95-4	2,4,5-Trichlorophenol	10	430	430	120	U
88-06-2	2,4,6-Trichlorophenol	10	220	220	13	U
95-94-3	1,2,4,5-Tetrachlorobenzene	10	220	220	10	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% REC.	QC Limits	Q
2-Fluorophenol	844	491	58	29 - 115	D

Use samples marked w/ ✓ only

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

ASB5-A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27 4MD

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-05RE2 File ID: 0442605D.D

Sampled: 04/20/06 13:30 Prepared: 04/26/06 09:30 Analyzed: 05/01/06 17:15

Solids: 79.00 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0604631 Sequence: 6050131 Calibration: 6D28021 Instrument: 195

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% REC.	QC Limits	Q
Phenol-d6	844	578	68	38 - 107	D
Nitrobenzene-d5	422	232	55	40 - 132	D
2-Fluorobiphenyl	422	309	73	50 - 118	D
2,4,6-Tribromophenol	844	357	42	22 - 113	D
o-Terphenyl	422	343	81	41 - 125	D

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	34908	4.87	34033	4.85	
Naphthalene-d8	147805	6.36	140894	6.35	
Acenaphthene-d10	77262	8.35	74507	8.35	
Phenanthrene-d10	109291	10.01	118119	10.01	
Chrysene-d12	82076	12.95	97268	12.94	
Perylene-d12	50222	14.43	71617	14.41	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

ASB5-A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27 4MD

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-05RE1 File ID: 604426D5.D

Sampled: 04/20/06 13:30 Prepared: 04/26/06 09:30 Analyzed: 05/01/06 13:00

Solids: 79.00 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0604631 Sequence: 6050131 Calibration: 6D28021 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
83-32-9	Acenaphthene	100	2200	2200	170	U
208-96-8	Acenaphthylene	100	2200	2200	170	U
98-86-2	Acetophenone	100	4300	4300	1200	U
120-12-7	Anthracene	100	2200	2200	210	U
1912-24-9	Atrazine	100	2200	2200	240	U
100-52-7	Benzaldehyde	100	2200	2200	240	U UJ,c
56-55-3	Benzo(a)anthracene	100	2200	2200	380	U
50-32-8	Benzo(a)pyrene	100	2200	2200	390	U
205-99-2	Benzo(b)fluoranthene	100	2200	2200	380	U
191-24-2	Benzo(g,h,i)perylene	100	8600	8600	2700	U
207-08-9	Benzo(k)fluoranthene	100	2200	2200	270	U
92-52-4	1,1'-Biphenyl	100	2200	2200	210	U
101-55-3	4-Bromophenyl Phenyl Ether	100	2200	2200	170	U
85-68-7	Butyl Benzyl Phthalate	100	8600	8600	2700	U
105-60-2	Caprolactam	100	8600	8600	1800	U
86-74-8	Carbazole	100	2200	2200	210	U
59-50-7	4-Chloro-3-methylphenol	100	2200	2200	230	U
106-47-8	4-Chloroaniline	100	8600	8600	1500	U
111-91-1	Bis(2-chloroethoxy)methane	100	2200	2200	130	U
111-44-4	Bis(2-chloroethyl) Ether	100	2200	2200	120	U
108-60-1	Bis(2-chloroisopropyl) Ether	100	2200	2200	110	U
91-58-7	2-Chloronaphthalene	100	2200	2200	160	U
95-57-8	2-Chlorophenol	100	2200	2200	170	U
7005-72-3	4-Chlorophenyl Phenyl Ether	100	2200	2200	170	U
218-01-9	Chrysene	100	2200	2200	350	U
53-70-3	Dibenz(a,h)anthracene	100	8600	8600	2600	U
132-64-9	Dibenzofuran	100	2200	2200	160	U
84-74-2	Di-n-butyl Phthalate	100	62000	2200	330	
120-83-2	2,4-Dichlorophenol	100	2200	2200	130	U
91-94-1	3,3'-Dichlorobenzidine	100	43000	43000	14000	U
84-66-2	Diethyl Phthalate	100	2200	2200	190	U
105-67-9	2,4-Dimethylphenol	100	8600	8600	1900	U
131-11-3	Dimethyl Phthalate	100	2200	2200	190	U
534-52-1	4,6-Dinitro-2-methylphenol	100	2200	2200	120	U

use sample w/ ✓ only

00625

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

ASB5-A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27 4MD

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-05RE1 File ID: 604426D5.D

Sampled: 04/20/06 13:30 Prepared: 04/26/06 09:30 Analyzed: 05/01/06 13:00

Solids: 79.00 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0604631 Sequence: 6050131 Calibration: 6D28021 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
51-28-5	2,4-Dinitrophenol	100	4300	4300	450	U
606-20-2	2,6-Dinitrotoluene	100	490	2200	170	J
121-14-2	2,4-Dinitrotoluene	100	11000	4300	1400	
117-84-0	Di-n-octyl Phthalate	100	2200	2200	250	U
117-81-7	Bis(2-ethylhexyl) Phthalate	100	5700	8600	2500	J
206-44-0	Fluoranthene	100	2200	2200	240	U
86-73-7	Fluorene	100	2200	2200	190	U
118-74-1	Hexachlorobenzene	100	2200	2200	190	U
87-68-3	Hexachlorobutadiene	100	2200	2200	160	U
77-47-4	Hexachlorocyclopentadiene	100	4300	4300	1400	U
67-72-1	Hexachloroethane	100	2200	2200	130	U
193-39-5	Indeno(1,2,3-cd)pyrene	100	8600	8600	2400	U
78-59-1	Isophorone	100	2200	2200	190	U
91-57-6	2-Methylnaphthalene	100	2200	2200	190	U
106-44-5	4-Methylphenol	100	2200	2200	150	U
95-48-7	2-Methylphenol	100	2200	2200	130	U
91-20-3	Naphthalene	100	2200	2200	220	U
99-09-2	3-Nitroaniline	100	8600	8600	2200	U
88-74-4	2-Nitroaniline	100	8600	8600	1900	U
100-01-6	4-Nitroaniline	100	8600	8600	1600	U
98-95-3	Nitrobenzene	100	2200	2200	230	U
88-75-5	2-Nitrophenol	100	2200	2200	180	U
100-02-7	4-Nitrophenol	100	11000	11000	3500	U
86-30-6	N-Nitroso-diphenylamine	100	2800	2200	150	
621-64-7	N-Nitroso-di-n-propylamine	100	2200	2200	190	U
87-86-5	Pentachlorophenol	100	4300	4300	280	U
85-01-8	Phenanthrene	100	2200	2200	220	U
108-95-2	Phenol	100	2200	2200	220	U
129-00-0	Pyrene	100	2200	2200	260	U
95-95-4	2,4,5-Trichlorophenol	100	4300	4300	1200	U
88-06-2	2,4,6-Trichlorophenol	100	2200	2200	130	U
95-94-3	1,2,4,5-Tetrachlorobenzene	100	2200	2200	100	U

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	33669	4.87	34033	4.85	

use sample w/ ✓ only

: 00627

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

ASB5-A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27 4MD

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-05RE1 File ID: 604426D5.D

Sampled: 04/20/06 13:30 Prepared: 04/26/06 09:30 Analyzed: 05/01/06 13:00

Solids: 79.00 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0604631 Sequence: 6050131 Calibration: 6D28021 Instrument: 195

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Naphthalene-d8	143703	6.36	140894	6.35	
Acenaphthene-d10	75335	8.35	74507	8.35	
Phenanthrene-d10	118046	10.01	118119	10.01	
Chrysene-d12	79140	12.94	97268	12.94	
Perylene-d12	55391	14.42	71617	14.41	

* Values outside of QC limits

: 00628

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

ASB5-B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27 4MD

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-06 File ID: 60442606.D

Sampled: 04/20/06 13:50 Prepared: 04/26/06 09:30 Analyzed: 05/01/06 11:37

Solids: 73.00 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0604631 Sequence: 6050131 Calibration: 6D28021 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
83-32-9	Acenaphthene	1	23	23	1.8	U
208-96-8	Acenaphthylene	1	23	23	1.8	U
98-86-2	Acetophenone	1	47	47	13	U
120-12-7	Anthracene	1	23	23	2.2	U
1912-24-9	Atrazine	1	23	23	2.6	U
100-52-7	Benzaldehyde	1	23	23	2.6	U UJc
56-55-3	Benzo(a)anthracene	1	23	23	4.2	U
50-32-8	Benzo(a)pyrene	1	23	23	4.2	U
205-99-2	Benzo(b)fluoranthene	1	23	23	4.1	U
191-24-2	Benzo(g,h,i)perylene	1	93	93	29	U
207-08-9	Benzo(k)fluoranthene	1	23	23	3.0	U
92-52-4	1,1'-Biphenyl	1	23	23	2.2	U
101-55-3	4-Bromophenyl Phenyl Ether	1	23	23	1.8	U
85-68-7	Butyl Benzyl Phthalate	1	93	93	29	U
105-60-2	Caprolactam	1	93	93	20	U
86-74-8	Carbazole	1	23	23	2.3	U
59-50-7	4-Chloro-3-methylphenol	1	23	23	2.5	U
106-47-8	4-Chloroaniline	1	93	93	17	U
111-91-1	Bis(2-chloroethoxy)methane	1	23	23	1.4	U
111-44-4	Bis(2-chloroethyl) Ether	1	23	23	1.3	U
108-60-1	Bis(2-chloroisopropyl) Ether	1	23	23	1.2	U
91-58-7	2-Chloronaphthalene	1	23	23	1.7	U
95-57-8	2-Chlorophenol	1	23	23	1.9	U
7005-72-3	4-Chlorophenyl Phenyl Ether	1	23	23	1.9	U
218-01-9	Chrysene	1	23	23	3.8	U
53-70-3	Dibenz(a,h)anthracene	1	93	93	28	U
132-64-9	Dibenzofuran	1	23	23	1.7	U
84-74-2	Di-n-butyl Phthalate	1	89	23	3.6	
120-83-2	2,4-Dichlorophenol	1	23	23	1.4	U
91-94-1	3,3´-Dichlorobenzidine	1	470	470	150	U
84-66-2	Diethyl Phthalate	1	3.9	23	2.1	J
105-67-9	2,4-Dimethylphenol	1	93	93	21	U
131-11-3	Dimethyl Phthalate	1	23	23	2.0	U
534-52-1	4,6-Dinitro-2-methylphenol	1	23	23	1.3	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

ASB5-B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27 4MD

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-06 File ID: 60442606.D

Sampled: 04/20/06 13:50 Prepared: 04/26/06 09:30 Analyzed: 05/01/06 11:37

Solids: 73.00 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0604631 Sequence: 6050131 Calibration: 6D28021 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
51-28-5	2,4-Dinitrophenol	1	47	47	4.8	U
606-20-2	2,6-Dinitrotoluene	1	23	23	1.8	U
121-14-2	2,4-Dinitrotoluene	1	47	47	15	U
117-84-0	Di-n-octyl Phthalate	1	23	23	2.8	U
117-81-7	Bis(2-ethylhexyl) Phthalate	1	130	93	27	
206-44-0	Fluoranthene	1	23	23	2.5	U
86-73-7	Fluorene	1	23	23	2.1	U
118-74-1	Hexachlorobenzene	1	23	23	2.1	U
87-68-3	Hexachlorobutadiene	1	23	23	1.7	U
77-47-4	Hexachlorocyclopentadiene	1	47	47	15	U
67-72-1	Hexachloroethane	1	23	23	1.4	U
193-39-5	Indeno(1,2,3-cd)pyrene	1	93	93	26	U
78-59-1	Isophorone	1	23	23	2.0	U
91-57-6	2-Methylnaphthalene	1	23	23	2.1	U
106-44-5	4-Methylphenol	1	23	23	1.7	U
95-48-7	2-Methylphenol	1	23	23	1.4	U
91-20-3	Naphthalene	1	23	23	2.4	U
99-09-2	3-Nitroaniline	1	93	93	23	U
88-74-4	2-Nitroaniline	1	93	93	21	U
100-01-6	4-Nitroaniline	1	93	93	17	U
98-95-3	Nitrobenzene	1	23	23	2.5	U
88-75-5	2-Nitrophenol	1	23	23	2.0	U
100-02-7	4-Nitrophenol	1	120	120	38	U
86-30-6	N-Nitroso-diphenylamine	1	5.2	23	1.6	J
621-64-7	N-Nitroso-di-n-propylamine	1	23	23	2.1	U
87-86-5	Pentachlorophenol	1	47	47	3.0	U
85-01-8	Phenanthrene	1	23	23	2.4	U
108-95-2	Phenol	1	23	23	2.4	U
129-00-0	Pyrene	1	23	23	2.8	U
95-95-4	2,4,5-Trichlorophenol	1	47	47	13	U
88-06-2	2,4,6-Trichlorophenol	1	23	23	1.4	U
95-94-3	1,2,4,5-Tetrachlorobenzene	1	23	23	1.1	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% REC.	QC Limits	Q
2-Fluorophenol	913	664	73	29 - 115	

: 00661

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

ASB5-B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27 4MD

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-06 File ID: 60442606.D

Sampled: 04/20/06 13:50 Prepared: 04/26/06 09:30 Analyzed: 05/01/06 11:37

Solids: 73.00 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0604631 Sequence: 6050131 Calibration: 6D28021 Instrument: 195

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% REC.	QC Limits	Q
Phenol-d6	913	730	80	38 - 107	
Nitrobenzene-d5	457	366	80	40 - 132	
2-Fluorobiphenyl	457	373	82	50 - 118	
2,4,6-Tribromophenol	913	673	74	22 - 113	
o-Terphenyl	457	400	88	41 - 125	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	39121	4.86	34033	4.85	
Naphthalene-d8	164183	6.35	140894	6.35	
Acenaphthene-d10	86369	8.35	74507	8.35	
Phenanthrene-d10	137728	10	118119	10.01	
Chrysene-d12	107734	12.94	97268	12.94	
Perylene-d12	69990	14.41	71617	14.41	

* Values outside of QC limits

SAMPLE ID SUMMARY

USEPA-8081A

REVISED MA 6/22/09

Laboratory: TriMatrix Laboratories, Inc.

SDG: 36440-27

Client: URS Group, Inc.

Project: RFAAP SSP Investigation

Client Sample Id:	Lab Sample Id:
FSB4A	0604361-01
FSB4A	0604361-01RE1
FSB4B	0604361-02
FSB4B	0604361-02RE1
FSB4C	0604361-03
FSB4C	0604361-03RE1
EQBK-1	0604361-04
ASB4-A	0604426-01
ASB4-A	0604426-01RE1
ASB4-B	0604426-02
ASB4-B	0604426-02RE1
ASB4-C	0604426-03
ASB4-C	0604426-03RE1
DUP-1 > ASB4A	0604426-04
DUP-1	0604426-04RE1
ASB5-A	0604426-05
ASB5-A	0604426-05RE1
ASB5-A	0604426-05RE2
ASB5-A	0604426-05RE3
ASB5-B	0604426-06
ASB5-B	0604426-06RE1

01080

ANALYSIS DATA SHEET

FSB4A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27

REVISED
IAW 6/22/06

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604361-01 File ID: B39_151-0

Sampled: 04/19/06 09:20 Prepared: 04/27/06 09:11 Analyzed: 05/02/06 04:52

Solids: 78.00 Preparation: 3550B Sonication Initial/Final: 30 g / 10 mL

QC Batch: 0604629 Sequence: 6051614 Calibration: 6E24006 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	26	26	0.65	U
319-85-7	beta-BHC	1	26	26	0.80	U
58-89-9	gamma-BHC (Lindane)	1	26	26	0.67	U
319-86-8	delta-BHC	1	26	26	0.50	U
5103-71-9	alpha-Chlordane	1	26	26	0.58	U
5103-74-2	gamma-Chlordane	1	26	26	0.59	U
72-54-8	4,4'-DDD	1	26	26	0.61	U
72-55-9	4,4'-DDE	1	26	26	0.74	U
50-29-3	4,4'-DDT	1	26	26	0.69	U
309-00-2	Aldrin	1	26	26	0.58	U
~~60-57-1~~	~~Dieldrin~~ we second	~~1~~	~~2.5~~	~~26~~	~~0.60~~	J J,m
959-98-8	Endosulfan I column YM	1	26	26	0.67	U
33213-65-9	Endosulfan II	1	26	26	0.40	U
1031-07-8	Endosulfan Sulfate	1	26	26	0.69	U
72-20-8	Endrin	1	26	26	0.64	U
7421-93-4	Endrin Aldehyde	1	26	26	0.56	U
53494-70-5	Endrin Ketone	1	26	26	0.59	U
76-44-8	Heptachlor	1	26	26	0.63	U
1024-57-3	Heptachlor Epoxide	1	26	26	0.89	U
72-43-5	Methoxychlor	1	26	26	1.2	U
8001-35-2	Toxaphene	1	220	220	30	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	42.7	40.2	94	58 - 137	
Decachlorobiphenyl	42.7	42.4	99	56 - 150	

* Values outside of QC limits

01125

ANALYSIS DATA SHEET

FSB4A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27

Client: URS Group, Inc. Project: RFAAP SSP Investigation

REVISED CLH 6/22/06

Matrix: Soil Laboratory ID: 0604361-01RE1 File ID: A134077-0

Sampled: 04/19/06 09:20 Prepared: 04/27/06 09:11 Analyzed: 05/05/06 18:47

Solids: 78.00 Preparation: 3550B Sonication Initial/Final: 30 g / 10 mL

QC Batch: 0604629 Sequence: 6051818 Calibration: 6E24010 Instrument: 158

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q	
319-84-6	alpha-BHC	1	26	26	0.65	U	
319-85-7	beta-BHC	1	26	26	0.80	U	
58-89-9	gamma-BHC (lindane)	1	26	26	0.67	U	
319-86-8	delta-BHC	1	26	26	0.50	U	
5103-71-9	alpha-Chlordane	1	26	26	0.58	U	
5103-74-2	gamma-Chlordane	1	26	26	0.59	U	
72-54-8	4,4'-DDD	1	26	26	0.61	U	
72-55-9	4,4'-DDE	1	26	26	0.74	U	
50-29-3	4,4'-DDT	1	26	26	0.69	U	
309-00-2	Aldrin	1	26	26	0.58	U	
✓ 60-57-1	Dieldrin	1	9.2	26	0.60	J	J,m
959-98-8	Endosulfan I	1	26	26	0.67	U	
33213-65-9	Endosulfan II	1	26	26	0.40	U	
1031-07-8	Endosulfan Sulfate	1	26	26	0.69	U	
72-20-8	Endrin	1	26	26	0.64	U	
7421-93-4	Endrin Aldehyde	1	26	26	0.56	U	
53494-70-5	Endrin Ketone	1	26	26	0.59	U	
76-44-8	Heptachlor	1	26	26	0.63	U	
1024-57-3	Heptachlor Epoxide	1	26	26	0.89	U	
72-43-5	Methoxychlor	1	26	26	1.2	U	R,c
8001-35-2	Toxaphene	1	220	220	30	U	

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	42.7	43.8	103	58 - 137	
Decachlorobiphenyl	42.7	49.1	115	56 - 150	

* Values outside of QC limits

use only ✓ result
JM

01131

ANALYSIS DATA SHEET

FSB4B

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-27

Client: URS Group, Inc.
Project: RFAAP SSP Investigation

REVISED
KM 6/22/06

Matrix: Soil
Laboratory ID: 0604361-02
File ID: B39_152-0

Sampled: 04/19/06 09:40
Prepared: 04/27/06 09:11
Analyzed: 05/02/06 05:27

Solids: 83.00
Preparation: 3550B Sonication
Initial/Final: 30 g / 10 mL

QC Batch: 0604629
Sequence: 6051614
Calibration: 6E24006
Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	24	24	0.61	U
319-85-7	beta-BHC	1	24	24	0.76	U
58-89-9	gamma-BHC (Lindane)	1	24	24	0.63	U
319-86-8	delta-BHC	1	24	24	0.47	U
5103-71-9	alpha-Chlordane	1	24	24	0.54	U
5103-74-2	gamma-Chlordane	1	24	24	0.55	U
72-54-8	4,4'-DDD	1	24	24	0.58	U
72-55-9	4,4'-DDE	1	24	24	0.70	U
50-29-3	4,4'-DDT	1	24	24	0.65	U
309-00-2	Aldrin	1	24	24	0.54	U
60-57-1	Dieldrin	1	24	24	0.57	U
959-98-8	Endosulfan I	1	24	24	0.63	U
33213-65-9	Endosulfan II	1	24	24	0.38	U
1031-07-8	Endosulfan Sulfate	1	24	24	0.65	U
72-20-8	Endrin	1	24	24	0.60	U
7421-93-4	Endrin Aldehyde	1	24	24	0.52	U
53494-70-5	Endrin Ketone	1	24	24	0.55	U
76-44-8	Heptachlor	1	24	24	0.59	U
1024-57-3	Heptachlor Epoxide	1	24	24	0.83	U
72-43-5	Methoxychlor	1	24	24	1.1	U
8001-35-2	Toxaphene	1	200	200	28	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	40.2	40.3	100	58 - 137	
Decachlorobiphenyl	40.2	39.6	99	56 - 150	

* Values outside of QC limits

01138

ANALYSIS DATA SHEET

FSB4B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27

Client: URS Group, Inc. Project: RFAAP SSP Investigation

REVISED 10/5 6/22/06

Matrix: Soil Laboratory ID: 0604361-02RE1 File ID: A134078-0

Sampled: 04/19/06 09:40 Prepared: 04/27/06 09:11 Analyzed: 05/05/06 19:22

Solids: 83.00 Preparation: 3550B Sonication Initial/Final: 30 g / 10 mL

QC Batch: 0604629 Sequence: 6051818 Calibration: 6E24010 Instrument: 158

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	24	24	0.61	U
319-85-7	beta-BHC	1	24	24	0.76	U
58-89-9	gamma-BHC (lindane)	1	24	24	0.63	U
319-86-8	delta-BHC	1	24	24	0.47	U
5103-71-9	alpha-Chlordane	1	24	24	0.54	U
5103-74-2	gamma-Chlordane	1	24	24	0.55	U
72-54-8	4,4'-DDD	1	24	24	0.58	U
72-55-9	4,4'-DDE	1	24	24	0.70	U
50-29-3	4,4'-DDT	1	24	24	0.65	U
309-00-2	Aldrin	1	24	24	0.54	U
60-57-1	Dieldrin	1	24	24	0.57	U
959-98-8	Endosulfan I	1	24	24	0.63	U
33213-65-9	Endosulfan II	1	24	24	0.38	U
1031-07-8	Endosulfan Sulfate	1	24	24	0.65	U
72-20-8	Endrin	1	24	24	0.60	U
7421-93-4	Endrin Aldehyde	1	24	24	0.52	U
53494-70-5	Endrin Ketone	1	24	24	0.55	U
76-44-8	Heptachlor	1	24	24	0.59	U
1024-57-3	Heptachlor Epoxide	1	24	24	0.83	U
72-43-5	Methoxychlor	1	24	24	1.1	U
8001-35-2	Toxaphene	1	200	200	28	U

R, C

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	40.2	38.5	96	58 - 137	
Decachlorobiphenyl	40.2	35.9	89	56 - 150	

* Values outside of QC limits

01143

ANALYSIS DATA SHEET

FSB4C

REVISED
LMW 6/27/06

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604361-03 File ID: B39_153-0

Sampled: 04/19/06 10:00 Prepared: 04/27/06 09:11 Analyzed: 05/02/06 06:02

Solids: 86.00 Preparation: 3550B Sonication Initial/Final: 30 g / 10 mL

QC Batch: 0604629 Sequence: 6051614 Calibration: 6E24006 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	23	23	0.59	U
319-85-7	beta-BHC	1	23	23	0.73	U
58-89-9	gamma-BHC (Lindane)	1	23	23	0.61	U
319-86-8	delta-BHC	1	23	23	0.45	U
5103-71-9	alpha-Chlordane	1	23	23	0.52	U
5103-74-2	gamma-Chlordane	1	23	23	0.53	U
72-54-8	4,4'-DDD	1	23	23	0.56	U
72-55-9	4,4'-DDE	1	23	23	0.67	U
50-29-3	4,4'-DDT	1	23	23	0.63	U
309-00-2	Aldrin	1	23	23	0.52	U
60-57-1	Dieldrin	1	23	23	0.55	U
959-98-8	Endosulfan I	1	23	23	0.61	U
33213-65-9	Endosulfan II	1	23	23	0.37	U
1031-07-8	Endosulfan Sulfate	1	23	23	0.62	U
72-20-8	Endrin	1	23	23	0.58	U
7421-93-4	Endrin Aldehyde	1	23	23	0.50	U
53494-70-5	Endrin Ketone	1	23	23	0.53	U
76-44-8	Heptachlor	1	23	23	0.57	U
1024-57-3	Heptachlor Epoxide	1	23	23	0.80	U
72-43-5	Methoxychlor	1	23	23	1.1	U
8001-35-2	Toxaphene	1	200	200	27	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	38.8	38.5	99	58 - 137	
Decachlorobiphenyl	38.8	35.8	92	56 - 150	

* Values outside of QC limits

01148

ANALYSIS DATA SHEET

FSB4C

REVISED MH 6/22/06

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604361-03RE1 File ID: A134079-0

Sampled: 04/19/06 10:00 Prepared: 04/27/06 09:11 Analyzed: 05/05/06 19:57

Solids: 86.00 Preparation: 3550B Sonication Initial/Final: 30 g / 10 mL

QC Batch: 0604629 Sequence: 6051818 Calibration: 6E24010 Instrument: 158

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	23	23	0.59	U
319-85-7	beta-BHC	1	23	23	0.73	U
58-89-9	gamma-BHC (lindane)	1	23	23	0.61	U
319-86-8	delta-BHC	1	23	23	0.45	U
5103-71-9	alpha-Chlordane	1	23	23	0.52	U
5103-74-2	gamma-Chlordane	1	23	23	0.53	U
72-54-8	4,4'-DDD	1	23	23	0.56	U
72-55-9	4,4'-DDE	1	23	23	0.67	U
50-29-3	4,4'-DDT	1	23	23	0.63	U
309-00-2	Aldrin	1	23	23	0.52	U
60-57-1	Dieldrin	1	23	23	0.55	U
959-98-8	Endosulfan I	1	23	23	0.61	U
33213-65-9	Endosulfan II	1	23	23	0.37	U
1031-07-8	Endosulfan Sulfate	1	23	23	0.62	U
72-20-8	Endrin	1	23	23	0.58	U
7421-93-4	Endrin Aldehyde	1	23	23	0.50	U
53494-70-5	Endrin Ketone	1	23	23	0.53	U
76-44-8	Heptachlor	1	23	23	0.57	U
1024-57-3	Heptachlor Epoxide	1	23	23	0.80	U
72-43-5	Methoxychlor	1	23	23	1.1	U RJC
8001-35-2	Toxaphene	1	200	200	27	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	38.8	41.5	107	58 - 137	
Decachlorobiphenyl	38.8	47.4	122	56 - 150	

* Values outside of QC limits

ANALYSIS DATA SHEET

EQBK-1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Water Laboratory ID: 0604361-04 File ID: B39_088-0

Sampled: 04/19/06 15:15 Prepared: 04/25/06 08:12 Analyzed: 04/26/06 03:36

Solids: Preparation: 3510C Liquid-Liquid Ex Initial/Final: 1030 mL / 2 mL

QC Batch: 0604518 Sequence: 6042640 Calibration: 6E03017 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/L)	MRL	MDL	Q
319-84-6	alpha-BHC	1	0.050	0.050	0.0014	U
319-85-7	beta-BHC	1	0.050	0.050	0.0039	U
58-89-9	gamma-BHC (Lindane)	1	0.050	0.050	0.0016	U
319-86-8	delta-BHC	1	0.050	0.050	0.0025	U
5103-71-9	alpha-Chlordane	1	0.050	0.050	0.0024	U
5103-74-2	gamma-Chlordane	1	0.050	0.050	0.0023	U
72-54-8	4,4'-DDD	1	0.10	0.10	0.0016	U
72-55-9	4,4'-DDE	1	0.10	0.10	0.0025	U
50-29-3	4,4'-DDT	1	0.10	0.10	0.0018	U
309-00-2	Aldrin	1	0.050	0.050	0.0019	U
60-57-1	Dieldrin	1	0.10	0.10	0.0034	U
959-98-8	Endosulfan I	1	0.050	0.050	0.0026	U
33213-65-9	Endosulfan II	1	0.10	0.10	0.0021	U
1031-07-8	Endosulfan Sulfate	1	0.10	0.10	0.0022	U
72-20-8	Endrin	1	0.10	0.10	0.0038	U
7421-93-4	Endrin Aldehyde	1	0.10	0.10	0.0053	U
53494-70-5	Endrin Ketone	1	0.10	0.10	0.0020	U
76-44-8	Heptachlor	1	0.050	0.050	0.0021	U
1024-57-3	Heptachlor Epoxide	1	0.050	0.050	0.0022	U
72-43-5	Methoxychlor	1	0.50	0.50	0.0032	U
8001-35-2	Toxaphene	1	1.0	1.0	0.12	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	0.194	0.107	55	36 - 123	
Decachlorobiphenyl	0.194	0.189	97	30 - 103	

* Values outside of QC limits

61158

ANALYSIS DATA SHEET

ASB4-A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-01 File ID: B39_154-0

Sampled: 04/20/06 11:30 Prepared: 04/27/06 09:11 Analyzed: 05/02/06 06:36

Solids: 78.00 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0604629 Sequence: 6051614 Calibration: 6E24006 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	26	26	0.65	U
319-85-7	beta-BHC	1	26	26	0.80	U
58-89-9	gamma-BHC (Lindane)	1	26	26	0.67	U
319-86-8	delta-BHC	1	26	26	0.50	U
5103-71-9	alpha-Chlordane	1	26	26	0.58	U
5103-74-2	gamma-Chlordane	1	26	26	0.59	U
72-54-8	4,4'-DDD	1	26	26	0.61	U
72-55-9	4,4'-DDE	1	26	26	0.74	U
50-29-3	4,4'-DDT	1	26	26	0.69	U
309-00-2	Aldrin	1	26	26	0.58	U
60-57-1	Dieldrin use	1	4.2	26	0.60	J 5,g
959-98-8	Endosulfan I second column	1	26	26	0.67	U
33213-65-9	Endosulfan II LOM	1	26	26	0.40	U
1031-07-8	Endosulfan Sulfate	1	26	26	0.69	U
72-20-8	Endrin	1	26	26	0.64	U
7421-93-4	Endrin Aldehyde	1	26	26	0.56	U
53494-70-5	Endrin Ketone	1	26	26	0.59	U
76-44-8	Heptachlor	1	26	26	0.63	U
1024-57-3	Heptachlor Epoxide	1	26	26	0.89	U
72-43-5	Methoxychlor	1	26	26	1.2	U
8001-35-2	Toxaphene	1	220	220	30	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	42.7	34.5	81	58 - 137	
Decachlorobiphenyl	42.7	35.8	84	56 - 150	

* Values outside of QC limits

ANALYSIS DATA SHEET

ASB4-A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-01RE1 File ID: A134051-0

Sampled: 04/20/06 11:30 Prepared: 04/27/06 09:11 Analyzed: 05/05/06 00:59

Solids: 78.00 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0604629 Sequence: 6051930 Calibration: 6E19011 Instrument: 158

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	26	26	0.65	U
319-85-7	beta-BHC	1	26	26	0.80	U
58-89-9	gamma-BHC (lindane)	1	26	26	0.67	U
319-86-8	delta-BHC	1	26	26	0.50	U
5103-71-9	alpha-Chlordane	1	26	26	0.58	U
5103-74-2	gamma-Chlordane	1	26	26	0.59	U
72-54-8	4,4'-DDD	1	26	26	0.61	U
72-55-9	4,4'-DDE	1	26	26	0.74	U
50-29-3	4,4'-DDT	1	26	26	0.69	U
309-00-2	Aldrin	1	26	26	0.58	U
60-57-1	Dieldrin	1	14	26	0.60	J
959-98-8	Endosulfan I	1	26	26	0.67	U
33213-65-9	Endosulfan II	1	26	26	0.40	U
1031-07-8	Endosulfan Sulfate	1	26	26	0.69	U
72-20-8	Endrin	1	26	26	0.64	U
7421-93-4	Endrin Aldehyde	1	26	26	0.56	U
53494-70-5	Endrin Ketone	1	26	26	0.59	U
76-44-8	Heptachlor	1	26	26	0.63	U
1024-57-3	Heptachlor Epoxide	1	26	26	0.89	U
72-43-5	Methoxychlor	1	26	26	1.2	U
8001-35-2	Toxaphene	1	220	220	30	U

J, g ✓

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	42.7	41.3	97	58 - 137	
Decachlorobiphenyl	42.7	53.3	125	56 - 150	

* Values outside of QC limits

use only ✓ result

01173

ANALYSIS DATA SHEET

ASB4-B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-02 File ID: B39_155-0

Sampled: 04/20/06 12:00 Prepared: 04/27/06 09:11 Analyzed: 05/02/06 07:11

Solids: 78.00 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0604629 Sequence: 6051614 Calibration: 6E24006 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	26	26	0.65	U
319-85-7	beta-BHC	1	26	26	0.80	U
58-89-9	gamma-BHC (Lindane)	1	26	26	0.67	U
319-86-8	delta-BHC	1	26	26	0.50	U
5103-71-9	alpha-Chlordane	1	26	26	0.58	U
5103-74-2	gamma-Chlordane	1	26	26	0.59	U
72-54-8	4,4'-DDD	1	26	26	0.61	U
72-55-9	4,4'-DDE	1	26	26	0.74	U
50-29-3	4,4'-DDT	1	26	26	0.69	U
309-00-2	Aldrin	1	26	26	0.58	U
60-57-1	Dieldrin (use second column)	1	0.81	26	0.60	J, g
959-98-8	Endosulfan I	1	26	26	0.67	U
33213-65-9	Endosulfan II	1	26	26	0.40	U
1031-07-8	Endosulfan Sulfate	1	26	26	0.69	U
72-20-8	Endrin	1	26	26	0.64	U
7421-93-4	Endrin Aldehyde	1	26	26	0.56	U
53494-70-5	Endrin Ketone	1	26	26	0.59	U
76-44-8	Heptachlor	1	26	26	0.63	U
1024-57-3	Heptachlor Epoxide	1	26	26	0.89	U
72-43-5	Methoxychlor	1	26	26	1.2	U
8001-35-2	Toxaphene	1	220	220	30	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	42.7	45.1	106	58 - 137	
Decachlorobiphenyl	42.7	41.5	97	56 - 150	

* Values outside of QC limits

01179

ANALYSIS DATA SHEET

ASB4-B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-02RE1 File ID: A134081-0

Sampled: 04/20/06 12:00 Prepared: 04/27/06 09:11 Analyzed: 05/05/06 21:06

Solids: 78.00 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0604629 Sequence: 6051818 Calibration: 6E24010 Instrument: 158

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q	
319-84-6	alpha-BHC	1	26	26	0.65	U	
319-85-7	beta-BHC	1	26	26	0.80	U	
58-89-9	gamma-BHC (lindane)	1	26	26	0.67	U	
319-86-8	delta-BHC	1	26	26	0.50	U	
5103-71-9	alpha-Chlordane	1	26	26	0.58	U	
5103-74-2	gamma-Chlordane	1	26	26	0.59	U	
72-54-8	4,4'-DDD	1	26	26	0.61	U	
72-55-9	4,4'-DDE	1	26	26	0.74	U	
50-29-3	4,4'-DDT	1	26	26	0.69	U	
309-00-2	Aldrin	1	26	26	0.58	U	
60-57-1	Dieldrin	1	4.6	26	0.60	J	J, g✓
959-98-8	Endosulfan I	1	26	26	0.67	U	
33213-65-9	Endosulfan II	1	26	26	0.40	U	
1031-07-8	Endosulfan Sulfate	1	26	26	0.69	U	
72-20-8	Endrin	1	26	26	0.64	U	
7421-93-4	Endrin Aldehyde	1	26	26	0.56	U	
53494-70-5	Endrin Ketone	1	26	26	0.59	U	
76-44-8	Heptachlor	1	26	26	0.63	U	
1024-57-3	Heptachlor Epoxide	1	26	26	0.89	U	
72-43-5	Methoxychlor	1	26	26	1.2	U	R, c
8001-35-2	Toxaphene	1	220	220	30	U	

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	42.7	43.7	102	58 - 137	
Decachlorobiphenyl	42.7	53.3	125	56 - 150	

* Values outside of QC limits

Use only ✓ result
Lam

01184

ANALYSIS DATA SHEET

ASB4-C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-03 File ID: B39_156-0

Sampled: 04/20/06 12:25 Prepared: 04/27/06 09:11 Analyzed: 05/02/06 07:46

Solids: 67.00 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0604629 Sequence: 6051614 Calibration: 6E24006 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	30	30	0.75	U
319-85-7	beta-BHC	1	30	30	0.94	U
58-89-9	gamma-BHC (Lindane)	1	30	30	0.78	U
319-86-8	delta-BHC	1	30	30	0.58	U
5103-71-9	alpha-Chlordane	1	30	30	0.67	U
5103-74-2	gamma-Chlordane	1	30	30	0.68	U
72-54-8	4,4'-DDD	1	30	30	0.71	U
72-55-9	4,4'-DDE	1	30	30	0.86	U
50-29-3	4,4'-DDT	1	30	30	0.80	U
309-00-2	Aldrin	1	30	30	0.67	U
60-57-1	Dieldrin	1	30	30	0.70	U
959-98-8	Endosulfan I	1	30	30	0.78	U
33213-65-9	Endosulfan II	1	30	30	0.47	U
1031-07-8	Endosulfan Sulfate	1	30	30	0.80	U
72-20-8	Endrin	1	30	30	0.75	U
7421-93-4	Endrin Aldehyde	1	30	30	0.65	U
53494-70-5	Endrin Ketone	1	30	30	0.68	U
76-44-8	Heptachlor	1	30	30	0.73	U
1024-57-3	Heptachlor Epoxide	1	30	30	1.0	U
72-43-5	Methoxychlor	1	30	30	1.4	U
8001-35-2	Toxaphene	1	250	250	35	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	49.8	47.8	96	58 - 137	
Decachlorobiphenyl	49.8	44.9	90	56 - 150	

* Values outside of QC limits

: 01189

ANALYSIS DATA SHEET

DUP-1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-04 File ID: B39_219-0

Sampled: 04/20/06 00:00 Prepared: 04/27/06 09:11 Analyzed: 05/05/06 11:38

Solids: 77.00 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0604629 Sequence: 6051632 Calibration: 6E24007 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	26	26	0.66	U
319-85-7	beta-BHC	1	26	26	0.81	U
58-89-9	gamma-BHC (Lindane)	1	26	26	0.68	U
319-86-8	delta-BHC	1	26	26	0.51	U
5103-71-9	alpha-Chlordane	1	26	26	0.58	U
5103-74-2	gamma-Chlordane	1	26	26	0.59	U
72-54-8	4,4'-DDD	1	26	26	0.62	U
72-55-9	4,4'-DDE	1	26	26	0.75	U
50-29-3	4,4'-DDT	1	26	26	0.70	U
309-00-2	Aldrin	1	26	26	0.58	U
~~60-57-1~~	~~Dieldrin~~ not second column	1	0.74	26	0.61	J
959-98-8	Endosulfan I	1	26	26	0.68	U
33213-65-9	Endosulfan II	1	26	26	0.41	U
1031-07-8	Endosulfan Sulfate	1	26	26	0.70	U
72-20-8	Endrin	1	26	26	0.65	U
7421-93-4	Endrin Aldehyde	1	26	26	0.56	U
53494-70-5	Endrin Ketone	1	26	26	0.59	U
76-44-8	Heptachlor	1	26	26	0.64	U
1024-57-3	Heptachlor Epoxide	1	26	26	0.90	U
72-43-5	Methoxychlor	1	26	26	1.2	U
8001-35-2	Toxaphene	1	220	220	30	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	43.3	32.8	76	58 - 137	
Decachlorobiphenyl	43.3	33.2	77	56 - 150	

* Values outside of QC limits

ANALYSIS DATA SHEET

DUP-1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-04RE1 File ID: A134083-0

Sampled: 04/20/06 00:00 Prepared: 04/27/06 09:11 Analyzed: 05/05/06 22:15

Solids: 77.00 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0604629 Sequence: 6051818 Calibration: 6E24010 Instrument: 158

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q	
319-84-6	alpha-BHC	1	26	26	0.66	U	
319-85-7	beta-BHC	1	26	26	0.81	U	
58-89-9	gamma-BHC (lindane)	1	26	26	0.68	U	
319-86-8	delta-BHC	1	26	26	0.51	U	
5103-71-9	alpha-Chlordane	1	26	26	0.58	U	
5103-74-2	gamma-Chlordane	1	26	26	0.59	U	
72-54-8	4,4'-DDD	1	26	26	0.62	U	
72-55-9	4,4'-DDE	1	26	26	0.75	U	
50-29-3	4,4'-DDT	1	26	26	0.70	U	
309-00-2	Aldrin	1	26	26	0.58	U	
60-57-1	Dieldrin	1	3.2	26	0.61	J	J, gr
959-98-8	Endosulfan I	1	26	26	0.68	U	
33213-65-9	Endosulfan II	1	26	26	0.41	U	
1031-07-8	Endosulfan Sulfate	1	26	26	0.70	U	
72-20-8	Endrin	1	26	26	0.65	U	
7421-93-4	Endrin Aldehyde	1	26	26	0.56	U	
53494-70-5	Endrin Ketone	1	26	26	0.59	U	
76-44-8	Heptachlor	1	26	26	0.64	U	
1024-57-3	Heptachlor Epoxide	1	26	26	0.90	U	
72-43-5	Methoxychlor	1	26	26	1.2	U	R, c
8001-35-2	Toxaphene	1	220	220	30	U	

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	43.3	40.6	94	58 - 137	
Decachlorobiphenyl	43.3	49.6	115	56 - 150	

* Values outside of QC limits

use only ✓ result
Lam

: 01267

ANALYSIS DATA SHEET

ASB5-A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-05 File ID: B39_307-0

Sampled: 04/20/06 13:30 Prepared: 04/27/06 09:11 Analyzed: 05/09/06 02:55

Solids: 79.00 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0604629 Sequence: 6052228 Calibration: 6E22006 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	20	510	510	13	U
319-85-7	beta-BHC	20	510	510	16	U
58-89-9	gamma-BHC (Lindane)	20	510	510	13	U
319-86-8	delta-BHC	20	510	510	9.8	U
5103-71-9	alpha-Chlordane	20	510	510	11	U
5103-74-2	gamma-Chlordane	20	510	510	12	U
72-54-8	4,4'-DDD	20	510	510	12	U
72-55-9	4,4'-DDE	20	510	510	15	U
50-29-3	4,4'-DDT	20	510	510	14	U
309-00-2	Aldrin	20	510	510	11	U
60-57-1	Dieldrin	20	510	510	12	U
959-98-8	Endosulfan I	20	510	510	13	U
33213-65-9	Endosulfan II	20	510	510	8.0	U
1031-07-8	Endosulfan Sulfate	20	510	510	14	U
72-20-8	Endrin	20	510	510	13	U
7421-93-4	Endrin Aldehyde	20	510	510	11	U
53494-70-5	Endrin Ketone	20	510	510	12	U
76-44-8	Heptachlor	20	510	510	12	U
1024-57-3	Heptachlor Epoxide	20	510	510	18	U
72-43-5	Methoxychlor	20	510	510	24	U
8001-35-2	Toxaphene	20	4300	4300	590	U

* Values outside of QC limits

: 6i2i2

ANALYSIS DATA SHEET

ASB5-A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-05RE1 File ID: A134125-0

Sampled: 04/20/06 13:30 Prepared: 04/27/06 09:11 Analyzed: 05/06/06 22:23

Solids: 79.00 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0604629 Sequence: 6052210 Calibration: 6E22003 Instrument: 158

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	20	510	510	13	U
319-85-7	beta-BHC	20	510	510	16	U
58-89-9	gamma-BHC (lindane)	20	510	510	13	U
319-86-8	delta-BHC	20	510	510	9.8	U
5103-71-9	alpha-Chlordane	20	510	510	11	U
5103-74-2	gamma-Chlordane	20	510	510	12	U
72-54-8	4,4'-DDD	20	510	510	12	U
72-55-9	4,4'-DDE	20	510	510	15	U
50-29-3	4,4'-DDT	20	510	510	14	U
309-00-2	Aldrin	20	510	510	11	U
60-57-1	Dieldrin	20	510	510	12	U
959-98-8	Endosulfan I	20	510	510	13	U
33213-65-9	Endosulfan II	20	510	510	8.0	U
1031-07-8	Endosulfan Sulfate	20	510	510	14	U
72-20-8	Endrin	20	510	510	13	U
7421-93-4	Endrin Aldehyde	20	510	510	11	U
53494-70-5	Endrin Ketone	20	510	510	12	U
76-44-8	Heptachlor	20	510	510	12	U
1024-57-3	Heptachlor Epoxide	20	510	510	18	U
72-43-5	Methoxychlor	20	510	510	24	U
8001-35-2	Toxaphene	20	4300	4300	590	U

* Values outside of QC limits

ANALYSIS DATA SHEET

ASB5-A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-05RE3 File ID: B39_218-0

Sampled: 04/20/06 13:30 Prepared: 04/27/06 09:11 Analyzed: 05/05/06 11:04

Solids: 79.00 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0604629 Sequence: 6051632 Calibration: 6E24007 Instrument: 199

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	42.2	36.6	87	58 - 137	
Decachlorobiphenyl	42.2	40.8	97	56 - 150	

* Values outside of QC limits

: 61223

ANALYSIS DATA SHEET

ASB5-A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-05RE2 File ID: A134060-0

Sampled: 04/20/06 13:30 Prepared: 04/27/06 09:11 Analyzed: 05/05/06 06:11

Solids: 79.00 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0604629 Sequence: 6051930 Calibration: 6E19011 Instrument: 158

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	42.2	53.8	127	58 - 137	
Decachlorobiphenyl	42.2	76.7	182	56 - 150	*

* Values outside of QC limits

01226

ANALYSIS DATA SHEET

ASB5-B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-06 File ID: B39_220-0

Sampled: 04/20/06 13:50 Prepared: 04/27/06 09:11 Analyzed: 05/05/06 12:12

Solids: 73.00 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0604629 Sequence: 6051632 Calibration: 6E24007 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	27	27	0.69	U
319-85-7	beta-BHC	1	27	27	0.86	U
58-89-9	gamma-BHC (Lindane)	1	27	27	0.72	U
319-86-8	delta-BHC	1	27	27	0.53	U
5103-71-9	alpha-Chlordane	1	27	27	0.62	U
5103-74-2	gamma-Chlordane	1	27	27	0.63	U
72-54-8	4,4'-DDD	1	27	27	0.65	U
72-55-9	4,4'-DDE	1	27	27	0.79	U
50-29-3	4,4'-DDT	1	27	27	0.74	U
309-00-2	Aldrin	1	27	27	0.62	U
60-57-1	Dieldrin	1	27	27	0.65	U
959-98-8	Endosulfan I	1	27	27	0.72	U
33213-65-9	Endosulfan II	1	27	27	0.43	U
1031-07-8	Endosulfan Sulfate	1	27	27	0.74	U
72-20-8	Endrin	1	27	27	0.68	U
7421-93-4	Endrin Aldehyde	1	27	27	0.59	U
53494-70-5	Endrin Ketone	1	27	27	0.63	U
76-44-8	Heptachlor	1	27	27	0.67	U
1024-57-3	Heptachlor Epoxide	1	27	27	0.95	U
72-43-5	Methoxychlor	1	27	27	1.3	U
8001-35-2	Toxaphene	1	230	230	32	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Tetrachloro-m-xylene		45.7	33.5	73	58 - 137	
Decachlorobiphenyl		45.7	34.1	75	56 - 150	

* Values outside of QC limits

01229

ANALYSIS DATA SHEET

ASB5-B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-06RE1 File ID: A134090-0

Sampled: 04/20/06 13:50 Prepared: 04/27/06 09:11 Analyzed: 05/06/06 02:18

Solids: 73.00 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0604629 Sequence: 6051818 Calibration: 6E24010 Instrument: 158

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	27	27	0.69	U
319-85-7	beta-BHC	1	27	27	0.86	U
58-89-9	gamma-BHC (lindane)	1	27	27	0.72	U
319-86-8	delta-BHC	1	27	27	0.53	U
5103-71-9	alpha-Chlordane	1	27	27	0.62	U
5103-74-2	gamma-Chlordane	1	27	27	0.63	U
72-54-8	4,4'-DDD	1	27	27	0.65	U
72-55-9	4,4'-DDE	1	27	27	0.79	U
50-29-3	4,4'-DDT	1	27	27	0.74	U
309-00-2	Aldrin	1	27	27	0.62	U
60-57-1	Dieldrin	1	27	27	0.65	U
959-98-8	Endosulfan I	1	27	27	0.72	U
33213-65-9	Endosulfan II	1	27	27	0.43	U
1031-07-8	Endosulfan Sulfate	1	27	27	0.74	U
72-20-8	Endrin	1	27	27	0.68	U
7421-93-4	Endrin Aldehyde	1	27	27	0.59	U
53494-70-5	Endrin Ketone	1	27	27	0.63	U
76-44-8	Heptachlor	1	27	27	0.67	U
1024-57-3	Heptachlor Epoxide	1	27	27	0.95	U
72-43-5	Methoxychlor	1	27	27	1.3	U R,C
8001-35-2	Toxaphene	1	230	230	32	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	45.7	46.1	101	58 - 137	
Decachlorobiphenyl	45.7	41.0	90	56 - 150	

* Values outside of QC limits

: 01235

SAMPLE ID SUMMARY

USEPA-8082

REVISED
KAH 6/22/06

Laboratory: TriMatrix Laboratories, Inc.

SDG: 36440-27

Client: URS Group, Inc.

Project: RFAAP SSP Investigation

Client Sample Id:	Lab Sample Id:
FSB4A	0604361-01
FSB4B	0604361-02
FSB4C	0604361-03
EQBK-1	0604361-04
ASB4-A	0604426-01
ASB4-B	0604426-02
ASB4-C	0604426-03
DUP-1 → ASB4A	0604426-04
ASB5-A	0604426-05
ASB5-B	0604426-06

01807

ANALYSIS DATA SHEET

FSB4A

REVISED
KLN 6/22/06

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604361-01 File ID: A166063-0

Sampled: 04/19/06 09:20 Prepared: 04/27/06 08:46 Analyzed: 05/01/06 16:11

Solids: 78.00 Preparation: 3550B Sonication Initial/Final: 30 g / 10 mL

QC Batch: 0604625 Sequence: 6050252 Calibration: 6E02016 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (mg/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	0.085	0.085	0.0055	U
11104-28-2	PCB-1221	1	0.085	0.085	0.016	U
11141-16-5	PCB-1232	1	0.085	0.085	0.0058	U
53469-21-9	PCB-1242	1	0.042	0.042	0.0079	U
12672-29-6	PCB-1248	1	0.042	0.042	0.0047	U
11097-69-1	PCB-1254	1	0.14	0.042	0.0077	
11096-82-5	PCB-1260	1	0.085	0.085	0.0056	U
System Monitoring Compound		ADDED (mg/kg dry)	CONC (mg/kg dry)	% Rec.	QC Limits	Q
Decachlorobiphenyl		0.0427	0.0451	106	30 - 139	
Tetrachloro-m-xylene		0.0427	0.0389	91	32 - 129	

* Values outside of QC limits

01829

ANALYSIS DATA SHEET

FSB4B

REVISED
KLN 6/22/06

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604361-02 File ID: A166064-0

Sampled: 04/19/06 09:40 Prepared: 04/27/06 08:46 Analyzed: 05/01/06 16:29

Solids: 83.00 Preparation: 3550B Sonication Initial/Final: 30 g / 10 mL

QC Batch: 0604625 Sequence: 6050252 Calibration: 6E02016 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (mg/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	0.080	0.080	0.0052	U
11104-28-2	PCB-1221	1	0.080	0.080	0.015	U
11141-16-5	PCB-1232	1	0.080	0.080	0.0054	U
53469-21-9	PCB-1242	1	0.040	0.040	0.0075	U
12672-29-6	PCB-1248	1	0.040	0.040	0.0045	U
11097-69-1	PCB-1254	1	0.040	0.040	0.0072	U
11096-82-5	PCB-1260	1	0.080	0.080	0.0053	U
System Monitoring Compound		**ADDED (mg/kg dry)**	**CONC (mg/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		0.0402	0.0414	103	30 - 139	
Tetrachloro-m-xylene		0.0402	0.0362	90	32 - 129	

* Values outside of QC limits

01838

ANALYSIS DATA SHEET

FSB4C

REVISED
KAA 6/22/06

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604361-03 File ID: A166068-0

Sampled: 04/19/06 10:00 Prepared: 04/27/06 08:46 Analyzed: 05/01/06 17:40

Solids: 86.00 Preparation: 3550B Sonication Initial/Final: 30 g / 10 mL

QC Batch: 0604625 Sequence: 6050252 Calibration: 6E02016 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (mg/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	0.077	0.077	0.0050	U
11104-28-2	PCB-1221	1	0.077	0.077	0.014	U
11141-16-5	PCB-1232	1	0.077	0.077	0.0052	U
53469-21-9	PCB-1242	1	0.038	0.038	0.0072	U
12672-29-6	PCB-1248	1	0.038	0.038	0.0043	U
11097-69-1	PCB-1254	1	0.038	0.038	0.0070	U
11096-82-5	PCB-1260	1	0.077	0.077	0.0051	U
System Monitoring Compound		**ADDED (mg/kg dry)**	**CONC (mg/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		0.0388	0.0395	102	30 - 139	
Tetrachloro-m-xylene		0.0388	0.0357	92	32 - 129	

* Values outside of QC limits

01847

ANALYSIS DATA SHEET

EQBK-1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Water Laboratory ID: 0604361-04 File ID: A166059-0

Sampled: 04/19/06 15:15 Prepared: 04/25/06 08:13 Analyzed: 05/01/06 15:00

Solids: Preparation: 3510C Liquid-Liquid Ext Initial/Final: 1030 mL / 2 mL

QC Batch: 0604519 Sequence: 6050252 Calibration: 6E02016 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/L)	MRL	MDL	Q
12674-11-2	PCB-1016	1	0.30	0.30	0.046	U
11104-28-2	PCB-1221	1	0.50	0.50	0.053	U
11141-16-5	PCB-1232	1	0.30	0.30	0.050	U
53469-21-9	PCB-1242	1	0.30	0.30	0.053	U
12672-29-6	PCB-1248	1	0.30	0.30	0.024	U
11097-69-1	PCB-1254	1	0.30	0.30	0.038	U
11096-82-5	PCB-1260	1	0.30	0.30	0.045	U
System Monitoring Compound		**ADDED (ug/L)**	**CONC (ug/L)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		0.194	0.199	103	30 - 120	
Tetrachloro-m-xylene		0.194	0.105	54	36 - 114	

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* Values outside of QC limits

01856

ANALYSIS DATA SHEET

ASB4-A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-01 File ID: A166069-0

Sampled: 04/20/06 11:30 Prepared: 04/27/06 08:46 Analyzed: 05/01/06 17:58

Solids: 78.00 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0604625 Sequence: 6050252 Calibration: 6E02016 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	85	85	5.5	U
11104-28-2	PCB-1221	1	85	85	16	U
11141-16-5	PCB-1232	1	85	85	5.8	U
53469-21-9	PCB-1242	1	42	42	7.9	U
12672-29-6	PCB-1248	1	42	42	4.7	U
11097-69-1	PCB-1254	1	200	42	7.7	
11096-82-5	PCB-1260	1	85	85	5.6	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		42.7	45.0	105	30 - 139	
Tetrachloro-m-xylene		42.7	37.3	87	32 - 129	

* Values outside of QC limits

01865

ANALYSIS DATA SHEET

ASB4-B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-02 File ID: A166070-0

Sampled: 04/20/06 12:00 Prepared: 04/27/06 08:46 Analyzed: 05/01/06 18:16

Solids: 78.00 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0604625 Sequence: 6050252 Calibration: 6E02016 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	85	85	5.5	U
11104-28-2	PCB-1221	1	85	85	16	U
11141-16-5	PCB-1232	1	85	85	5.8	U
53469-21-9	PCB-1242	1	42	42	7.9	U
12672-29-6	PCB-1248	1	42	42	4.7	U
11097-69-1	PCB-1254	1	41	42	7.7	J
11096-82-5	PCB-1260	1	85	85	5.6	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		42.7	45.8	107	30 - 139	
Tetrachloro-m-xylene		42.7	38.6	90	32 - 129	

* Values outside of QC limits

: 01874

ANALYSIS DATA SHEET

ASB4-C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-03 File ID: A166071-0

Sampled: 04/20/06 12:25 Prepared: 04/27/06 08:46 Analyzed: 05/01/06 18:33

Solids: 67.00 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0604625 Sequence: 6050252 Calibration: 6E02016 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	99	99	6.4	U
11104-28-2	PCB-1221	1	99	99	18	U
11141-16-5	PCB-1232	1	99	99	6.7	U
53469-21-9	PCB-1242	1	49	49	9.3	U
12672-29-6	PCB-1248	1	49	49	5.5	U
11097-69-1	PCB-1254	1	49	49	9.0	U
11096-82-5	PCB-1260	1	99	99	6.6	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		49.8	54.5	109	30 - 139	
Tetrachloro-m-xylene		49.8	45.7	92	32 - 129	

* Values outside of QC limits

: 61883

ANALYSIS DATA SHEET

DUP-1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-04 File ID: A166072-0

Sampled: 04/20/06 00:00 Prepared: 04/27/06 08:46 Analyzed: 05/01/06 18:51

Solids: 77.00 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0604625 Sequence: 6050252 Calibration: 6E02016 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	86	86	5.6	U
11104-28-2	PCB-1221	1	86	86	16	U
11141-16-5	PCB-1232	1	86	86	5.8	U
53469-21-9	PCB-1242	1	43	43	8.1	U
12672-29-6	PCB-1248	1	43	43	4.8	U
11097-69-1	PCB-1254	1	30	43	7.8	J
11096-82-5	PCB-1260	1	86	86	5.7	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		43.3	48.6	112	30 - 139	
Tetrachloro-m-xylene		43.3	39.4	91	32 - 129	

* Values outside of QC limits

: 01892

ANALYSIS DATA SHEET

ASB5-A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-05 File ID: A166215-0

Sampled: 04/20/06 13:30 Prepared: 04/27/06 08:46 Analyzed: 05/04/06 13:27

Solids: 79.00 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0604625 Sequence: 6050504 Calibration: 6E05001 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	10	840	840	54	U
11104-28-2	PCB-1221	10	840	840	150	U
11141-16-5	PCB-1232	10	840	840	57	U
53469-21-9	PCB-1242	10	420	420	78	U
12672-29-6	PCB-1248	10	420	420	47	U
11097-69-1	PCB-1254	10	2400	420	76	
11096-82-5	PCB-1260	10	840	840	56	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		42.2	35.4	84	30 - 139	
Tetrachloro-m-xylene		42.2	36.3	86	32 - 129	

* Values outside of QC limits

: 01901

ANALYSIS DATA SHEET

ASB5-B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-06 File ID: A166074-0

Sampled: 04/20/06 13:50 Prepared: 04/27/06 08:46 Analyzed: 05/01/06 19:27

Solids: 73.00 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0604625 Sequence: 6050252 Calibration: 6E02016 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	90	90	5.9	U
11104-28-2	PCB-1221	1	90	90	17	U
11141-16-5	PCB-1232	1	90	90	6.2	U
53469-21-9	PCB-1242	1	45	45	8.5	U
12672-29-6	PCB-1248	1	45	45	5.1	U
11097-69-1	PCB-1254	1	160	45	8.2	
11096-82-5	PCB-1260	1	90	90	6.0	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		45.7	49.6	109	30 - 139	
Tetrachloro-m-xylene		45.7	41.4	91	32 - 129	

* Values outside of QC limits

01510

SAMPLE ID SUMMARY

USEPA-8330

REVISED KH 6/22/06

Laboratory: TriMatrix Laboratories, Inc.

SDG: 36440-27

Client: URS Group, Inc.

Project: RFAAP SSP Investigation

Client Sample Id:	Lab Sample Id:
FSB4A	0604361-01
FSB4B	0604361-02
FSB4C	0604361-03
EQBK-1	0604361-04
ASB4-A	0604426-01
ASB4-B	0604426-02
ASB4-C	0604426-03
DUP-1 →ASB4-A	0604426-04
ASB5-A	0604426-05
ASB5-A	0604426-05RE1
ASB5-B	0604426-06

00832

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

FSB4A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-27 4MD
Client: URS Group, Inc.
Project: RFAAP SSP Investigation
Matrix: Soil
Laboratory ID: 0604361-01
File ID: ata019-0
Sampled: 04/19/06 09:20
Prepared: 04/27/06 09:04
Analyzed: 05/03/06 08:52
Solids: 78.00
Preparation: 8330 Extraction
Initial/Final: 2 g / 20 mL
QC Batch: 0604600
Sequence: 6050431
Calibration: 6E04009
Instrument: 221

REVISED
JWH 6/22/06

CAS No.	Analyte	Dilution	CONC. (mg/kg dry wt.)	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	1.0	1.0	0.20	U
99-65-0	1,3-Dinitrobenzene	1	0.50	0.50	0.052	U
118-96-7	2,4,6-Trinitrotoluene	1	0.50	0.50	0.051	U
121-14-2	2,4-Dinitrotoluene	1	0.50	0.50	0.073	U
606-20-2	2,6-Dinitrotoluene	1	1.0	1.0	0.099	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	0.50	0.50	0.088	U
88-72-2	2-Nitrotoluene	1	1.0	1.0	0.071	U
99-08-1	3-Nitrotoluene	1	1.0	1.0	0.12	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	0.50	0.50	0.053	U
99-99-0	4-Nitrotoluene	1	1.0	1.0	0.12	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	0.50	0.50	0.089	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	1.0	1.0	0.059	U
98-95-3	Nitrobenzene	1	0.50	0.50	0.089	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	1.0	1.0	0.17	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.45	98	57 - 139	

* Values outside of QC limits

00853

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

FSB4B

REVISED
MJC 6/22/06

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27 4MD

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604361-02 File ID: ata020-0

Sampled: 04/19/06 09:40 Prepared: 04/27/06 09:04 Analyzed: 05/03/06 09:29

Solids: 83.00 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0604600 Sequence: 6050431 Calibration: 6E04009 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry wt.)	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	1.0	1.0	0.20	U
99-65-0	1,3-Dinitrobenzene	1	0.50	0.50	0.052	U
118-96-7	2,4,6-Trinitrotoluene	1	0.50	0.50	0.051	U
121-14-2	2,4-Dinitrotoluene	1	0.50	0.50	0.073	U
606-20-2	2,6-Dinitrotoluene	1	1.0	1.0	0.099	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	0.50	0.50	0.088	U
88-72-2	2-Nitrotoluene	1	1.0	1.0	0.071	U
99-08-1	3-Nitrotoluene	1	1.0	1.0	0.12	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	0.50	0.50	0.053	U
99-99-0	4-Nitrotoluene	1	1.0	1.0	0.12	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	0.50	0.50	0.089	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	1.0	1.0	0.059	U
98-95-3	Nitrobenzene	1	0.50	0.50	0.089	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	1.0	1.0	0.17	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.50	100	57 - 139	

* Values outside of QC limits

00855

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

FSB4C

REVISED 10 AUG 22/06

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27 4MD

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604361-03 File ID: ata022-0

Sampled: 04/19/06 10:00 Prepared: 04/27/06 09:04 Analyzed: 05/03/06 10:42

Solids: 86.00 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0604600 Sequence: 6050431 Calibration: 6E04009 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry wt.)	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	1.0	1.0	0.20	U
99-65-0	1,3-Dinitrobenzene	1	0.50	0.50	0.052	U
118-96-7	2,4,6-Trinitrotoluene	1	0.50	0.50	0.051	U
121-14-2	2,4-Dinitrotoluene	1	0.50	0.50	0.073	U
606-20-2	2,6-Dinitrotoluene	1	1.0	1.0	0.099	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	0.50	0.50	0.088	U
88-72-2	2-Nitrotoluene	1	1.0	1.0	0.071	U
99-08-1	3-Nitrotoluene	1	1.0	1.0	0.12	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	0.50	0.50	0.053	U
99-99-0	4-Nitrotoluene	1	1.0	1.0	0.12	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	0.50	0.50	0.089	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	1.0	1.0	0.059	U
98-95-3	Nitrobenzene	1	0.50	0.50	0.089	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	1.0	1.0	0.17	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.55	102	57 - 139	

* Values outside of QC limits

00857

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

EQBK-1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27 4MD

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Water Laboratory ID: 0604361-04 File ID: ata014-0

Sampled: 04/19/06 15:15 Prepared: 04/25/06 08:16 Analyzed: 05/03/06 05:47

Solids: Preparation: 8330 Extraction Initial/Final: 770 mL / 10 mL

QC Batch: 0604520 Sequence: 6050413 Calibration: 6E04005 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	0.5	0.65	0.65	0.16	U
99-65-0	1,3-Dinitrobenzene	0.5	1.0	1.0	0.23	U
118-96-7	2,4,6-Trinitrotoluene	0.5	0.65	0.65	0.075	U
121-14-2	2,4-Dinitrotoluene	0.5	0.65	0.65	0.12	U
606-20-2	2,6-Dinitrotoluene	0.5	1.0	1.0	0.27	U
35572-78-2	2-Amino-4,6-dinitrotoluene	0.5	1.0	1.0	0.20	U
88-72-2	2-Nitrotoluene	0.5	1.0	1.0	0.26	U
99-08-1	3-Nitrotoluene	0.5	2.0	2.0	0.22	U
1946-51-0	4-Amino-2,6-dinitrotoluene	0.5	1.0	1.0	0.31	U
99-99-0	4-Nitrotoluene	0.5	2.0	2.0	0.15	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	0.5	0.65	0.65	0.16	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	0.5	2.0	2.0	0.18	U
98-95-3	Nitrobenzene	0.5	0.65	0.65	0.058	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	0.5	1.0	1.0	0.25	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
4-Nitroaniline	3.25	2.83	87	30 - 138	

* Values outside of QC limits

00659

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

ASB4-A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27 4MD

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-01 File ID: ata023-0

Sampled: 04/20/06 11:30 Prepared: 04/27/06 09:04 Analyzed: 05/03/06 11:19

Solids: 78.00 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0604600 Sequence: 6050431 Calibration: 6E04009 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	1.0	1.0	0.20	U
99-65-0	1,3-Dinitrobenzene	1	0.50	0.50	0.052	U
118-96-7	2,4,6-Trinitrotoluene	1	0.50	0.50	0.051	U
121-14-2	2,4-Dinitrotoluene	1	0.50	0.50	0.073	U
606-20-2	2,6-Dinitrotoluene	1	1.0	1.0	0.099	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	0.50	0.50	0.088	U
88-72-2	2-Nitrotoluene	1	1.0	1.0	0.071	U
99-08-1	3-Nitrotoluene	1	1.0	1.0	0.12	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	0.50	0.50	0.053	U
99-99-0	4-Nitrotoluene	1	1.0	1.0	0.12	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	0.50	0.50	0.089	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	1.0	1.0	0.059	U
98-95-3	Nitrobenzene	1	0.50	0.50	0.089	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	1.0	1.0	0.17	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.59	104	57 - 139	

* Values outside of QC limits

: 00862

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

ASB4-B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27 4MD

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-02 File ID: ata024-0

Sampled: 04/20/06 12:00 Prepared: 04/27/06 09:04 Analyzed: 05/03/06 11:56

Solids: 78.00 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0604600 Sequence: 6050431 Calibration: 6E04009 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	1.0	1.0	0.20	U
99-65-0	1,3-Dinitrobenzene	1	0.50	0.50	0.052	U
118-96-7	2,4,6-Trinitrotoluene	1	0.50	0.50	0.051	U
121-14-2	2,4-Dinitrotoluene	1	0.50	0.50	0.073	U
606-20-2	2,6-Dinitrotoluene	1	1.0	1.0	0.099	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	0.50	0.50	0.088	U
88-72-2	2-Nitrotoluene	1	1.0	1.0	0.071	U
99-08-1	3-Nitrotoluene	1	1.0	1.0	0.12	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	0.50	0.50	0.053	U
99-99-0	4-Nitrotoluene	1	1.0	1.0	0.12	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	0.50	0.50	0.089	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	1.0	1.0	0.059	U
98-95-3	Nitrobenzene	1	0.50	0.50	0.089	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	1.0	1.0	0.17	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.44	98	57 - 139	

* Values outside of QC limits

: 00864

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

ASB4-C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27 4MD

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-03 File ID: ata025-0

Sampled: 04/20/06 12:25 Prepared: 04/27/06 09:04 Analyzed: 05/03/06 12:33

Solids: 67.00 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0604600 Sequence: 6050431 Calibration: 6E04009 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	1.0	1.0	0.20	U
99-65-0	1,3-Dinitrobenzene	1	0.50	0.50	0.052	U
118-96-7	2,4,6-Trinitrotoluene	1	0.50	0.50	0.051	U
121-14-2	2,4-Dinitrotoluene	1	0.50	0.50	0.073	U
606-20-2	2,6-Dinitrotoluene	1	1.0	1.0	0.099	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	0.50	0.50	0.088	U
88-72-2	2-Nitrotoluene	1	1.0	1.0	0.071	U
99-08-1	3-Nitrotoluene	1	1.0	1.0	0.12	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	0.50	0.50	0.053	U
99-99-0	4-Nitrotoluene	1	1.0	1.0	0.12	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	0.50	0.50	0.089	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	1.0	1.0	0.059	U
98-95-3	Nitrobenzene	1	0.50	0.50	0.089	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	1.0	1.0	0.17	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.85	114	57 - 139	

* Values outside of QC limits

: 00866

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

DUP-1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27 4MD

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-04 File ID: ata026-0

Sampled: 04/20/06 00:00 Prepared: 04/27/06 09:04 Analyzed: 05/03/06 13:10

Solids: 77.00 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0604600 Sequence: 6050431 Calibration: 6E04009 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	1.0	1.0	0.20	U
99-65-0	1,3-Dinitrobenzene	1	0.50	0.50	0.052	U
118-96-7	2,4,6-Trinitrotoluene	1	0.50	0.50	0.051	U
121-14-2	2,4-Dinitrotoluene	1	0.50	0.50	0.073	U
606-20-2	2,6-Dinitrotoluene	1	1.0	1.0	0.099	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	0.50	0.50	0.088	U
88-72-2	2-Nitrotoluene	1	1.0	1.0	0.071	U
99-08-1	3-Nitrotoluene	1	1.0	1.0	0.12	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	0.50	0.50	0.053	U
99-99-0	4-Nitrotoluene	1	1.0	1.0	0.12	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	0.50	0.50	0.089	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	1.0	1.0	0.059	U
98-95-3	Nitrobenzene	1	0.50	0.50	0.089	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	1.0	1.0	0.17	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.61	104	57 - 139	

* Values outside of QC limits

: 00868

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

ASB5-A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27 4MD

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-05 File ID: ata027-0

Sampled: 04/20/06 13:30 Prepared: 04/27/06 09:04 Analyzed: 05/03/06 13:46

Solids: 79.00 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0604600 Sequence: 6050431 Calibration: 6E04009 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	1.0	1.0	0.20	U
99-65-0	1,3-Dinitrobenzene	1	0.50	0.50	0.052	U
118-96-7	2,4,6-Trinitrotoluene	1	0.50	0.50	0.051	U
121-14-2	2,4-Dinitrotoluene	1	1.3	0.50	0.073	
606-20-2	2,6-Dinitrotoluene	1	0.25	1.0	0.099	J
35572-78-2	2-Amino-4,6-dinitrotoluene	1	0.50	0.50	0.088	U
88-72-2	2-Nitrotoluene	1	1.0	1.0	0.071	U
99-08-1	3-Nitrotoluene	1	1.0	1.0	0.12	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	0.50	0.50	0.053	U
99-99-0	4-Nitrotoluene	1	1.0	1.0	0.12	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	0.50	0.50	0.089	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	1.0	1.0	0.059	U
98-95-3	Nitrobenzene	1	0.50	0.50	0.089	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	1.0	1.0	0.17	U

J,g

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.71	108	57 - 139	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

ASB5-A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27 4MD

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-05RE1 File ID: data021-0

Sampled: 04/20/06 13:30 Prepared: 04/27/06 09:04 Analyzed: 05/05/06 17:20

Solids: 79.00 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0604600 Sequence: 6051104 Calibration: 6E11005 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	1.0	1.0	0.20	U
99-65-0	1,3-Dinitrobenzene	1	0.50	0.50	0.052	U
118-96-7	2,4,6-Trinitrotoluene	1	0.50	0.50	0.051	U
121-14-2	2,4-Dinitrotoluene	1	1.2	0.50	0.073	
606-20-2	2,6-Dinitrotoluene	1	0.55	1.0	0.099	J
35572-78-2	2-Amino-4,6-dinitrotoluene	1	0.50	0.50	0.088	U
88-72-2	2-Nitrotoluene	1	1.0	1.0	0.071	U
99-08-1	3-Nitrotoluene	1	1.0	1.0	0.12	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	0.50	0.50	0.053	U
99-99-0	4-Nitrotoluene	1	1.0	1.0	0.12	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	0.50	0.50	0.089	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	1.0	1.0	0.059	U
98-95-3	Nitrobenzene	1	0.50	0.50	0.089	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	1.0	1.0	0.17	U

J,g

UJ,c

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.13	85	57 - 139	

* Values outside of QC limits

Note: Second Column Confirmation analysis (WR)

: 00872

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

ASB5-B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27 4MD

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-06 File ID: ata028-0

Sampled: 04/20/06 13:50 Prepared: 04/27/06 09:04 Analyzed: 05/03/06 14:24

Solids: 73.00 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0604600 Sequence: 6050431 Calibration: 6E04009 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	1.0	1.0	0.20	U
99-65-0	1,3-Dinitrobenzene	1	0.50	0.50	0.052	U
118-96-7	2,4,6-Trinitrotoluene	1	0.50	0.50	0.051	U
121-14-2	2,4-Dinitrotoluene	1	0.50	0.50	0.073	U
606-20-2	2,6-Dinitrotoluene	1	1.0	1.0	0.099	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	0.50	0.50	0.088	U
88-72-2	2-Nitrotoluene	1	1.0	1.0	0.071	U
99-08-1	3-Nitrotoluene	1	1.0	1.0	0.12	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	0.50	0.50	0.053	U
99-99-0	4-Nitrotoluene	1	1.0	1.0	0.12	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	0.50	0.50	0.089	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	1.0	1.0	0.059	U
98-95-3	Nitrobenzene	1	0.50	0.50	0.089	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	1.0	1.0	0.17	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.61	104	57 - 139	

* Values outside of QC limits

: 00674

SAMPLE ID SUMMARY

USEPA-8332

REVISED
KAH 6/22/02

Laboratory: TriMatrix Laboratories, Inc.

SDG: 36440-27

Client: URS Group, Inc.

Project: RFAAP SSP Investigation

Client Sample Id:	Lab Sample Id:
FSB4A	0604361-01
FSB4B	0604361-02
FSB4C	0604361-03
EQBK-1	0604361-04
ASB4-A	0604426-01
ASB4-B	0604426-02
ASB4-C	0604426-03
DUP-1 → ASB4A	0604426-04
ASB5-A	0604426-05
ASB5-B	0604426-06

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

FSB4A

REVISED
ICH 6/22/06

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-27 4MD
Client: URS Group, Inc.
Project: RFAAP SSP Investigation
Matrix: Soil
Laboratory ID: 0604361-01
File ID: NGa017-0
Sampled: 04/19/06 09:20
Prepared: 04/26/06 09:07
Analyzed: 05/01/06 18:58
Solids: 78.00
Preparation: 8332 Extraction
Initial/Final: 2 g / 20 mL
QC Batch: 0604601
Sequence: 6050351
Calibration: 6E03020
Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry wt.)	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	1.2	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.37	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.56	103	30 - 150	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

FSB4B

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-27 4MD

REVISED
KEN 6/22/06

Client: URS Group, Inc.
Project: RFAAP SSP Investigation

Matrix: Soil
Laboratory ID: 0604361-02
File ID: NGa018-0

Sampled: 04/19/06 09:40
Prepared: 04/26/06 09:07
Analyzed: 05/01/06 19:15

Solids: 83.00
Preparation: 8332 Extraction
Initial/Final: 2 g / 20 mL

QC Batch: 0604601
Sequence: 6050351
Calibration: 6E03020
Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry wt.)	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	1.2	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.37	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.62	106	30 - 150	

* Values outside of QC limits

01007

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

FSB4C

REVISED
MH 6/22/06

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-27 4MD
Client: URS Group, Inc.
Project: RFAAP SSP Investigation
Matrix: Soil
Laboratory ID: 0604361-03
File ID: NGa019-0
Sampled: 04/19/06 10:00
Prepared: 04/26/06 09:07
Analyzed: 05/01/06 19:33
Solids: 86.00
Preparation: 8332 Extraction
Initial/Final: 2 g / 20 mL
QC Batch: 0604601
Sequence: 6050351
Calibration: 6E03020
Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry wt.)	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	1.2	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.37	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.63	106	30 - 150	

* Values outside of QC limits

01009

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

EQBK-1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27 4MD

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Water Laboratory ID: 0604361-04 File ID: NGa014-0

Sampled: 04/19/06 15:15 Prepared: 04/25/06 08:17 Analyzed: 05/01/06 18:06

Solids: Preparation: 8332 Extraction Initial/Final: 770 mL / 10 mL

QC Batch: 0604521 Sequence: 6050329 Calibration: 6E03018 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.58	U
78-11-5	Pentaerythritol Tetranitrate	1	10	10	0.61	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
1-Nitronaphthalene	3.21	3.49	109	50 - 130	

* Values outside of QC limits

: 6161 1

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

ASB4-A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27 4MD

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-01 File ID: NGa020-0

Sampled: 04/20/06 11:30 Prepared: 04/26/06 09:07 Analyzed: 05/01/06 19:50

Solids: 78.00 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0604601 Sequence: 6050351 Calibration: 6E03020 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	1.2	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.37	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.68	108	30 - 150	

* Values outside of QC limits

: 01013

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

ASB4-B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27 4MD

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-02 File ID: NGa022-0

Sampled: 04/20/06 12:00 Prepared: 04/26/06 09:07 Analyzed: 05/01/06 20:25

Solids: 78.00 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0604601 Sequence: 6050351 Calibration: 6E03020 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	1.2	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.37	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.67	108	30 - 150	

* Values outside of QC limits

: 0i0i5

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

ASB4-C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27 4MD

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-03 File ID: NGa023-0

Sampled: 04/20/06 12:25 Prepared: 04/26/06 09:07 Analyzed: 05/01/06 20:42

Solids: 67.00 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0604601 Sequence: 6050351 Calibration: 6E03020 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	1.2	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.37	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.70	109	30 - 150	

* Values outside of QC limits

: 01017

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

DUP-1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27 4MD

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-04 File ID: NGa024-0

Sampled: 04/20/06 00:00 Prepared: 04/26/06 09:07 Analyzed: 05/01/06 20:59

Solids: 77.00 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0604601 Sequence: 6050351 Calibration: 6E03020 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	1.2	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.37	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.60	105	30 - 150	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

ASB5-A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27 4MD

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-05 File ID: NGa025-0

Sampled: 04/20/06 13:30 Prepared: 04/26/06 09:07 Analyzed: 05/01/06 21:16

Solids: 79.00 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0604601 Sequence: 6050351 Calibration: 6E03020 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	1.2	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.37	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.38	96	30 - 150	

* Values outside of QC limits

: 61021

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

ASB5-B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27 4MD

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604426-06 File ID: NGa026-0

Sampled: 04/20/06 13:50 Prepared: 04/26/06 09:07 Analyzed: 05/01/06 21:34

Solids: 73.00 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0604601 Sequence: 6050351 Calibration: 6E03020 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	1.2	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.37	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.01	81	30 - 150	

* Values outside of QC limits

: 61023

SAMPLE ID SUMMARY

USEPA-6020

REVISED
KJH 6/22/06

Laboratory: TriMatrix Laboratories, Inc.

SDG: 36440-27

Client: URS Group, Inc.

Project: RFAAP SSP Investigation

Client Sample Id:	Lab Sample Id:
FSB4A	0604361-01
FSB4B	0604361-02
FSB4C	0604361-03
EQBK-1	0604361-04
ASB4-A	0604426-01
ASB4-B	0604426-02
ASB4-C	0604426-03
DUP-1 → ASB4A	0604426-04
ASB5-A	0604426-05
ASB5-B	0604426-06

02760

INORGANIC ANALYSIS DATA SHEET
USEPA-6020

FSB4A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Matrix: Soil
Sampled: 04/19/06 09:20
Solids: 78.00
Laboratory ID: 0604361-01

SDG: 36440-27
Project: RFAAP SSP Investigation
Preparation: 3050B Digestion
Prepared: 04/28/06 07:02
Initial/Final: 0.4996 g / 50 mL
QC Batch: 0604716

REVISED
MH 6/22/06

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-38-2	Arsenic, Total	2.2	mg/kg dry wt.	1	0.40	0.023		05/05/06 11:05	
7440-43-9	Cadmium, Total	0.20	mg/kg dry wt.	1	1.0	0.0073	J	05/05/06 11:05	
7440-50-8	Copper, Total	16	mg/kg dry wt.	1	1.0	0.022		05/05/06 11:05	J,s
7439-92-1	Lead, Total	26	mg/kg dry wt.	1	1.0	0.041		05/05/06 11:05	
7440-02-0	Nickel, Total	16	mg/kg dry wt.	1	0.50	0.027		05/05/06 11:05	J,s
7782-49-2	Selenium, Total	0.26	mg/kg dry wt.	1	1.0	0.063	J	05/05/06 11:05	
7440-22-4	Silver, Total	0.089	mg/kg dry wt.	1	3.0	0.017	J	05/05/06 11:05	
7440-28-0	Thallium, Total	0.24	mg/kg dry wt.	1	0.50	0.0085	J	05/05/06 11:05	
7440-62-2	Vanadium, Total	53	mg/kg dry wt.	2	2.0	0.047		05/08/06 14:56	K,m

027761

INORGANIC ANALYSIS DATA SHEET
USEPA-6020

FSB4A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Matrix: Soil
Sampled: 04/19/06 09:20
Solids: 78.00
Laboratory ID: 0604361-01

SDG: 36440-27
Project: RFAAP SSP Investigation
Preparation: 3050B Digestion
Prepared: 04/28/06 14:30
Initial/Final: 0.4999 g / 50 mL
QC Batch: 0604757

REVISED 10/11 6/22/06

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.082	mg/kg dry wt.	1	0.50	0.036	J	05/02/06 15:33

INORGANIC ANALYSIS DATA SHEET
USEPA-6020

FSB4B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Matrix: Soil
Sampled: 04/19/06 09:40
Solids: 83.00
Laboratory ID: 0604361-02

SDG: 36440-27
Project: RFAAP SSP Investigation
Preparation: 3050B Digestion
Prepared: 04/28/06 07:02
Initial/Final: 0.5001 g / 50 mL
QC Batch: 0604716

REVISED
RMH 6/22/06

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-38-2	Arsenic, Total	1.6	mg/kg dry wt.	1	0.40	0.023		05/05/06 11:22	
7440-43-9	Cadmium, Total	0.10	mg/kg dry wt.	1	1.0	0.0073	J	05/05/06 11:22	
7440-50-8	Copper, Total	17	mg/kg dry wt.	1	1.0	0.022		05/05/06 11:22	J,S
7439-92-1	Lead, Total	14	mg/kg dry wt.	1	1.0	0.041		05/05/06 11:22	
7440-02-0	Nickel, Total	17	mg/kg dry wt.	1	0.50	0.027		05/05/06 11:22	J,S
7782-49-2	Selenium, Total	0.11	mg/kg dry wt.	1	1.0	0.063	J	05/05/06 11:22	
7440-22-4	Silver, Total	0.056	mg/kg dry wt.	1	3.0	0.017	J	05/05/06 11:22	
7440-28-0	Thallium, Total	0.25	mg/kg dry wt.	1	0.50	0.0085	J	05/05/06 11:22	
7440-62-2	Vanadium, Total	60	mg/kg dry wt.	2	2.0	0.047		05/08/06 15:06	K,M

02763

INORGANIC ANALYSIS DATA SHEET
USEPA-6020

FSB4B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Matrix: Soil
Sampled: 04/19/06 09:40
Solids: 83.00
Laboratory ID: 0604361-02

SDG: 36440-27
Project: RFAAP SSP Investigation
Preparation: 3050B Digestion
Prepared: 04/28/06 14:30
Initial/Final: 0.5003 g / 50 mL
QC Batch: 0604757

REVISED
AH 6/27/06

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.50	mg/kg dry wt.	1	0.50	0.036	U	05/02/06 15:42

027764

INORGANIC ANALYSIS DATA SHEET
USEPA-6020

FSB4C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Matrix: Soil
Sampled: 04/19/06 10:00
Solids: 86.00
Laboratory ID: 0604361-03

SDG: 36440-27
Project: RFAAP SSP Investigation
Preparation: 3050B Digestion
Prepared: 04/28/06 07:02
Initial/Final: 0.5001 g / 50 mL
QC Batch: 0604716

REVISED
JAN 6/27/08

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-38-2	Arsenic, Total	2.0	mg/kg dry wt.	1	0.40	0.023		05/05/06 11:25	
7440-43-9	Cadmium, Total	0.12	mg/kg dry wt.	1	1.0	0.0073	J	05/05/06 11:25	
7440-50-8	Copper, Total	16	mg/kg dry wt.	1	1.0	0.022		05/05/06 11:25	J,S
7439-92-1	Lead, Total	16	mg/kg dry wt.	1	1.0	0.041		05/05/06 11:25	
7440-02-0	Nickel, Total	15	mg/kg dry wt.	1	0.50	0.027		05/05/06 11:25	J,S
7782-49-2	Selenium, Total	0.13	mg/kg dry wt.	1	1.0	0.063	J	05/05/06 11:25	
7440-22-4	Silver, Total	0.088	mg/kg dry wt.	1	3.0	0.017	J	05/05/06 11:25	
7440-28-0	Thallium, Total	0.21	mg/kg dry wt.	1	0.50	0.0085	J	05/05/06 11:25	
7440-62-2	Vanadium, Total	49	mg/kg dry wt.	1	1.0	0.024		05/08/06 15:08	K,M

027165

INORGANIC ANALYSIS DATA SHEET
USEPA-6020

FSB4C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Matrix: Soil
Sampled: 04/19/06 10:00
Solids: 86.00
Laboratory ID: 0604361-03

SDG: 36440-27
Project: RFAAP SSP Investigation
Preparation: 3050B Digestion
Prepared: 04/28/06 14:30
Initial/Final: 0.4995 g / 50 mL
QC Batch: 0604757

REVISED
jcett 6/22/06

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.50	mg/kg dry wt.	1	0.50	0.036	U	05/02/06 15:48

INORGANIC ANALYSIS DATA SHEET

USEPA-6020

EQBK-1

REVISED
DAH 6/7/06

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Matrix: Water
Sampled: 04/19/06 15:15
Solids: 0.00
Laboratory ID: 0604361-04

SDG: 36440-27
Project: RFAAP SSP Investigation
Preparation: 3010A Digestion
Prepared: 05/02/06 06:20
Initial/Final: 25 mL / 25 mL
QC Batch: 0604826

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	2.3	ug/L	1	3.0	0.73	JB	05/05/06 09:36
7440-38-2	Arsenic, Total	2.0	ug/L	1	2.0	0.47	U	05/05/06 09:36
7440-43-9	Cadmium, Total	0.50	ug/L	1	0.50	0.062	U	05/05/06 09:36
7440-48-4	Cobalt, Total	10	ug/L	1	10	0.22	U	05/05/06 09:36
7440-50-8	Copper, Total	0.37	ug/L	1	3.0	0.32	J	05/05/06 09:36
7439-92-1	Lead, Total	1.0	ug/L	1	1.0	0.22	U	05/05/06 09:36
7439-96-5	Manganese, Total	1.5	ug/L	1	10	0.74	J	05/05/06 09:36
7440-02-0	Nickel, Total	3.0	ug/L	1	3.0	0.80	U	05/05/06 09:36
7782-49-2	Selenium, Total	3.0	ug/L	1	3.0	0.73	U	05/05/06 09:36
7440-22-4	Silver, Total	0.50	ug/L	1	0.50	0.073	U	05/05/06 09:36
7440-28-0	Thallium, Total	1.0	ug/L	1	1.0	0.14	U	05/05/06 09:36
7440-62-2	Vanadium, Total	10	ug/L	1	10	0.26	U	05/05/06 09:36

B, P

02767

INORGANIC ANALYSIS DATA SHEET
USEPA-6020

ASB4-A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Matrix: Soil
Sampled: 04/20/06 11:30
Solids: 78.00
Laboratory ID: 0604426-01

SDG: 36440-27
Project: RFAAP SSP Investigation
Preparation: 3050B Digestion
Prepared: 04/28/06 07:02
Initial/Final: 0.4995 g / 50 mL
QC Batch: 0604716

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-38-2	Arsenic, Total	2.0	mg/kg dry wt.	1	0.40	0.023		05/05/06 11:28	J,k
7440-43-9	Cadmium, Total	0.076	mg/kg dry wt.	1	1.0	0.0073	J	05/05/06 11:28	
7440-50-8	Copper, Total	460	mg/kg dry wt.	10	10	0.22		05/08/06 14:22	
7439-92-1	Lead, Total	30	mg/kg dry wt.	1	1.0	0.041		05/05/06 11:28	
7440-02-0	Nickel, Total	16	mg/kg dry wt.	1	0.50	0.027		05/05/06 11:28	
7782-49-2	Selenium, Total	1.0	mg/kg dry wt.	1	1.0	0.063	U	05/05/06 11:28	UJ,k
7440-22-4	Silver, Total	0.10	mg/kg dry wt.	1	3.0	0.017	J	05/05/06 11:28	J,k
7440-28-0	Thallium, Total	0.32	mg/kg dry wt.	1	0.50	0.0085	J	05/05/06 11:28	
7440-62-2	Vanadium, Total	91	mg/kg dry wt.	2	2.0	0.047		05/08/06 15:10	

: 02768

INORGANIC ANALYSIS DATA SHEET
USEPA-6020

ASB4-A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Matrix: Soil
Sampled: 04/20/06 11:30
Solids: 78.00
Laboratory ID: 0604426-01

SDG: 36440-27
Project: RFAAP SSP Investigation
Preparation: 3050B Digestion
Prepared: 04/28/06 14:30
Initial/Final: 0.4995 g / 50 mL
QC Batch: 0604757

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.10	mg/kg dry wt.	1	0.50	0.036	J	05/02/06 15:50

J, k

02769

INORGANIC ANALYSIS DATA SHEET
USEPA-6020

ASB4-B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Matrix: Soil
Sampled: 04/20/06 12:00
Solids: 78.00
Laboratory ID: 0604426-02

SDG: 36440-27
Project: RFAAP SSP Investigation
Preparation: 3050B Digestion
Prepared: 04/28/06 07:02
Initial/Final: 0.5 g / 50 mL
QC Batch: 0604716

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	1.6	mg/kg dry wt.	1	0.40	0.023		05/05/06 11:38
7440-43-9	Cadmium, Total	0.036	mg/kg dry wt.	1	1.0	0.0073	J	05/05/06 11:38
7440-50-8	Copper, Total	15	mg/kg dry wt.	1	1.0	0.022		05/05/06 11:38
7439-92-1	Lead, Total	13	mg/kg dry wt.	1	1.0	0.041		05/05/06 11:38
7440-02-0	Nickel, Total	12	mg/kg dry wt.	1	0.50	0.027		05/05/06 11:38
7782-49-2	Selenium, Total	0.070	mg/kg dry wt.	1	1.0	0.063	J	05/05/06 11:38
7440-22-4	Silver, Total	0.045	mg/kg dry wt.	1	3.0	0.017	J	05/05/06 11:38
7440-28-0	Thallium, Total	0.19	mg/kg dry wt.	1	0.50	0.0085	J	05/05/06 11:38
7440-62-2	Vanadium, Total	71	mg/kg dry wt.	2	2.0	0.047		05/08/06 15:15

J, k

: 02776

INORGANIC ANALYSIS DATA SHEET
USEPA-6020

ASB4-B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Matrix: Soil
Sampled: 04/20/06 12:00
Solids: 78.00
Laboratory ID: 0604426-02

SDG: 36440-27
Project: RFAAP SSP Investigation
Preparation: 3050B Digestion
Prepared: 04/28/06 14:30
Initial/Final: 0.5005 g / 50 mL
QC Batch: 0604757

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-36-0	Antimony, Total	0.50	mg/kg dry wt.	1	0.50	0.036	U	05/02/06 15:52	UJ,K

02771

INORGANIC ANALYSIS DATA SHEET
USEPA-6020

ASB4-C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Matrix: Soil
Sampled: 04/20/06 12:25
Solids: 67.00
Laboratory ID: 0604426-03

SDG: 36440-27
Project: RFAAP SSP Investigation
Preparation: 3050B Digestion
Prepared: 04/28/06 07:02
Initial/Final: 0.5003 g / 50 mL
QC Batch: 0604716

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	4.2	mg/kg dry wt.	1	0.40	0.023		05/05/06 11:41
7440-43-9	Cadmium, Total	0.15	mg/kg dry wt.	1	1.0	0.0073	J	05/05/06 11:41
7440-50-8	Copper, Total	30	mg/kg dry wt.	1	1.0	0.022		05/05/06 11:41
7439-92-1	Lead, Total	25	mg/kg dry wt.	1	1.0	0.041		05/05/06 11:41
7440-02-0	Nickel, Total	32	mg/kg dry wt.	1	0.50	0.027		05/05/06 11:41
7782-49-2	Selenium, Total	0.10	mg/kg dry wt.	1	1.0	0.063	J	05/05/06 11:41
7440-22-4	Silver, Total	0.19	mg/kg dry wt.	1	3.0	0.017	J	05/05/06 11:41
7440-28-0	Thallium, Total	0.37	mg/kg dry wt.	1	0.50	0.0085	J	05/05/06 11:41
7440-62-2	Vanadium, Total	77	mg/kg dry wt.	2	2.0	0.047		05/08/06 15:17

J, k

02772

INORGANIC ANALYSIS DATA SHEET
USEPA-6020

ASB4-C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Matrix: Soil
Sampled: 04/20/06 12:25
Solids: 67.00
Laboratory ID: 0604426-03

SDG: 36440-27
Project: RFAAP SSP Investigation
Preparation: 3050B Digestion
Prepared: 04/28/06 14:30
Initial/Final: 0.5005 g / 50 mL
QC Batch: 0604757

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.14	mg/kg dry wt.	1	0.50	0.036	J	05/02/06 15:54

J,k

02773

INORGANIC ANALYSIS DATA SHEET

USEPA-6020

DUP-1

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Matrix: Soil
Sampled: 04/20/06 00:00
Solids: 77.00
Laboratory ID: 0604426-04

SDG: 36440-27
Project: RFAAP SSP Investigation
Preparation: 3050B Digestion
Prepared: 04/28/06 07:02
Initial/Final: 0.5005 g / 50 mL
QC Batch: 0604716

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	1.7	mg/kg dry wt.	1	0.40	0.023		05/05/06 11:44
7440-43-9	Cadmium, Total	0.17	mg/kg dry wt.	1	1.0	0.0073	J	05/05/06 11:44
7440-50-8	Copper, Total	560	mg/kg dry wt.	20	20	0.45		05/08/06 14:39
7439-92-1	Lead, Total	34	mg/kg dry wt.	1	1.0	0.041		05/05/06 11:44
7440-02-0	Nickel, Total	13	mg/kg dry wt.	1	0.50	0.027		05/05/06 11:44
7782-49-2	Selenium, Total	0.070	mg/kg dry wt.	1	1.0	0.063	J	05/05/06 11:44
7440-22-4	Silver, Total	0.065	mg/kg dry wt.	1	3.0	0.017	J	05/05/06 11:44
7440-28-0	Thallium, Total	0.24	mg/kg dry wt.	1	0.50	0.0085	J	05/05/06 11:44
7440-62-2	Vanadium, Total	75	mg/kg dry wt.	2	2.0	0.047		05/08/06 15:19

J, k

02774

INORGANIC ANALYSIS DATA SHEET
USEPA-6020

DUP-1

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Matrix: Soil
Sampled: 04/20/06 00:00
Solids: 77.00
Laboratory ID: 0604426-04

SDG: 36440-27
Project: RFAAP SSP Investigation
Preparation: 3050B Digestion
Prepared: 04/28/06 14:30
Initial/Final: 0.5002 g / 50 mL
QC Batch: 0604757

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.24	mg/kg dry wt.	1	0.50	0.036	J	05/02/06 15:56

J, k

02775

INORGANIC ANALYSIS DATA SHEET
USEPA-6020

ASB5-A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Matrix: Soil
Sampled: 04/20/06 13:30
Solids: 79.00
Laboratory ID: 0604426-05

SDG: 36440-27
Project: RFAAP SSP Investigation
Preparation: 3050B Digestion
Prepared: 04/28/06 07:02
Initial/Final: 0.5001 g / 50 mL
QC Batch: 0604716

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	20	mg/kg dry wt.	1	0.40	0.023		05/05/06 11:48
7440-43-9	Cadmium, Total	1.3	mg/kg dry wt.	1	1.0	0.0073		05/05/06 11:48
7440-50-8	Copper, Total	150	mg/kg dry wt.	10	10	0.22		05/08/06 14:27
7439-92-1	Lead, Total	330	mg/kg dry wt.	10	10	0.41		05/08/06 14:27
7440-02-0	Nickel, Total	13	mg/kg dry wt.	1	0.50	0.027		05/05/06 11:48
7782-49-2	Selenium, Total	0.32	mg/kg dry wt.	1	1.0	0.063	J	05/05/06 11:48
7440-22-4	Silver, Total	0.18	mg/kg dry wt.	1	3.0	0.017	J	05/05/06 11:48
7440-28-0	Thallium, Total	0.21	mg/kg dry wt.	1	0.50	0.0085	J	05/05/06 11:48
7440-62-2	Vanadium, Total	56	mg/kg dry wt.	2	2.0	0.047		05/08/06 15:21

J, k

INORGANIC ANALYSIS DATA SHEET
USEPA-6020

ASB5-A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Matrix: Soil
Sampled: 04/20/06 13:30
Solids: 79.00
Laboratory ID: 0604426-05

SDG: 36440-27
Project: RFAAP SSP Investigation
Preparation: 3050B Digestion
Prepared: 04/28/06 14:30
Initial/Final: 0.4995 g / 50 mL
QC Batch: 0604757

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.63	mg/kg dry wt.	1	0.50	0.036		05/02/06 15:58

J, k

02777

INORGANIC ANALYSIS DATA SHEET
USEPA-6020

ASB5-B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Matrix: Soil
Sampled: 04/20/06 13:50
Solids: 73.00
Laboratory ID: 0604426-06

SDG: 36440-27
Project: RFAAP SSP Investigation
Preparation: 3050B Digestion
Prepared: 04/28/06 07:02
Initial/Final: 0.5005 g / 50 mL
QC Batch: 0604716

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	1.8	mg/kg dry wt.	1	0.40	0.023		05/05/06 11:51
7440-43-9	Cadmium, Total	0.072	mg/kg dry wt.	1	1.0	0.0073	J	05/05/06 11:51
7440-50-8	Copper, Total	21	mg/kg dry wt.	1	1.0	0.022		05/05/06 11:51
7439-92-1	Lead, Total	24	mg/kg dry wt.	1	1.0	0.041		05/05/06 11:51
7440-02-0	Nickel, Total	19	mg/kg dry wt.	1	0.50	0.027		05/05/06 11:51
7782-49-2	Selenium, Total	0.16	mg/kg dry wt.	1	1.0	0.063	J	05/05/06 11:51
7440-22-4	Silver, Total	0.064	mg/kg dry wt.	1	3.0	0.017	J	05/05/06 11:51
7440-28-0	Thallium, Total	0.39	mg/kg dry wt.	1	0.50	0.0085	J	05/05/06 11:51
7440-62-2	Vanadium, Total	96	mg/kg dry wt.	2	2.0	0.047		05/08/06 15:23

J, k

INORGANIC ANALYSIS DATA SHEET
USEPA-6020

ASB5-B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Matrix: Soil
Sampled: 04/20/06 13:50
Solids: 73.00
Laboratory ID: 0604426-06

SDG: 36440-27
Project: RFAAP SSP Investigation
Preparation: 3050B Digestion
Prepared: 04/28/06 14:30
Initial/Final: 0.5004 g / 50 mL
QC Batch: 0604757

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-36-0	Antimony, Total	0.50	mg/kg dry wt.	1	0.50	0.036	U	05/02/06 16:00	UJ,k

62779

SAMPLE ID SUMMARY

USEPA-6010B

REVISED
ICAH 6/24/04

Laboratory: TriMatrix Laboratories, Inc.

SDG: 36440-27

Client: URS Group, Inc.

Project: RFAAP SSP Investigation

Client Sample Id:	Lab Sample Id:
FSB4A	0604361-01
FSB4B	0604361-02
FSB4C	0604361-03
EQBK-1	0604361-04
ASB4-A	0604426-01
ASB4-B	0604426-02
ASB4-C	0604426-03
DUP-1 → ASB4A	0604426-04
ASB5-A	0604426-05
ASB5-B	0604426-06

02237

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

FSB4A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Matrix: Soil
Sampled: 04/19/06 09:20
Solids: 78.00
Laboratory ID: 0604361-01

SDG: 36440-27
Project: RFAAP SSP Investigation
Preparation: 3050B Digestion
Prepared: 04/28/06 07:01
Initial/Final: 0.5001 g / 50 mL
QC Batch: 0604714

REVISED
KAH 6/22/06

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	17000	mg/kg dry wt.	100	5000	160		05/08/06 15:10
7440-39-3	Barium, Total	110	mg/kg dry wt.	1	5.0	0.10		05/08/06 10:41
7440-41-7	Beryllium, Total	0.95	mg/kg dry wt.	1	1.0	0.016	J	05/08/06 10:41
7440-70-2	Calcium, Total	5700	mg/kg dry wt.	1	250	10		05/08/06 10:41
7440-47-3	Chromium, Total	31	mg/kg dry wt.	1	5.0	0.57		05/08/06 10:41
7440-48-4	Cobalt, Total	13	mg/kg dry wt.	1	1.0	0.35		05/08/06 10:41
7439-89-6	Iron, Total	33000	mg/kg dry wt.	500	5000	230		05/09/06 15:28
7439-95-4	Magnesium, Total	6100	mg/kg dry wt.	1	250	3.4		05/08/06 10:41
7439-96-5	Manganese, Total	900	mg/kg dry wt.	10	100	1.4		05/08/06 15:30
7440-09-7	Potassium, Total	2200	mg/kg dry wt.	1	100	7.5		05/08/06 10:41
7440-23-5	Sodium, Total	100	mg/kg dry wt.	1	100	19	U	05/08/06 10:41
7440-66-6	Zinc, Total	600	mg/kg dry wt.	10	40	8.5		05/08/06 15:30

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

FSB4B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Matrix: Soil
Sampled: 04/19/06 09:40
Solids: 83.00
Laboratory ID: 0604361-02

SDG: 36440-27
Project: RFAAP SSP Investigation
Preparation: 3050B Digestion
Prepared: 04/28/06 07:01
Initial/Final: 0.5002 g / 50 mL
QC Batch: 0604714

REVISED
10M 6/22/06

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	18000	mg/kg dry wt.	1	50	1.6		05/08/06 11:04
7440-39-3	Barium, Total	100	mg/kg dry wt.	1	5.0	0.10		05/08/06 11:04
7440-41-7	Beryllium, Total	0.84	mg/kg dry wt.	1	1.0	0.016	J	05/08/06 11:04
7440-70-2	Calcium, Total	1500	mg/kg dry wt.	1	250	10		05/08/06 11:04
7440-47-3	Chromium, Total	33	mg/kg dry wt.	1	5.0	0.57		05/08/06 11:04
7440-48-4	Cobalt, Total	12	mg/kg dry wt.	1	1.0	0.35		05/08/06 11:04
7439-89-6	Iron, Total	34000	mg/kg dry wt.	50	500	23		05/08/06 16:04
7439-95-4	Magnesium, Total	4000	mg/kg dry wt.	1	250	3.4		05/08/06 11:04
7439-96-5	Manganese, Total	550	mg/kg dry wt.	1	10	0.14		05/08/06 11:04
7440-09-7	Potassium, Total	2000	mg/kg dry wt.	1	100	7.5		05/08/06 11:04
7440-23-5	Sodium, Total	100	mg/kg dry wt.	1	100	19	U	05/08/06 11:04
7440-66-6	Zinc, Total	62	mg/kg dry wt.	1	4.0	0.85		05/08/06 11:04

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

FSB4C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Matrix: Soil
Sampled: 04/19/06 10:00
Solids: 86.00
Laboratory ID: 0604361-03

SDG: 36440-27
Project: RFAAP SSP Investigation
Preparation: 3050B Digestion
Prepared: 04/28/06 07:01
Initial/Final: 0.4995 g / 50 mL
QC Batch: 0604714

REVISED
KAH 6/22/06

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	14000	mg/kg dry wt.	1	50	1.6		05/08/06 11:08
7440-39-3	Barium, Total	88	mg/kg dry wt.	1	5.0	0.10		05/08/06 11:08
7440-41-7	Beryllium, Total	0.74	mg/kg dry wt.	1	1.0	0.016	J	05/08/06 11:08
7440-70-2	Calcium, Total	1400	mg/kg dry wt.	1	250	10		05/08/06 11:08
7440-47-3	Chromium, Total	30	mg/kg dry wt.	1	5.0	0.57		05/08/06 11:08
7440-48-4	Cobalt, Total	12	mg/kg dry wt.	1	1.0	0.35		05/08/06 11:08
7439-89-6	Iron, Total	34000	mg/kg dry wt.	50	500	23		05/08/06 16:08
7439-95-4	Magnesium, Total	3500	mg/kg dry wt.	1	250	3.4		05/08/06 11:08
7439-96-5	Manganese, Total	670	mg/kg dry wt.	1	10	0.14		05/08/06 11:08
7440-09-7	Potassium, Total	1800	mg/kg dry wt.	1	100	7.5		05/08/06 11:08
7440-23-5	Sodium, Total	100	mg/kg dry wt.	1	100	19	U	05/08/06 11:08
7440-66-6	Zinc, Total	73	mg/kg dry wt.	1	4.0	0.85		05/08/06 11:08

INORGANIC ANALYSIS DATA SHEET

USEPA-6010B

EQBK-1

REVISED 6/7/06 CAH

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Matrix: Water
Sampled: 04/19/06 15:15
Solids: 0.00
Laboratory ID: 0604361-04

SDG: 36440-27
Project: RFAAP SSP Investigation
Preparation: 3010A Digestion
Prepared: 05/02/06 06:25
Initial/Final: 25 mL / 25 mL
QC Batch: 0604827

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	100	ug/L	1	100	16	U	05/08/06 15:00
7440-39-3	Barium, Total	10	ug/L	1	10	0.92	U	05/08/06 15:00
7440-41-7	Beryllium, Total	4.0	ug/L	1	4.0	0.50	U	05/08/06 15:02
7440-70-2	Calcium, Total	500	ug/L	1	500	52	U	05/08/06 15:00
7440-47-3	Chromium, Total	50	ug/L	1	50	5.5	U	05/08/06 15:02
7439-89-6	Iron, Total	5.1	ug/L	1	100	3.2	J	05/08/06 15:01
7439-95-4	Magnesium, Total	500	ug/L	1	500	32	U	05/08/06 15:01
7440-09-7	Potassium, Total	200	ug/L	1	200	36	U	05/08/06 15:00
7440-23-5	Sodium, Total	500	ug/L	1	500	59	U	05/08/06 15:00
7440-66-6	Zinc, Total	8.8	ug/L	1	30	7.7	JB	05/08/06 15:02

B,P

02241

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

ASB4-A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Matrix: Soil
Sampled: 04/20/06 11:30
Solids: 78.00
Laboratory ID: 0604426-01

SDG: 36440-27
Project: RFAAP SSP Investigation
Preparation: 3050B Digestion
Prepared: 04/28/06 07:01
Initial/Final: 0.4995 g / 50 mL
QC Batch: 0604714

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	33000	mg/kg dry wt.	50	2500	79		05/08/06 16:12
7440-39-3	Barium, Total	67	mg/kg dry wt.	1	5.0	0.10		05/08/06 11:12
7440-41-7	Beryllium, Total	0.55	mg/kg dry wt.	1	1.0	0.016	J	05/08/06 11:12
7440-70-2	Calcium, Total	2200	mg/kg dry wt.	1	250	10		05/08/06 11:12
7440-47-3	Chromium, Total	29	mg/kg dry wt.	1	5.0	0.57		05/08/06 11:12
7440-48-4	Cobalt, Total	6.2	mg/kg dry wt.	1	1.0	0.35		05/08/06 11:12
7439-89-6	Iron, Total	40000	mg/kg dry wt.	50	500	23		05/08/06 16:12
7439-95-4	Magnesium, Total	2600	mg/kg dry wt.	1	250	3.4		05/08/06 11:12
7439-96-5	Manganese, Total	290	mg/kg dry wt.	1	10	0.14		05/08/06 11:12
7440-09-7	Potassium, Total	1600	mg/kg dry wt.	1	100	7.5		05/08/06 11:12
7440-23-5	Sodium, Total	120	mg/kg dry wt.	1	100	19		05/08/06 11:12
7440-66-6	Zinc, Total	76	mg/kg dry wt.	1	4.0	0.85		05/08/06 11:12

J, k

02242

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

ASB4-B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Matrix: Soil
Sampled: 04/20/06 12:00
Solids: 78.00
Laboratory ID: 0604426-02

SDG: 36440-27
Project: RFAAP SSP Investigation
Preparation: 3050B Digestion
Prepared: 04/28/06 07:01
Initial/Final: 0.4996 g / 50 mL
QC Batch: 0604714

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	26000	mg/kg dry wt.	50	2500	79		05/08/06 16:16
7440-39-3	Barium, Total	50	mg/kg dry wt.	1	5.0	0.10		05/08/06 11:29
7440-41-7	Beryllium, Total	0.59	mg/kg dry wt.	1	1.0	0.016	J	05/08/06 11:29
7440-70-2	Calcium, Total	710	mg/kg dry wt.	1	250	10		05/08/06 11:29
7440-47-3	Chromium, Total	28	mg/kg dry wt.	1	5.0	0.57		05/08/06 11:29
7440-48-4	Cobalt, Total	6.3	mg/kg dry wt.	1	1.0	0.35		05/08/06 11:29
7439-89-6	Iron, Total	33000	mg/kg dry wt.	50	500	23		05/08/06 16:16
7439-95-4	Magnesium, Total	1300	mg/kg dry wt.	1	250	3.4		05/08/06 11:29
7439-96-5	Manganese, Total	260	mg/kg dry wt.	1	10	0.14		05/08/06 11:29
7440-09-7	Potassium, Total	1200	mg/kg dry wt.	1	100	7.5		05/08/06 11:29
7440-23-5	Sodium, Total	330	mg/kg dry wt.	1	100	19		05/08/06 11:29
7440-66-6	Zinc, Total	47	mg/kg dry wt.	1	4.0	0.85		05/08/06 11:29

J, K

02243

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

ASB4-C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Matrix: Soil
Sampled: 04/20/06 12:25
Solids: 67.00
Laboratory ID: 0604426-03

SDG: 36440-27
Project: RFAAP SSP Investigation
Preparation: 3050B Digestion
Prepared: 04/28/06 07:01
Initial/Final: 0.4999 g / 50 mL
QC Batch: 0604714

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7429-90-5	Aluminum, Total	27000	mg/kg dry wt.	25	1200	40		05/08/06 16:24	J,K
7440-39-3	Barium, Total	86	mg/kg dry wt.	1	5.0	0.10		05/08/06 11:34	
7440-41-7	Beryllium, Total	1.1	mg/kg dry wt.	1	1.0	0.016		05/08/06 11:34	
7440-70-2	Calcium, Total	320	mg/kg dry wt.	1	250	10		05/08/06 11:34	
7440-47-3	Chromium, Total	21	mg/kg dry wt.	1	5.0	0.57		05/08/06 11:34	
7440-48-4	Cobalt, Total	33	mg/kg dry wt.	1	1.0	0.35		05/08/06 11:34	
7439-89-6	Iron, Total	55000	mg/kg dry wt.	100	1000	46		05/08/06 16:20	
7439-95-4	Magnesium, Total	3900	mg/kg dry wt.	1	250	3.4		05/08/06 11:34	
7439-96-5	Manganese, Total	1700	mg/kg dry wt.	25	250	3.5		05/08/06 16:24	
7440-09-7	Potassium, Total	2600	mg/kg dry wt.	1	100	7.5		05/08/06 11:34	
7440-23-5	Sodium, Total	100	mg/kg dry wt.	1	100	19	U	05/08/06 11:34	UJ,K
7440-66-6	Zinc, Total	37	mg/kg dry wt.	1	4.0	0.85		05/08/06 11:34	J,K

02244

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

DUP-1

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Matrix: Soil
Sampled: 04/20/06 00:00
Solids: 77.00
Laboratory ID: 0604426-04

SDG: 36440-27
Project: RFAAP SSP Investigation
Preparation: 3050B Digestion
Prepared: 04/28/06 07:01
Initial/Final: 0.4998 g / 50 mL
QC Batch: 0604714

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	28000	mg/kg dry wt.	25	1200	40		05/08/06 16:45
7440-39-3	Barium, Total	57	mg/kg dry wt.	1	5.0	0.10		05/08/06 11:39
7440-41-7	Beryllium, Total	0.64	mg/kg dry wt.	1	1.0	0.016	J	05/08/06 11:39
7440-70-2	Calcium, Total	2100	mg/kg dry wt.	1	250	10		05/08/06 11:39
7440-47-3	Chromium, Total	43	mg/kg dry wt.	1	5.0	0.57		05/08/06 11:39
7440-48-4	Cobalt, Total	6.2	mg/kg dry wt.	1	1.0	0.35		05/08/06 11:39
7439-89-6	Iron, Total	66000	mg/kg dry wt.	100	1000	46		05/08/06 16:28
7439-95-4	Magnesium, Total	2400	mg/kg dry wt.	1	250	3.4		05/08/06 11:39
7439-96-5	Manganese, Total	350	mg/kg dry wt.	1	10	0.14		05/08/06 11:39
7440-09-7	Potassium, Total	1500	mg/kg dry wt.	1	100	7.5		05/08/06 11:39
7440-23-5	Sodium, Total	49	mg/kg dry wt.	1	100	19	J	05/08/06 11:39
7440-66-6	Zinc, Total	140	mg/kg dry wt.	5	20	4.3		05/09/06 15:48

J,k

02245

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

ASB5-A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Matrix: Soil
Sampled: 04/20/06 13:30
Solids: 79.00
Laboratory ID: 0604426-05

SDG: 36440-27
Project: RFAAP SSP Investigation
Preparation: 3050B Digestion
Prepared: 04/28/06 07:01
Initial/Final: 0.4995 g / 50 mL
QC Batch: 0604714

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	21000	mg/kg dry wt.	1	50	1.6		05/08/06 11:43
7440-39-3	Barium, Total	150	mg/kg dry wt.	1	5.0	0.10		05/08/06 11:43
7440-41-7	Beryllium, Total	0.59	mg/kg dry wt.	1	1.0	0.016	J	05/08/06 11:43
7440-70-2	Calcium, Total	18000	mg/kg dry wt.	1	250	10		05/08/06 11:43
7440-47-3	Chromium, Total	100	mg/kg dry wt.	2	10	1.1		05/09/06 15:53
7440-48-4	Cobalt, Total	6.9	mg/kg dry wt.	1	1.0	0.35		05/08/06 11:43
7439-89-6	Iron, Total	33000	mg/kg dry wt.	50	500	23		05/08/06 16:49
7439-95-4	Magnesium, Total	10000	mg/kg dry wt.	1	250	3.4		05/08/06 11:43
7439-96-5	Manganese, Total	310	mg/kg dry wt.	1	10	0.14		05/08/06 11:43
7440-09-7	Potassium, Total	1100	mg/kg dry wt.	1	100	7.5		05/08/06 11:43
7440-23-5	Sodium, Total	41	mg/kg dry wt.	1	100	19	J	05/08/06 11:43
7440-66-6	Zinc, Total	1400	mg/kg dry wt.	50	200	43		05/08/06 16:49

J, k

02246

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

ASB5-B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Matrix: Soil
Sampled: 04/20/06 13:50
Solids: 73.00
Laboratory ID: 0604426-06

SDG: 36440-27
Project: RFAAP SSP Investigation
Preparation: 3050B Digestion
Prepared: 04/28/06 07:01
Initial/Final: 0.4998 g / 50 mL
QC Batch: 0604714

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	36000	mg/kg dry wt.	50	2500	79		05/08/06 16:53
7440-39-3	Barium, Total	94	mg/kg dry wt.	1	5.0	0.10		05/08/06 11:48
7440-41-7	Beryllium, Total	0.84	mg/kg dry wt.	1	1.0	0.016	J	05/08/06 11:48
7440-70-2	Calcium, Total	220	mg/kg dry wt.	1	250	10	J	05/08/06 11:48
7440-47-3	Chromium, Total	30	mg/kg dry wt.	1	5.0	0.57		05/08/06 11:48
7440-48-4	Cobalt, Total	22	mg/kg dry wt.	1	1.0	0.35		05/08/06 11:48
7439-89-6	Iron, Total	47000	mg/kg dry wt.	50	500	23		05/08/06 16:53
7439-95-4	Magnesium, Total	2700	mg/kg dry wt.	1	250	3.4		05/08/06 11:48
7439-96-5	Manganese, Total	950	mg/kg dry wt.	1	10	0.14		05/08/06 11:48
7440-09-7	Potassium, Total	2600	mg/kg dry wt.	1	100	7.5		05/08/06 11:48
7440-23-5	Sodium, Total	100	mg/kg dry wt.	1	100	19	U	05/08/06 11:48
7440-66-6	Zinc, Total	69	mg/kg dry wt.	1	4.0	0.85		05/08/06 11:48

J, K

02247

SAMPLE ID SUMMARY

USEPA-7470A

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Group, Inc.

SDG: 36440-27

Project: RFAAP SSP Investigation

Client Sample Id:	Lab Sample Id:
EQBK-1	0604361-04

INORGANIC ANALYSIS DATA SHEET
USEPA-7470A

EQBK-1

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Matrix: Water
Sampled: 04/19/06 15:15
Solids: 0.00
Laboratory ID: 0604361-04

SDG: 36440-27
Project: RFAAP SSP Investigation
Preparation: 7470A Digestion - Total
Prepared: 05/03/06 14:00
Initial/Final: 40 mL / 40 mL
QC Batch: 0604927

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.40	ug/L	1	0.40	0.037	U	05/04/06 14:46

031124

SAMPLE ID SUMMARY

USEPA-7471A

REVISED
KM 6/22/06

Laboratory: TriMatrix Laboratories, Inc.

SDG: 36440-27

Client: URS Group, Inc.

Project: RFAAP SSP Investigation

Client Sample Id:	Lab Sample Id:
FSB4A	0604361-01
FSB4B	0604361-02
FSB4C	0604361-03
ASB4-A	0604426-01
ASB4-B	0604426-02
ASB4-C	0604426-03
DUP-1 → ASB4A	0604426-04
ASB5-A	0604426-05
ASB5-B	0604426-06

03125

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

FSB4A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Matrix: Soil
Sampled: 04/19/06 09:20
Solids: 78.00
Laboratory ID: 0604361-01

SDG: 36440-27
Project: RFAAP SSP Investigation
Preparation: 7471A Mercury
Prepared: 05/02/06 14:00
Initial/Final: 0.2998 g / 50 mL
QC Batch: 0604834

REVISED
KM 6/22/06

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.025	mg/kg dry wt.	1	0.10	0.0048	J	05/03/06 11:49

03126

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

FSB4B

REVISED
(CAH 6/22/06

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Matrix: Soil
Sampled: 04/19/06 09:40
Solids: 83.00
Laboratory ID: 0604361-02

SDG: 36440-27
Project: RFAAP SSP Investigation
Preparation: 7471A Mercury
Prepared: 05/02/06 14:00
Initial/Final: 0.3 g / 50 mL
QC Batch: 0604834

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.012	mg/kg dry wt.	1	0.10	0.0048	J	05/03/06 12:04

03127

INORGANIC ANALYSIS DATA SHEET

USEPA-7471A

FSB4C

REVISED
CAN 6/22/06

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Matrix: Soil
Sampled: 04/19/06 10:00
Solids: 86.00
Laboratory ID: 0604361-03

SDG: 36440-27
Project: RFAAP SSP Investigation
Preparation: 7471A Mercury
Prepared: 05/02/06 14:00
Initial/Final: 0.2997 g / 50 mL
QC Batch: 0604834

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.015	mg/kg dry wt.	1	0.10	0.0048	J	05/03/06 12:22

03128

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

ASB4-A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Matrix: Soil
Sampled: 04/20/06 11:30
Solids: 78.00
Laboratory ID: 0604426-01

SDG: 36440-27
Project: RFAAP SSP Investigation
Preparation: 7471A Mercury Digestic
Prepared: 05/02/06 14:00
Initial/Final: 0.2995 g / 50 mL
QC Batch: 0604834

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7439-97-6	Mercury, Total	0.041	mg/kg dry wt.	1	0.10	0.0048	J	05/03/06 12:27	J, k

03125

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

ASB4-B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Matrix: Soil
Sampled: 04/20/06 12:00
Solids: 78.00
Laboratory ID: 0604426-02

SDG: 36440-27
Project: RFAAP SSP Investigation
Preparation: 7471A Mercury Digestic
Prepared: 05/02/06 14:00
Initial/Final: 0.2999 g / 50 mL
QC Batch: 0604834

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7439-97-6	Mercury, Total	0.033	mg/kg dry wt.	1	0.10	0.0048	J	05/03/06 12:32	J,k

03130

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

ASB4-C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Matrix: Soil
Sampled: 04/20/06 12:25
Solids: 67.00
Laboratory ID: 0604426-03

SDG: 36440-27
Project: RFAAP SSP Investigation
Preparation: 7471A Mercury Digestic
Prepared: 05/02/06 14:00
Initial/Final: 0.3002 g / 50 mL
QC Batch: 0604834

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7439-97-6	Mercury, Total	0.025	mg/kg dry wt.	1	0.10	0.0048	J	05/03/06 12:37	J,k

03131

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

DUP-1

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Matrix: Soil
Sampled: 04/20/06 00:00
Solids: 77.00
Laboratory ID: 0604426-04

SDG: 36440-27
Project: RFAAP SSP Investigation
Preparation: 7471A Mercury Digestic
Prepared: 05/02/06 14:00
Initial/Final: 0.2998 g / 50 mL
QC Batch: 0604834

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7439-97-6	Mercury, Total	0.035	mg/kg dry wt.	1	0.10	0.0048	J	05/03/06 12:42	J,k

: 03132

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

ASB5-A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Matrix: Soil
Sampled: 04/20/06 13:30
Solids: 79.00
Laboratory ID: 0604426-05

SDG: 36440-27
Project: RFAAP SSP Investigation
Preparation: 7471A Mercury Digestic
Prepared: 05/02/06 14:00
Initial/Final: 0.3002 g / 50 mL
QC Batch: 0604834

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.14	mg/kg dry wt.	1	0.10	0.0048		05/03/06 12:47

J,K

: 03133

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

ASB5-B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Matrix: Soil
Sampled: 04/20/06 13:50
Solids: 73.00
Laboratory ID: 0604426-06

SDG: 36440-27
Project: RFAAP SSP Investigation
Preparation: 7471A Mercury Digestic
Prepared: 05/02/06 14:00
Initial/Final: 0.3003 g / 50 mL
QC Batch: 0604834

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.062	mg/kg dry wt.	1	0.10	0.0048	J	05/03/06 12:52

J,k

03134

SAMPLE ID SUMMARY

USEPA-9012A

REVISED
LAN 6/22/06

Laboratory: TriMatrix Laboratories, Inc.

SDG: 36440-27

Client: URS Group, Inc.

Project: RFAAP SSP Investigation

Client Sample Id:	Lab Sample Id:
FSB4A	0604361-01
FSB4B	0604361-02
FSB4C	0604361-03
ASB4-A	0604426-01
ASB4-B	0604426-02
ASB4-C	0604426-03
DUP-1 → ASB4A	0604426-04
ASB5-A	0604426-05
ASB5-B	0604426-06

INORGANIC ANALYSIS DATA SHEET

USEPA-9012A

FSB4A

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Group, Inc.

Matrix: Soil

Sampled: 04/19/06 09:20

Solids: 78.00

Laboratory ID: 0604361-01

SDG: 36440-27

Project: RFAAP SSP Investigation

Preparation: Method-Specific

Prepared: 05/01/06 08:00

Initial/Final: 24.75 g / 250 mL

QC Batch: 0604860

REVISED
ICVS 6/22/06

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
57-12-5	Cyanide, Total	0.079	mg/kg dry	1	0.26	0.046	J	05/01/06 14:47

03196

INORGANIC ANALYSIS DATA SHEET

USEPA-9012A

FSB4B

REVISED
JAN 6 2006

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Matrix: Soil
Sampled: 04/19/06 09:40
Solids: 83.00
Laboratory ID: 0604361-02

SDG: 36440-27
Project: RFAAP SSP Investigation
Preparation: Method-Specific
Prepared: 05/01/06 08:00
Initial/Final: 25.85 g / 250 mL
QC Batch: 0604860

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
57-12-5	Cyanide, Total	0.075	mg/kg dry	1	0.24	0.043	J	05/01/06 14:47

03197

INORGANIC ANALYSIS DATA SHEET
USEPA-9012A

FSB4C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Matrix: Soil
Sampled: 04/19/06 10:00
Solids: 86.00
Laboratory ID: 0604361-03

SDG: 36440-27
Project: RFAAP SSP Investigation
Preparation: Method-Specific
Prepared: 05/01/06 08:00
Initial/Final: 27.85 g / 250 mL
QC Batch: 0604860

REVISED
lcH 6/22/06

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
57-12-5	Cyanide, Total	0.051	mg/kg dry	1	0.23	0.041	J	05/01/06 14:52

03198

INORGANIC ANALYSIS DATA SHEET
USEPA-9012A

ASB4-A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Matrix: Soil
Sampled: 04/20/06 11:30
Solids: 78.00
Laboratory ID: 0604426-01

SDG: 36440-27
Project: RFAAP SSP Investigation
Preparation: Method-Specific Prepara
Prepared: 05/01/06 08:00
Initial/Final: 26.19 g / 250 mL
QC Batch: 0604860

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
57-12-5	Cyanide, Total	0.26	mg/kg dry	1	0.26	0.046	U	05/01/06 14:52

03199

INORGANIC ANALYSIS DATA SHEET
USEPA-9012A

ASB4-B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Matrix: Soil
Sampled: 04/20/06 12:00
Solids: 78.00
Laboratory ID: 0604426-02

SDG: 36440-27
Project: RFAAP SSP Investigation
Preparation: Method-Specific Prepara
Prepared: 05/01/06 08:00
Initial/Final: 25.16 g / 250 mL
QC Batch: 0604860

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
57-12-5	Cyanide, Total	0.26	mg/kg dry	1	0.26	0.046	U	05/01/06 14:52

INORGANIC ANALYSIS DATA SHEET
USEPA-9012A

ASB4-C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Matrix: Soil
Sampled: 04/20/06 12:25
Solids: 67.00
Laboratory ID: 0604426-03

SDG: 36440-27
Project: RFAAP SSP Investigation
Preparation: Method-Specific Prepara
Prepared: 05/01/06 08:00
Initial/Final: 27.46 g / 250 mL
QC Batch: 0604860

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
57-12-5	Cyanide, Total	0.72	mg/kg dry	1	0.30	0.053		05/01/06 14:52

03261

INORGANIC ANALYSIS DATA SHEET
USEPA-9012A

DUP-1

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Matrix: Soil
Sampled: 04/20/06 00:00
Solids: 77.00
Laboratory ID: 0604426-04

SDG: 36440-27
Project: RFAAP SSP Investigation
Preparation: Method-Specific Prepara
Prepared: 05/01/06 08:00
Initial/Final: 27.07 g / 250 mL
QC Batch: 0604860

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
57-12-5	Cyanide, Total	0.26	mg/kg dry	1	0.26	0.046	U	05/01/06 14:52

03202

INORGANIC ANALYSIS DATA SHEET
USEPA-9012A

ASB5-A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Matrix: Soil
Sampled: 04/20/06 13:30
Solids: 79.00
Laboratory ID: 0604426-05

SDG: 36440-27
Project: RFAAP SSP Investigation
Preparation: Method-Specific Prepara
Prepared: 05/01/06 08:00
Initial/Final: 25.66 g / 250 mL
QC Batch: 0604860

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
57-12-5	Cyanide, Total	0.21	mg/kg dry	1	0.25	0.045	J	05/01/06 16:01

: 03263

INORGANIC ANALYSIS DATA SHEET
USEPA-9012A

ASB5-B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Matrix: Soil
Sampled: 04/20/06 13:50
Solids: 73.00
Laboratory ID: 0604426-06

SDG: 36440-27
Project: RFAAP SSP Investigation
Preparation: Method-Specific Prepara
Prepared: 05/01/06 08:00
Initial/Final: 28.32 g / 250 mL
QC Batch: 0604860

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
57-12-5	Cyanide, Total	0.60	mg/kg dry	1	0.27	0.049		05/01/06 16:01

: 63264

SAMPLE ID SUMMARY

USEPA-3550B

REVISED
10MH 6/22/06

Laboratory: TriMatrix Laboratories, Inc.

SDG: 36440-27

Client: URS Group, Inc.

Project: RFAAP SSP Investigation

Client Sample Id:	Lab Sample Id:
FSB4A	0604361-01
FSB4B	0604361-02
FSB4C	0604361-03
ASB4-A	0604426-01
ASB4-B	0604426-02
ASB4-C	0604426-03
DUP-1 → ASB4A	0604426-04
ASB5-A	0604426-05
ASB5-B	0604426-06

0322B

INORGANIC ANALYSIS DATA SHEET

USEPA-3550B

FSB4A

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Group, Inc.

Matrix: Soil

Sampled: 04/19/06 09:20

Solids: 78.00

Laboratory ID: 0604361-01

SDG: 36440-27

Project: RFAAP SSP Investigation

Preparation: Method-Specific

Prepared: 04/28/06 09:45

Initial/Final: 10 g / 10 mL

QC Batch: 0604775

REVISED
AH 6/22/06

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
	Percent Solids	78	%	1	0.1	0.1		04/28/06 09:45

03229

INORGANIC ANALYSIS DATA SHEET

USEPA-3550B

FSB4B

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Group, Inc.

Matrix: Soil

Sampled: 04/19/06 09:40

Solids: 83.00

Laboratory ID: 0604361-02

SDG: 36440-27

Project: RFAAP SSP Investigation

Preparation: Method-Specific

Prepared: 04/28/06 09:45

Initial/Final: 10 g / 10 mL

QC Batch: 0604775

REVISED
KM 6/22/06

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
	Percent Solids	83	%	1	0.1	0.1		04/28/06 09:45

INORGANIC ANALYSIS DATA SHEET
USEPA-3550B

FSB4C

REVISED
KH 6/22/06

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Matrix: Soil
Sampled: 04/19/06 10:00
Solids: 86.00
Laboratory ID: 0604361-03

SDG: 36440-27
Project: RFAAP SSP Investigation
Preparation: Method-Specific
Prepared: 04/28/06 09:45
Initial/Final: 10 g / 10 mL
QC Batch: 0604775

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
	Percent Solids	86	%	1	0.1	0.1		04/28/06 09:45

03231

INORGANIC ANALYSIS DATA SHEET
USEPA-3550B

ASB4-A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Matrix: Soil
Sampled: 04/20/06 11:30
Solids: 78.00
Laboratory ID: 0604426-01

SDG: 36440-27
Project: RFAAP SSP Investigation
Preparation: Method-Specific Prepara
Prepared: 04/28/06 15:30
Initial/Final: 10 g / 10 mL
QC Batch: 0604819

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
	Percent Solids	78	%	1	0.1	0.1		04/28/06 15:30

03232

INORGANIC ANALYSIS DATA SHEET
USEPA-3550B

ASB4-B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Matrix: Soil
Sampled: 04/20/06 12:00
Solids: 78.00
Laboratory ID: 0604426-02

SDG: 36440-27
Project: RFAAP SSP Investigation
Preparation: Method-Specific Prepara
Prepared: 04/28/06 15:30
Initial/Final: 10 g / 10 mL
QC Batch: 0604819

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
	Percent Solids	78	%	1	0.1	0.1		04/28/06 15:30

03233

INORGANIC ANALYSIS DATA SHEET
USEPA-3550B

ASB4-C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Matrix: Soil
Sampled: 04/20/06 12:25
Solids: 67.00
Laboratory ID: 0604426-03

SDG: 36440-27
Project: RFAAP SSP Investigation
Preparation: Method-Specific Prepara
Prepared: 04/28/06 15:30
Initial/Final: 10 g / 10 mL
QC Batch: 0604819

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
	Percent Solids	67	%	1	0.1	0.1		04/28/06 15:30

03234

INORGANIC ANALYSIS DATA SHEET
USEPA-3550B

DUP-1

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Matrix: Soil
Sampled: 04/20/06 00:00
Solids: 77.00
Laboratory ID: 0604426-04

SDG: 36440-27
Project: RFAAP SSP Investigation
Preparation: Method-Specific Prepara
Prepared: 04/28/06 15:30
Initial/Final: 10 g / 10 mL
QC Batch: 0604819

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
	Percent Solids	77	%	1	0.1	0.1		04/28/06 15:30

03235

INORGANIC ANALYSIS DATA SHEET
USEPA-3550B

ASB5-A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Matrix: Soil
Sampled: 04/20/06 13:30
Solids: 79.00
Laboratory ID: 0604426-05

SDG: 36440-27
Project: RFAAP SSP Investigation
Preparation: Method-Specific Prepara
Prepared: 04/28/06 15:30
Initial/Final: 10 g / 10 mL
QC Batch: 0604819

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
	Percent Solids	79	%	1	0.1	0.1		04/28/06 15:30

03236

INORGANIC ANALYSIS DATA SHEET
USEPA-3550B

ASB5-B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Matrix: Soil
Sampled: 04/20/06 13:50
Solids: 73.00
Laboratory ID: 0604426-06

SDG: 36440-27
Project: RFAAP SSP Investigation
Preparation: Method-Specific Prepara
Prepared: 04/28/06 15:30
Initial/Final: 10 g / 10 mL
QC Batch: 0604819

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
	Percent Solids	73	%	1	0.1	0.1		04/28/06 15:30

: 63237

DATA VALIDATION WORKSHEET

Volatile Organic Analysis by GC/MS

Reviewer: ZAM
Date: 6/5/06
DV Level: II III IV
Review Document:
X NFG - Region III Modifications
X Project QAPP/SAP

Project Name: RFAAP SSP
Project Number: 116566.28
Laboratory: Trimatrix
SDG No.: 36440-27
Test Name: VOC
Method No.: 8260B

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	✓		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	✓		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		✓	
1.4	Do sample preservation, collection and storage condition meet method requirement?		✓	
	If the temperature of the cooler was elevated (> 10 °C) or bubble size in aqueous sample was too big (tiny bubble is OK.), then flag all positive results with a "L" and all non-detects "UL".			
1.5	Do any soil samples contain more than 50% water? If yes, no dry weight correction is made and make notes in the DV Report.		✓	

Notes: Cooler TM1373 at 10.1°C, no qual action taken due to temp. exceedance of only 0.1°C.

2.0 Holding Times		Yes	No	NA
2.1	Were samples preserved on ice for soils and on ice with HCL for aqueous samples?	✓		
2.2	Have any technical holding times (14 days), determined from date of sampling to date of analysis, been exceeded? If yes, L(+)/UL(-).		✓	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, L(+)/R(-) .		✓	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks prepared at the appropriate frequency (every 12 hour period per GCMS, matrix, and level)?	✓		
3.2	Do any method blanks have positive results? Action: If yes, positive sample results should be reported and qualified "B", if the [sample]≤ 5X[associated blank]. (or 10 times for the common volatile lab contaminants - methylene chloride, acetone, and 2-butanone)	✓		
3.3	Do any field equipment blanks/trip blanks have positive results? If Yes, use same rules above.		✓	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, noted in the DV report.	✓		

Notes: MBs- Acetone. Mell <10X conc., flagged B,Z in eq. blank
MB pos detections for various analytes, samp. concs. <5X (or 10X) blank conc. flagged B,Z

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are at least five standards included in the calibration curve?Are at least five standards included in the calibration curve?	✓		
4.2	Was an initial calibration analyzed at the beginning of each analysis?	✓		
4.3	Was a second source calibration verification analyzed for each calibration curve?	✓		
4.4	Has a continuing calibration standard been analyzed for every 12 hours of sample analysis per instrument?	✓		
4.5	Are all calibration standard %RSDs, correlation coefficient, or % drift within the control limits (%RSD <15%, r>0.995 or r^2>0.99; for 2° source: %D<+20%; and for CCC, %D < 20%)?	✓		
For initial calibration: %RSD > 15%, but < 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).				
For second source: %D>20% J(+)/R(-).				
For continuing calibration: Positive Bias - %D >+ 20%, J(+), only. Negative Bias - %D>-20% but <-50%, J(+)/UJ(-) and %D>-50%, J(+)/R(-).				
4.6	Are any CCCs (chloroform, 1,1-DCE, 1,2-DCPA, ethylbenzene, toluene, and vinyl chloride) displaying an RSD greater than 30%? If yes, L(+)/R(-) all associated results.		✓	
4.7	Do any SPCC have an RRF low? (<0.10 for chloromethane, 1,1-dichloroethane, and bromoform or <0.30 for chlorobenzene and 1,1,2,2-tetrachloroethane) If yes, L(+)/R(-) all associated results.		✓	

Notes:

5.0 GC/MS Instrument Performance Check		Yes	No	NA
5.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?	✓		
5.2	Have all samples been analyzed within twelve hours of the BFB tune? If twelve hours have elapsed according to the system clock, and the laboratory had analyzed standards, blanks, field samples or QC samples after twelve (12) hours, the data for the affected standards, blanks, field samples or QC samples are rejected "R".	✓		
5.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag "R".	✓		

Notes:

6.0 Surrogate Recovery		Yes	No	NA
6.1	Are surrogate recoveries within acceptance criteria for all samples and method blanks?	✓		
6.2	If No in Section 6.2, are these sample(s) or method blank(s) reanalyzed?			✓
	If any system monitoring compound(s) in the volatile fraction is out of specification, there should be a reanalysis to confirm that			
6.3	If No in Section 6.3, is any sample dilution factor greater than 10? DV report should indicate that extraction efficiency/ method			✓
	1 or more <10% / 1 high/low / 2 or 3 high/low / 2 or 3 all low / 2 or 3 all high Positives: L / J / J / L / K Non-detects: R / UJ / UJ / UJ / NONE			
	Note: The B qualifier remains over surrogate flagging.			

Notes:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	✓		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
7.3	Are there any %R for matrix spike and matrix spike duplicate recoveries outside the QC limits?	✓		
7.4	Are there any RPD for matrix spike and matrix spike duplicate recoveries outside the QC limits?	✓		
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data.			

Notes:

MS %R for Acetone (20), below QC limits (58-140) - no qual action, previously flagged for MB contamination

MSD %R Acetone 185 > QC limits %RPD Acetone 43(20), MEK 32(20), Styrene 122(20)

Styrene 14 < QC limits 1,2,3-Trichlorobenzene 23(20)

Styrene flagged UJ,m pos. results flagged J,d unless prev flagged

8.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)		Yes	No	NA
8.1	Is the LCS/LCSD recovery form present?	✓		
8.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
8.3	Are %R for LCS/LCSD recoveries outside the QC limits? If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).		✓	
8.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits? If Yes, J(+) only.		✓	

Notes:

9.0 Internal Standard		Yes	No	NA
9.1	Are internal standard area of every sample and blank within +100% or -50% of the mid point calibration standard? If not, J(+)/UJ(-).	✓		
	If extremely low area counts are reported, or performance exhibits a major abrupt drop-off, then a severe loss of sensitivity is indicated. Non-detect target compounds should then be qualified as unusable (R).			
9.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	✓		
	The chromatographic profile for that sample must be examined to determine if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction. Positive results should not needed to be qualified as "R", if the mass spectral criteria are met.			

Notes:

10.0 Field Duplicate		Yes	No	NA
10.1	Was a field duplicate prepared and analyzed at the correct frequency (one per 20 samples, matrix, and level)?	✓		
	For sample results > 5 x RL, use the MS/MSD control limit. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 x RL for soil will be used.			
10.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV	✓		

Notes:

see attached

11.0 Detection Limit Verification		Yes	No	NA
11.1	Do detection limits meet those required by the project QAPP and were they properly adjusted to reflect all sample dilutions and dry weight factors?	✓		
11.2	Were sample concentrations above the highest standard run at a dilution? If not, for ion saturation flag "L", unsaturated results			✓

Notes:

12.0 Data Completeness		Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit $95\%_{aq}$ and $90\%_{so}$)	✓		
12.1.1	Number of samples: 11			
12.1.2	Number of target compounds in each analysis: 50			
12.1.3	Number of results rejected and not reported: 0			
	% Completeness = (12.1.1 x 12.1.2 - 12.1.3) x 100/(12.1.1 x 12.1.2)			
	% Completeness = _____			

Notes:

QC BATCH SUMMARY
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27

Client: URS Group, Inc. Project: RFAAP SSP Investigation

QC Batch: 0604474 QC Batch Matrix: Water Preparation: 5030B Aqueous Purge & Trap

Sample Name	Lab Sample ID	Date Prepared	Observations
EQBK-1	0604361-04	04/24/06 09:00	Project-specific QC limits
Trip blank	0604361-05	04/24/06 09:00	Project-specific QC limits
~~Blank~~	~~0604474-BLK1~~	~~04/21/06 08:00~~	
~~Blank~~	~~0604474-BLK2~~	~~04/24/06 08:00~~	
Blank	0604474-BLK3	04/24/06 09:00	
~~LCS~~	~~0604474-BS1~~	~~04/21/06 08:00~~	
~~LCS~~	~~0604474-BS2~~	~~04/24/06 08:00~~	
LCS	0604474-BS3	04/24/06 09:00	

Acetone 2.9 X10 = 29

MeCl 0.55 X10 = 5.5

00125

METHOD BLANK DATA SHEET
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Water Laboratory ID: 0604474-BLK3 File ID: BLK0424A.D

Prepared: 04/24/06 09:00 Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

Analyzed: 04/24/06 14:50 Instrument: 224

QC Batch: 0604474 Sequence: 6050232 Calibration: 6E02009

CAS No.	Analyte	MDL	MRL	Conc. (ug/L)	Q
67-64-1	Acetone	1.1	20	2.9	J
71-43-2	Benzene	0.065	1.0	1.0	U
74-97-5	Bromochloromethane	0.13	1.0	1.0	U
75-27-4	Bromodichloromethane	0.11	1.0	1.0	U
75-25-2	Bromoform	0.15	1.0	1.0	U
74-83-9	Bromomethane	0.25	1.0	1.0	U
75-15-0	Carbon Disulfide	0.21	5.0	5.0	U
56-23-5	Carbon Tetrachloride	0.081	1.0	1.0	U
108-90-7	Chlorobenzene	0.11	1.0	1.0	U
75-00-3	Chloroethane	0.16	1.0	1.0	U
67-66-3	Chloroform	0.17	1.0	1.0	U
74-87-3	Chloromethane	0.18	1.0	1.0	U
110-82-7	Cyclohexane	0.16	5.0	5.0	U
96-12-8	1,2-Dibromo-3-chloropropane	0.59	5.0	5.0	U
124-48-1	Dibromochloromethane	0.13	1.0	1.0	U
106-93-4	1,2-Dibromoethane	0.086	1.0	1.0	U
95-50-1	1,2-Dichlorobenzene	0.29	1.0	1.0	U
541-73-1	1,3-Dichlorobenzene	0.15	1.0	1.0	U
106-46-7	1,4-Dichlorobenzene	0.26	1.0	1.0	U
75-71-8	Dichlorodifluoromethane	0.19	1.0	1.0	U
75-34-3	1,1-Dichloroethane	0.16	1.0	1.0	U
107-06-2	1,2-Dichloroethane	0.086	1.0	1.0	U
75-35-4	1,1-Dichloroethene	0.13	1.0	1.0	U
156-59-2	cis-1,2-Dichloroethene	0.16	1.0	1.0	U
156-60-5	trans-1,2-Dichloroethene	0.15	1.0	1.0	U
78-87-5	1,2-Dichloropropane	0.17	1.0	1.0	U
10061-01-5	cis-1,3-Dichloropropene	0.072	1.0	1.0	U
10061-02-6	trans-1,3-Dichloropropene	0.087	1.0	1.0	U
100-41-4	Ethylbenzene	0.11	1.0	1.0	U
591-78-6	2-Hexanone	0.40	20	20	U

00123

METHOD BLANK DATA SHEET
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Water Laboratory ID: 0604474-BLK3 File ID: BLK0424A.D

Prepared: 04/24/06 09:00 Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

Analyzed: 04/24/06 14:50 Instrument: 224

QC Batch: 0604474 Sequence: 6050232 Calibration: 6E02009

CAS No.	Analyte	MDL	MRL	Conc. (ug/L)	Q
98-82-8	Isopropylbenzene	0.078	1.0	1.0	U
79-20-9	Methyl Acetate	0.39	10	10	U
1634-04-4	Methyl tert-Butyl Ether	0.074	1.0	1.0	U
108-87-2	Methylcyclohexane	0.18	5.0	5.0	U
75-09-2	Methylene Chloride	0.21	4.0	0.55	J
78-93-3	2-Butanone (MEK)	0.57	20	20	U
108-10-1	4-Methyl-2-pentanone (MIBK)	0.19	20	20	U
100-42-5	Styrene	0.043	1.0	1.0	U
79-34-5	1,1,2,2-Tetrachloroethane	0.12	1.0	1.0	U
127-18-4	Tetrachloroethene	0.13	1.0	1.0	U
108-88-3	Toluene	0.26	1.0	1.0	U
87-61-6	1,2,3-Trichlorobenzene	0.32	1.0	1.0	U
120-82-1	1,2,4-Trichlorobenzene	0.36	2.0	2.0	U
71-55-6	1,1,1-Trichloroethane	0.15	1.0	1.0	U
79-00-5	1,1,2-Trichloroethane	0.11	1.0	1.0	U
79-01-6	Trichloroethene	0.14	1.0	1.0	U
75-69-4	Trichlorofluoromethane	0.16	1.0	1.0	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.15	1.0	1.0	U
75-01-4	Vinyl Chloride	0.15	1.0	1.0	U
1330-20-7	Xylene (Total)	0.25	3.0	3.0	U

System Monitoring Compound	Added (ug/L)	Conc. (ug/L)	% REC	QC Limits	Q
Dibromofluoromethane	40.0	40.6	102	79 - 124	
1,2-Dichloroethane-d4	40.0	43.0	108	75 - 128	
Toluene-d8	40.0	41.4	104	87 - 113	
4-Bromofluorobenzene	40.0	40.3	101	70 - 121	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	660990	5.16	701947	5.16	
Chlorobenzene-d5	694696	8.1	733019	8.1	
1,4-Dichlorobenzene-d4	388701	10.39	431445	10.39	

QC BATCH SUMMARY
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-27

Client: URS Group, Inc.
Project: RFAAP SSP Investigation

QC Batch: 0604822
QC Batch Matrix: Soil
Preparation: 5030B Aqueous Purge & Trap

Sample Name	Lab Sample ID	Date Prepared	Observations
FSB3A	0604361-01	04/24/06 08:00	Project-specific QC limits
FSB3B	0604361-02	04/24/06 08:00	Project-specific QC limits
FSB3C	0604361-03	04/24/06 08:00	Project-specific QC limits
Blank	0604822-BLK1	04/24/06 08:00	
LCS	0604822-BS1	04/24/06 08:00	
FSB3A	0604822-MS1	04/24/06 08:00	
FSB3A	0604822-MSD1	04/24/06 08:00	

Acetone 55 x 10 = 550
Cyclohexane 0.61 x 5 = 3.05
Ethylbenzene 0.35 x 5 = 1.75
Toluene 0.69 x 5 = 3.45
Xylene 1.0 x 5 = 5.0
2butanone 34 x 10 = 340

00128

METHOD BLANK DATA SHEET
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604822-BLK1 File ID: BLK0427.D

Prepared: 04/24/06 08:00 Preparation: 5030B Aqueous Purge & Initial/Final: 5 g / 5 mL

Analyzed: 04/27/06 12:46 Instrument: 139

QC Batch: 0604822 Sequence: 6050109 Calibration: 6E01003

CAS No.	Analyte	MDL	MRL	Conc. (ug/kg wet)	Q
67-64-1	Acetone	5.0	20	55	
71-43-2	Benzene	0.20	5.0	5.0	U
74-97-5	Bromochloromethane	0.20	5.0	5.0	U
75-27-4	Bromodichloromethane	0.28	5.0	5.0	U
75-25-2	Bromoform	0.11	5.0	5.0	U
74-83-9	Bromomethane	0.31	5.0	5.0	U
75-15-0	Carbon Disulfide	0.29	5.0	5.0	U
56-23-5	Carbon Tetrachloride	0.36	5.0	5.0	U
108-90-7	Chlorobenzene	0.063	5.0	5.0	U
75-00-3	Chloroethane	0.53	5.0	5.0	U
67-66-3	Chloroform	0.26	5.0	5.0	U
74-87-3	Chloromethane	0.18	5.0	5.0	U
110-82-7	Cyclohexane	0.22	10	0.61	J
96-12-8	1,2-Dibromo-3-chloropropane	0.66	10	10	U
124-48-1	Dibromochloromethane	0.083	5.0	5.0	U
106-93-4	1,2-Dibromoethane	0.18	5.0	5.0	U
95-50-1	1,2-Dichlorobenzene	0.17	5.0	5.0	U
541-73-1	1,3-Dichlorobenzene	0.092	5.0	5.0	U
106-46-7	1,4-Dichlorobenzene	0.17	5.0	5.0	U
75-71-8	Dichlorodifluoromethane	0.36	5.0	5.0	U
75-34-3	1,1-Dichloroethane	0.50	5.0	5.0	U
107-06-2	1,2-Dichloroethane	0.14	5.0	5.0	U
75-35-4	1,1-Dichloroethene	0.49	5.0	5.0	U
156-59-2	cis-1,2-Dichloroethene	0.22	5.0	5.0	U
156-60-5	trans-1,2-Dichloroethene	0.16	5.0	5.0	U
78-87-5	1,2-Dichloropropane	0.29	5.0	5.0	U
10061-01-5	cis-1,3-Dichloropropene	0.26	5.0	5.0	U
10061-02-6	trans-1,3-Dichloropropene	0.28	5.0	5.0	U
100-41-4	Ethylbenzene	0.13	5.0	0.35	J
591-78-6	2-Hexanone	0.70	10	10	U

METHOD BLANK DATA SHEET
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604822-BLK1 File ID: BLK0427.D

Prepared: 04/24/06 08:00 Preparation: 5030B Aqueous Purge & Initial/Final: 5 g / 5 mL

Analyzed: 04/27/06 12:46 Instrument: 139

QC Batch: 0604822 Sequence: 6050109 Calibration: 6E01003

CAS No.	Analyte	MDL	MRL	Conc. (ug/kg wet)	Q
98-82-8	Isopropylbenzene	0.24	5.0	5.0	U
79-20-9	Methyl Acetate	0.37	20	20	U
1634-04-4	Methyl tert-Butyl Ether	0.25	5.0	5.0	U
108-87-2	Methylcyclohexane	0.32	10	10	U
75-09-2	Methylene Chloride	3.2	20	20	U
78-93-3	2-Butanone (MEK)	2.9	20	34	
108-10-1	4-Methyl-2-pentanone (MIBK)	0.64	10	10	U
100-42-5	Styrene	0.046	5.0	5.0	U
79-34-5	1,1,2,2-Tetrachloroethane	0.30	5.0	5.0	U
127-18-4	Tetrachloroethene	0.16	5.0	5.0	U
108-88-3	Toluene	0.40	5.0	0.69	J
87-61-6	1,2,3-Trichlorobenzene	0.39	5.0	5.0	U
120-82-1	1,2,4-Trichlorobenzene	0.39	5.0	5.0	U
71-55-6	1,1,1-Trichloroethane	0.41	5.0	5.0	U
79-00-5	1,1,2-Trichloroethane	0.38	5.0	5.0	U
79-01-6	Trichloroethene	0.13	5.0	5.0	U
75-69-4	Trichlorofluoromethane	0.38	5.0	5.0	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.33	5.0	5.0	U
75-01-4	Vinyl Chloride	0.13	5.0	5.0	U
1330-20-7	Xylene (Total)	0.25	5.0	1.0	J

System Monitoring Compound	Added (ug/L)	Conc. (ug/L)	% REC	QC Limits	Q
Dibromofluoromethane	40.0	40.4	101	78 - 121	
1,2-Dichloroethane-d4	40.0	40.6	102	66 - 124	
Toluene-d8	40.0	39.0	98	85 - 114	
4-Bromofluorobenzene	40.0	40.2	100	69 - 119	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	254837	7.4	248647	7.38	
Chlorobenzene-d5	207352	17.41	205072	17.41	
1,4-Dichlorobenzene-d4	235756	22.43	234301	22.43	

00127

QC BATCH SUMMARY
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27

Client: URS Group, Inc. Project: RFAAP SSP Investigation

QC Batch: 0604900 QC Batch Matrix: Soil Preparation: 5030B Aqueous Purge & Trap

Sample Name	Lab Sample ID	Date Prepared	Observations
ASB4-A	0604426-01	04/27/06 08:00	Project-specific QC limits
ASB4-B	0604426-02	04/27/06 08:00	Project-specific QC limits
ASB4-C	0604426-03	04/27/06 08:00	Project-specific QC limits
DUP-1	0604426-04	04/27/06 08:00	Project-specific QC limits
ASB5-A	0604426-05	04/27/06 08:00	Project-specific QC limits
ASB5-B	0604426-06	04/27/06 08:00	Project-specific QC limits
Blank	0604900-BLK1	04/27/06 08:00	
LCS	0604900-BS1	04/27/06 08:00	
LCS Dup	0604900-BSD1	04/27/06 08:00	

Acetone 72 x 10 = 720
1,3-DCB 12 x 5 = 60
1,4-DCB 16 x 5 = 80
MeCl 60 x 10 = 600
TCE 12 x 5 = 60

: 00131

METHOD BLANK DATA SHEET
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604900-BLK1 File ID: BLK0427.D

Prepared: 04/27/06 08:00 Preparation: 5030B Aqueous Purge & Initial/Final: 10 g / 500 mL

Analyzed: 04/27/06 12:50 Instrument: 224

QC Batch: 0604900 Sequence: 6050235 Calibration: 6E02011

CAS No.	Analyte	MDL	MRL	Conc. (ug/kg wet)	Q
67-64-1	Acetone	57	750	72	J
71-43-2	Benzene	3.2	50	50	U
74-97-5	Bromochloromethane	6.7	50	50	U
75-27-4	Bromodichloromethane	5.6	50	50	U
75-25-2	Bromoform	7.6	50	50	U
74-83-9	Bromomethane	13	50	50	U
75-15-0	Carbon Disulfide	10	250	250	U
56-23-5	Carbon Tetrachloride	4.0	50	50	U
108-90-7	Chlorobenzene	5.7	50	50	U
75-00-3	Chloroethane	8.0	50	50	U
67-66-3	Chloroform	8.4	50	50	U
74-87-3	Chloromethane	9.1	50	50	U
110-82-7	Cyclohexane	8.2	250	250	U
96-12-8	1,2-Dibromo-3-chloropropane	30	250	250	U
124-48-1	Dibromochloromethane	6.4	50	50	U
106-93-4	1,2-Dibromoethane	5.4	50	50	U
95-50-1	1,2-Dichlorobenzene	15	50	50	U
541-73-1	1,3-Dichlorobenzene	7.4	50	12	J
106-46-7	1,4-Dichlorobenzene	13	50	16	J
75-71-8	Dichlorodifluoromethane	9.4	50	50	U
75-34-3	1,1-Dichloroethane	8.0	50	50	U
107-06-2	1,2-Dichloroethane	4.3	50	50	U
75-35-4	1,1-Dichloroethene	6.6	50	50	U
156-59-2	cis-1,2-Dichloroethene	7.8	50	50	U
156-60-5	trans-1,2-Dichloroethene	7.5	50	50	U
78-87-5	1,2-Dichloropropane	8.7	50	50	U
10061-01-5	cis-1,3-Dichloropropene	3.6	50	50	U
10061-02-6	trans-1,3-Dichloropropene	4.3	50	50	U
100-41-4	Ethylbenzene	5.5	50	50	U
591-78-6	2-Hexanone	20	2500	2500	U

00129

METHOD BLANK DATA SHEET
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Soil Laboratory ID: 0604900-BLK1 File ID: BLK0427.D

Prepared: 04/27/06 08:00 Preparation: 5030B Aqueous Purge & Initial/Final: 10 g / 500 mL

Analyzed: 04/27/06 12:50 Instrument: 224

QC Batch: 0604900 Sequence: 6050235 Calibration: 6E02011

CAS No.	Analyte	MDL	MRL	Conc. (ug/kg wet)	Q
98-82-8	Isopropylbenzene	3.9	50	50	U
79-20-9	Methyl Acetate	20	250	250	U
1634-04-4	Methyl tert-Butyl Ether	3.7	50	50	U
108-87-2	Methylcyclohexane	8.9	250	250	U
75-09-2	Methylene Chloride	10	250	60	J
78-93-3	2-Butanone (MEK)	28	2500	2500	U
108-10-1	4-Methyl-2-pentanone (MIBK)	9.5	2500	2500	U
100-42-5	Styrene	2.2	50	50	U
79-34-5	1,1,2,2-Tetrachloroethane	5.9	50	50	U
127-18-4	Tetrachloroethene	6.7	50	50	U
108-88-3	Toluene	13	50	50	U
87-61-6	1,2,3-Trichlorobenzene	16	50	50	U
120-82-1	1,2,4-Trichlorobenzene	18	100	100	U
71-55-6	1,1,1-Trichloroethane	7.6	50	50	U
79-00-5	1,1,2-Trichloroethane	5.7	50	50	U
79-01-6	Trichloroethene	7.1	50	12	J
75-69-4	Trichlorofluoromethane	8.2	50	50	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	7.6	50	50	U
75-01-4	Vinyl Chloride	7.2	50	50	U
1330-20-7	Xylene (Total)	13	150	150	U

System Monitoring Compound	Added (ug/L)	Conc. (ug/L)	% REC	QC Limits	Q
Dibromofluoromethane	40.0	38.5	96	78 - 121	
1,2-Dichloroethane-d4	40.0	42.0	105	66 - 124	
Toluene-d8	40.0	37.4	94	85 - 114	
4-Bromofluorobenzene	40.0	38.4	96	69 - 119	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	752641	5.16	728977	5.16	
Chlorobenzene-d5	651285	8.1	657482	8.1	
1,4-Dichlorobenzene-d4	348085	10.39	375023	10.39	

: 00136

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-8260B

FSB3A
FSB4A JM

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Matrix: Soil

SDG: 36440-27
Project: RFAAP SSP Investigation
Preparation: 5030B Aqueous Purge & Trap
Initial/Final: 5.2 g / 5 mL

Laboratory ID: 0604822-MS1
QC Batch: 0604822

Analyte	Spike Added	Sample Conc.	MS Conc.	MS % Rec. #	QC Limits Rec.	Units
Acetone	49.3	139	149	20 *	58 - 140	ug/kg dry
Benzene	49.3	ND	46.9	95	62 - 134	ug/kg dry
Bromochloromethane	49.3	ND	48.8	99	50 - 150	ug/kg dry
Bromodichloromethane	49.3	ND	44.8	91	79 - 123	ug/kg dry
Bromoform	49.3	ND	44.9	91	50 - 125	ug/kg dry
Bromomethane	49.3	1.19	55.0	109	70 - 135	ug/kg dry
Carbon Disulfide	49.3	ND	41.8	85	50 - 149	ug/kg dry
Carbon Tetrachloride	49.3	ND	48.0	97	79 - 122	ug/kg dry
Chlorobenzene	49.3	ND	42.7	87	61 - 134	ug/kg dry
Chloroethane	49.3	ND	57.4	116	70 - 132	ug/kg dry
Chloroform	49.3	ND	45.4	92	79 - 123	ug/kg dry
Chloromethane	49.3	ND	54.3	110	60 - 144	ug/kg dry
Cyclohexane	49.3	ND	52.5	106	50 - 150	ug/kg dry
1,2-Dibromo-3-chloropropane	49.3	ND	57.0	116	50 - 150	ug/kg dry
Dibromochloromethane	49.3	ND	44.9	91	57 - 124	ug/kg dry
1,2-Dibromoethane	49.3	ND	49.0	99	50 - 150	ug/kg dry
1,2-Dichlorobenzene	49.3	ND	40.3	82	73 - 124	ug/kg dry
1,3-Dichlorobenzene	49.3	ND	40.1	81	70 - 124	ug/kg dry
1,4-Dichlorobenzene	49.3	ND	38.4	78	66 - 127	ug/kg dry
Dichlorodifluoromethane	49.3	ND	61.6	125	50 - 140	ug/kg dry
1,1-Dichloroethane	49.3	ND	49.0	99	70 - 127	ug/kg dry
1,2-Dichloroethane	49.3	ND	45.6	92	72 - 132	ug/kg dry
1,1-Dichloroethene	49.3	ND	49.9	101	58 - 142	ug/kg dry
cis-1,2-Dichloroethene	49.3	ND	47.0	95	62 - 141	ug/kg dry
trans-1,2-Dichloroethene	49.3	ND	47.6	97	74 - 122	ug/kg dry
1,2-Dichloropropane	49.3	ND	48.4	98	83 - 124	ug/kg dry
cis-1,3-Dichloropropene	49.3	ND	48.0	97	73 - 126	ug/kg dry
trans-1,3-Dichloropropene	49.3	ND	44.2	90	68 - 135	ug/kg dry
Ethylbenzene	49.3	ND	43.5	88	69 - 121	ug/kg dry
2-Hexanone	49.3	ND	54.2	110	50 - 150	ug/kg dry
Isopropylbenzene	49.3	ND	44.7	91	60 - 129	ug/kg dry
Methyl Acetate	49.3	ND	49.3	100	50 - 150	ug/kg dry
Methyl tert-Butyl Ether	49.3	ND	43.1	87	50 - 150	ug/kg dry

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-8260B

~~FSB3A~~ FSB4A JM

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Group, Inc.

Matrix: Soil

SDG: 36440-27

Project: RFAAP SSP Investigation

Preparation: 5030B Aqueous Purge & Trap

Initial/Final: 5.2 g / 5 mL

Laboratory ID: 0604822-MSD1

QC Batch: 0604822

Analyte	Spike Added	MSD Conc.	MSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
Acetone	49.3	230	185 *	43 *	20	58 - 140	ug/kg dry
Benzene	49.3	53.7	109	14	18	62 - 134	ug/kg dry
Bromochloromethane	49.3	53.7	109	10	20	50 - 150	ug/kg dry
Bromodichloromethane	49.3	50.1	102	11	20	79 - 123	ug/kg dry
Bromoform	49.3	50.7	103	12	24	50 - 125	ug/kg dry
Bromomethane	49.3	61.4	122	11	40	70 - 135	ug/kg dry
Carbon Disulfide	49.3	45.1	91	8	50	50 - 149	ug/kg dry
Carbon Tetrachloride	49.3	52.8	107	10	18	79 - 122	ug/kg dry
Chlorobenzene	49.3	46.0	93	7	27	61 - 134	ug/kg dry
Chloroethane	49.3	63.9	130	11	20	70 - 132	ug/kg dry
Chloroform	49.3	51.9	105	13	17	79 - 123	ug/kg dry
Chloromethane	49.3	63.1	128	15	17	60 - 144	ug/kg dry
Cyclohexane	49.3	54.0	110	3	40	50 - 150	ug/kg dry
1,2-Dibromo-3-chloropropane	49.3	61.7	125	8	40	50 - 150	ug/kg dry
Dibromochloromethane	49.3	48.8	99	8	23	57 - 124	ug/kg dry
1,2-Dibromoethane	49.3	54.1	110	10	40	50 - 150	ug/kg dry
1,2-Dichlorobenzene	49.3	41.1	83	2	20	73 - 124	ug/kg dry
1,3-Dichlorobenzene	49.3	41.2	84	3	40	70 - 124	ug/kg dry
1,4-Dichlorobenzene	49.3	39.6	80	3	40	66 - 127	ug/kg dry
Dichlorodifluoromethane	49.3	66.5	135	8	40	50 - 140	ug/kg dry
1,1-Dichloroethane	49.3	55.2	112	12	33	70 - 127	ug/kg dry
1,2-Dichloroethane	49.3	53.1	108	15	30	72 - 132	ug/kg dry
1,1-Dichloroethene	49.3	49.7	101	0.4	20	58 - 142	ug/kg dry
cis-1,2-Dichloroethene	49.3	51.4	104	9	20	62 - 141	ug/kg dry
trans-1,2-Dichloroethene	49.3	50.0	101	5	20	74 - 122	ug/kg dry
1,2-Dichloropropane	49.3	53.9	109	11	12	83 - 124	ug/kg dry
cis-1,3-Dichloropropene	49.3	53.4	108	11	11	73 - 126	ug/kg dry
trans-1,3-Dichloropropene	49.3	47.7	97	8	20	68 - 135	ug/kg dry
Ethylbenzene	49.3	45.7	93	5	40	69 - 121	ug/kg dry
2-Hexanone	49.3	62.7	127	15	20	50 - 150	ug/kg dry
Isopropylbenzene	49.3	48.2	98	8	20	60 - 129	ug/kg dry
Methyl Acetate	49.3	49.6	101	0.6	20	50 - 150	ug/kg dry
Methyl tert-Butyl Ether	49.3	49.0	99	13	29	50 - 150	ug/kg dry
Methylcyclohexane	49.3	47.5	96	7	20	59 - 125	ug/kg dry

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-8260B

~~FSB34~~

FSB4A

ZM

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Group, Inc.

Matrix: Soil

SDG: 36440-27

Project: RFAAP SSP Investigation

Preparation: 5030B Aqueous Purge & Trap

Initial/Final: 5.2 g / 5 mL

Laboratory ID: 0604822-MSD1

QC Batch: 0604822

Analyte	Spike Added	MSD Conc.	MSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
Methylene Chloride	49.3	54.9	111	10	41	65 - 136	ug/kg dry
2-Butanone (MEK)	49.3	96.8	147	32 *	20	50 - 150	ug/kg dry
4-Methyl-2-pentanone (MIBK)	49.3	65.4	133	10	50	50 - 150	ug/kg dry
Styrene	49.3	7.09	14 *	122 *	20	50 - 137	ug/kg dry
1,1,2,2-Tetrachloroethane	49.3	61.1	124	18	33	54 - 145	ug/kg dry
Tetrachloroethene	49.3	46.6	95	5	31	72 - 115	ug/kg dry
Toluene	49.3	51.5	104	8	24	62 - 137	ug/kg dry
1,2,3-Trichlorobenzene	49.3	29.0	59	23 *	20	50 - 150	ug/kg dry
1,2,4-Trichlorobenzene	49.3	30.7	62	19	20	50 - 132	ug/kg dry
1,1,1-Trichloroethane	49.3	52.2	106	10	18	76 - 122	ug/kg dry
1,1,2-Trichloroethane	49.3	54.8	111	11	24	72 - 130	ug/kg dry
Trichloroethene	49.3	51.3	104	12	21	60 - 140	ug/kg dry
Trichlorofluoromethane	49.3	55.4	112	8	23	50 - 150	ug/kg dry
1,1,2-Trichloro-1,2,2-trifluoroetha	49.3	50.0	101	1	20	50 - 150	ug/kg dry
Vinyl Chloride	49.3	59.8	121	7	25	60 - 136	ug/kg dry
Xylene (Total)	148	136	92	5	40	68 - 120	ug/kg dry

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

DATA VALIDATION WORKSHEET

Semivolatile Organic Analysis

Reviewer: ZAM
Date: 6/5/06
DV Level: II III IV
Review Document:
_X_ SW-846
_X_ NFG - Region III Modifications
_X_ Project QAPP/SAP

Project Name: RFAAP SSP
Project Number: 11656628
Laboratory: Trimatrix
SDG No.: 36440-27
Test Name: SVOC
Method No.: 8270C

1.0 Laboratory Deliverables

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	✓		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	✓		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of		✓	
1.4	Do sample preservation, collection and storage condition meet method requirement?	✓		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 20 ^{O}C), then flag all positive results with a "L" and all non-detects "UL".			
1.5	Do any soil samples contain more than 50% water? If yes, no dry weight correction is made and make notes in the DV Report.		✓	

Notes:

2.0 Holding Times

		Yes	No	NA
2.1	Have any technical holding times, determined from date of sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-). For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction)		✓	
2.2	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, J(+)/R(-) .		✓	

Notes:

3.0 Blanks (Laboratory and Field)

		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per batch)?	✓		
3.2	Do any blanks have positive results? Action: If yes, positive sample results should be reported and qualified "B", if the [sample≤5X[blank] (or 10 times for the common phthalate contaminants).	✓		
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.	✓		

Notes: MB: Di-n-butyl phthalate DQS detection 5.94 x 10 = 59.4 no qual. action due to result of ND.
EQB: Butyl Benzyl Phthalate (0.77 x 10 = 7.7)
Diethyl Phthalate (0.41 x 10 = 4.1) > no qual. action required
Bis(2-ethylhexyl)phthalate (2.8 x 10 = 28)

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are at least five standards included in the calibration curve?	✓		
4.2	Was a second source calibration verification analyzed for each calibration curve?	✓		
4.3	Has a continuing calibration standard been analyzed for every 12 hours of sample analysis?	✓		
4.4	Are all calibration standard %RSD ≤15%, r>0.995, or r^2<0.99), second source ±30% or %D(≤20%) within the control limits?		✓	
For initial calibration: %RSD > 15% but < 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).				
For second source: %D>30% J(+)/R(-).				
For continuing calibration: Positive Bias - %D >+ 20%, J(+), only. Negative Bias - %D>-20% but <-50%, J(+)/UJ(-) and %D>-50%, J(+)/R(-).				
4.5	Are any SPCCs RF < 0.05 and/or CCC >30%? If yes reject all associated data.		✓	

Notes:

see attached

5.0 GC/MS Instrument Performance Check		Yes	No	NA
5.1	Are GC/MS Tuning and Mass Calibration forms present for decafluorotriphenylphosphine (DFTPP)?	✓		
5.2	Are DFTPP monitored ions within specification? If no, flag R.	✓		
5.3	Have all samples been analyzed within twelve hours of the DFTPP tune? If no, flag R.	✓		
5.4	Have ion abundance criteria for DFTPP been met for each instrument used? If no, flag R.	✓		

Notes:

6.0 Surrogate Recovery		Yes	No	NA
6.1	Are surrogate recoveries within acceptance criteria for all samples and method blanks?	✓		
6.2	If No in Section 6.2, are these sample(s) or method blank(s) reanalyzed?			✓
6.3	If any two base/neutral or acid fraction are out of specification, or if any one base/neutral or acid extractable surrogate has a recovery of less than 10%, then there should be a reanalysis to confirm that the non-compliance is because of sample matrix effects rather than laboratory deficiencies.			
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? (recoveries may be diluted out.)	✓		
	If No, for 2 or 3 %Rs > UCL, K(+) only; for 2 or 3 %Rs < LCL, but > 10%, L(+)/UL (-); for 2 or 3 %Rs mixed high/low, J(+)/UJ(-); for %R < 10%, L(+)/R(-).			

Notes:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	✓		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
7.3	Are there any %R for matrix spike and matrix spike duplicate outside the QC limits?	✓		
7.4	Are there any RPD for matrix spike and matrix spike duplicate outside the QC limits?		✓	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer use the MS/MSD results in conjunction with other QC criteria to determine the need for qualification of the data.			

Notes: MS

%R: 4-Nitroaniline 51 (57-110) > parent samp. results ND, flagged UJ, m

MSD

%R: 4-Nitroaniline 54 (57-110)

8.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)		Yes	No	NA
8.1	Is the LCS/LCSD recovery form present?	✓		
8.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
8.3	Are there any %R for LCS outside the QC limits? If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).		✓	
8.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits? If Yes, J(+) only.		✓	

Notes:

9.0 Internal Standard		Yes	No	NA
9.1	Are internal standard areas within +100% and -50% of the mid point initail calibration? If No, J(+)/UJ(-).	✓		
	If extremely low area counts are reported, or performance exhibits a major abrupt drop-off, then a severe loss of sensitivity is indicated. Non-detect target compounds should then be qualified as unusable (R).			
9.2	Are retention times of internal standards within 30 seconds of the associated calibration?	✓		
	The chromatographic profile for that sample must be examined to determine if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction. Positive results should not needed to be qualified as "R", if the mass spectral criteria are met.			

Notes:

10.0 Field Duplicate		Yes	No	NA
10.1	Are all analyte duplicate results within control limits (use RPD limits of matrix spikes)? Generally, no action is taken on the basis of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.			

Notes:

Bis(2-ethylhexyl)phthlate > Δ > 4X RL, flagged J, f
N-nitroso-diphenylamine

11.0 Detection Limit Verification		Yes	No	NA
11.1	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture?	✓		

Notes:

12.0 Data Completeness		Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit $95\%_{aq}$ and $90\%_{so}$)	✓		
12.1.1	Number of samples:_____			
12.1.2	Number of target compounds in each analysis:_____			
12.1.3	Number of results rejected and not reported:_____			
	% Completeness = (12.1.1 x 12.1.2 - 12.1.3) x 100/(12.1.1 x 12.1.2)			
	% Completeness = 100%			

Notes:

METHOD BLANK DATA SHEET
USEPA-8270C

REVISED
CWR 6/13/06

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-27

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Water Laboratory ID: 0604457-BLK1 File ID: 604457BK.D

Prepared: 04/24/06 09:08 Preparation: 3510C Liquid-Liquid Initial/Final: 1000 mL / 1 mL

Analyzed: 04/26/06 16:30 Instrument: 195

QC Batch: 0604457 Sequence: 6042857 Calibration: 6D28021

CAS No.	Analyte	MDL	MRL	Conc. (ug/L)	Q
83-32-9	Acenaphthene	0.021	5.0	5.0	U
208-96-8	Acenaphthylene	0.038	5.0	5.0	U
98-86-2	Acetophenone	0.033	5.0	5.0	U
120-12-7	Anthracene	0.030	5.0	5.0	U
1912-24-9	Atrazine	0.087	5.0	5.0	U
100-52-7	Benzaldehyde	0.056	5.0	5.0	U
56-55-3	Benzo(a)anthracene	0.058	5.0	5.0	U
50-32-8	Benzo(a)pyrene	0.031	5.0	5.0	U
205-99-2	Benzo(b)fluoranthene	0.038	5.0	5.0	U
191-24-2	Benzo(g,h,i)perylene	0.030	5.0	5.0	U
207-08-9	Benzo(k)fluoranthene	0.048	5.0	5.0	U
92-52-4	1,1'-Biphenyl	0.024	5.0	5.0	U
101-55-3	4-Bromophenyl Phenyl Ether	0.039	5.0	5.0	U
85-68-7	Butyl Benzyl Phthalate	0.76	5.0	5.0	U
105-60-2	Caprolactam	0.77	5.0	5.0	U
86-74-8	Carbazole	0.032	5.0	5.0	U
59-50-7	4-Chloro-3-methylphenol	0.024	5.0	5.0	U
106-47-8	4-Chloroaniline	0.93	5.0	5.0	U
111-91-1	Bis(2-chloroethoxy)methane	0.022	5.0	5.0	U
111-44-4	Bis(2-chloroethyl) Ether	0.039	5.0	5.0	U
108-60-1	Bis(2-chloroisopropyl) Ether	0.047	5.0	5.0	U
91-58-7	2-Chloronaphthalene	0.012	5.0	5.0	U
95-57-8	2-Chlorophenol	0.028	5.0	5.0	U
7005-72-3	4-Chlorophenyl Phenyl Ether	0.029	5.0	5.0	U
218-01-9	Chrysene	0.030	5.0	5.0	U
53-70-3	Dibenz(a,h)anthracene	0.019	5.0	5.0	U
132-64-9	Dibenzofuran	0.014	5.0	5.0	U
84-74-2	Di-n-butyl Phthalate	0.81	5.0	5.94	
120-83-2	2,4-Dichlorophenol	0.022	5.0	5.0	U
91-94-1	3,3´-Dichlorobenzidine	0.048	5.0	5.0	U

: 00469

CONTINUING CALIBRATION CHECK
USEPA-8270C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Instrument ID: 195
Lab File ID: 10C0426A.D
Sequence: 6042857
Lab Sample ID: 6042857-CCV1

SDG: 36440-27
Project: RFAAP SSP Investigation
Calibration: 6D28021
Calibration Date: 04/19/06 14:14
Injection Date: 04/26/06
Injection Time: 15:49

Analyte	Type	CONC. (ug/mL)		Response Factor			% Diff. / Drift	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
3,3´-Dichlorobenzidine	Q	10.0	10.1	0.312646	0.272448		1.00	25
Diethyl Phthalate	A	10.0	10.3	1.21483	1.25294		3.14	25
2,4-Dimethylphenol	A	10.0	10.7	0.305684	0.326355		6.76	25
Dimethyl Phthalate	A	10.0	10.0	1.25114	1.25626		0.409	25
4,6-Dinitro-2-methylphenol	L	10.0	8.92	0.109392	0.11678		-10.8	25
2,4-Dinitrophenol	Q	20.0	12.0	0.101151	0.0753021	0.05	-40.0	40
2,6-Dinitrotoluene	A	10.0	10.3	0.286555	0.294309		2.71	25
2,4-Dinitrotoluene	A	10.0	10.5	0.358722	0.375817		4.77	25
Di-n-octyl Phthalate	Q	10.0	11.6	1.11254	1.41567		16.0	20
Bis(2-ethylhexyl) Phthalate	A	10.0	11.1	0.795773	0.884521		11.2	25
Fluoranthene	A	10.0	10.3	1.08022	1.10734		2.51	20
Fluorene	A	10.0	10.2	1.32955	1.35826		2.16	25
Hexachlorobenzene	A	10.0	9.97	0.228404	0.227753		-0.285	25
Hexachlorobutadiene	A	10.0	9.96	0.146205	0.145609		-0.408	20
Hexachlorocyclopentadiene	A	10.0	9.61	0.247044	0.237378	0.05	-3.91	40
Hexachloroethane	A	10.0	10.2	0.534366	0.546684		2.31	25
Indeno(1,2,3-cd)pyrene	A	10.0	11.8	0.850521	1.0007		17.7	25
Isophorone	A	10.0	10.1	0.600109	0.607476		1.23	25
2-Methylnaphthalene	A	10.0	11.6	0.647047	0.74845		15.7	25
4-Methylphenol	A	10.0	10.2	1.43415	1.46656		2.26	25
2-Methylphenol	A	10.0	10.5	1.27559	1.33428		4.60	25
Naphthalene	L	10.0	10.3	1.0683	1.01865		3.00	25
3-Nitroaniline	Q	10.0	8.22	0.219323	0.189023		-17.8	40
2-Nitroaniline	A	10.0	9.95	0.356941	0.3553		-0.460	40
4-Nitroaniline	Q	10.0	9.67	0.207663	0.216396		-3.30	40
Nitrobenzene	A	10.0	10.5	0.34987	0.367127		4.93	25
2-Nitrophenol	A	10.0	9.90	0.174933	0.173139		-1.03	20
4-Nitrophenol	Q	20.0	18.6	0.150912	0.16774	0.05	-7.00	40
N-Nitroso-diphenylamine	A	10.0	9.48	0.683457	0.64776		-5.22	20

CONTINUING CALIBRATION CHECK
USEPA-8270C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Instrument ID: 195
Lab File ID: 10C0427A.D
Sequence: 6050110
Lab Sample ID: 6050110-CCV1

SDG: 36440-27
Project: RFAAP SSP Investigation
Calibration: 6D28021
Calibration Date: 04/19/06 14:14
Injection Date: 04/27/06
Injection Time: 10:16

Analyte	Type	CONC. (ug/mL)		Response Factor			% Diff. / Drift	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
3,3´-Dichlorobenzidine	Q	10.0	11.3	0.312646	0.298154		13.0	25
Diethyl Phthalate	A	10.0	11.6	1.21483	1.40444		15.6	25
2,4-Dimethylphenol	A	10.0	10.8	0.305684	0.329828		7.90	25
Dimethyl Phthalate	A	10.0	9.84	1.25114	1.23147		-1.57	25
4,6-Dinitro-2-methylphenol	L	10.0	8.31	0.109392	0.108422		-16.9	25
2,4-Dinitrophenol	Q	20.0	14.2	0.101151	0.0926101	0.05	-29.0	40
2,6-Dinitrotoluene	A	10.0	10.1	0.286555	0.289094		0.886	25
2,4-Dinitrotoluene	A	10.0	10.1	0.358722	0.362161		0.959	25
Di-n-octyl Phthalate	Q	10.0	11.0	1.11254	1.34146		10.0	20
Bis(2-ethylhexyl) Phthalate	A	10.0	11.0	0.795773	0.877938		10.3	25
Fluoranthene	A	10.0	9.96	1.08022	1.07535		-0.451	20
Fluorene	A	10.0	9.98	1.32955	1.32697		-0.194	25
Hexachlorobenzene	A	10.0	9.84	0.228404	0.224736		-1.61	25
Hexachlorobutadiene	A	10.0	10.1	0.146205	0.147645		0.985	20
Hexachlorocyclopentadiene	A	10.0	7.78	0.247044	0.192302	0.05	-22.2	40
Hexachloroethane	A	10.0	10.1	0.534366	0.538567		0.786	25
Indeno(1,2,3-cd)pyrene	A	10.0	10.2	0.850521	0.865385		1.75	25
Isophorone	A	10.0	10.4	0.600109	0.62299		3.81	25
2-Methylnaphthalene	A	10.0	10.7	0.647047	0.690785		6.76	25
4-Methylphenol	A	10.0	10.0	1.43415	1.43701		0.199	25
2-Methylphenol	A	10.0	10.3	1.27559	1.31442		3.04	25
Naphthalene	L	10.0	10.4	1.0683	1.0292		4.00	25
3-Nitroaniline	Q	10.0	8.25	0.219323	0.189516		-17.5	40
2-Nitroaniline	A	10.0	10.3	0.356941	0.36606		2.55	40
4-Nitroaniline	Q	10.0	9.76	0.207663	0.218316		-2.40	40
Nitrobenzene	A	10.0	10.8	0.34987	0.377368		7.86	25
2-Nitrophenol	A	10.0	10.2	0.174933	0.179097		2.38	20
4-Nitrophenol	Q	20.0	20.8	0.150912	0.189352	0.05	4.00	40
N-Nitroso-diphenylamine	A	10.0	10.2	0.683457	0.696518		1.91	20

CONTINUING CALIBRATION CHECK
USEPA-8270C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Instrument ID: 195
Lab File ID: 10C0501B.D
Sequence: 6050131
Lab Sample ID: 6050131-CCV1

SDG: 36440-27
Project: RFAAP SSP Investigation
Calibration: 6D28021
Calibration Date: 04/19/06 14:14
Injection Date: 05/01/06
Injection Time: 10:42

Analyte	Type	CONC. (ug/mL)		Response Factor			% Diff. / Drift	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
Acenaphthene	A	10.0	9.84	1.14058	1.122		-1.63	20
Acenaphthylene	A	10.0	9.93	1.94551	1.93135		-0.728	25
Acetophenone	A	10.0	10.4	1.88171	1.95247		3.76	25
Anthracene	A	10.0	10.5	1.14969	1.20206		4.56	25
Atrazine	A	10.0	11.1	0.195168	0.215947		10.6	25
Benzaldehyde	A	10.0	7.16	1.07788	0.771633		-28.4	25 *
Benzo(a)anthracene	A	10.0	10.3	1.13321	1.16647		2.94	25
Benzo(a)pyrene	A	10.0	10.8	1.32711	1.43376		8.04	20
Benzo(b)fluoranthene	A	10.0	10.8	1.36469	1.47478		8.07	25
Benzo(g,h,i)perylene	A	10.0	11.8	1.13506	1.33574		17.7	25
Benzo(k)fluoranthene	A	10.0	9.29	1.72256	1.60081		-7.07	25
1,1'-Biphenyl	A	10.0	10.3	1.59413	1.64436		3.15	25
4-Bromophenyl Phenyl Ether	A	10.0	9.62	0.214889	0.206719		-3.80	25
Butyl Benzyl Phthalate	A	10.0	11.5	0.567481	0.654928		15.4	25
Caprolactam	A	10.0	10.6	0.126266	0.133902		6.05	25
Carbazole	A	10.0	10.8	0.909433	0.97806		7.55	25
4-Chloro-3-methylphenol	A	10.0	10.8	0.251959	0.273078		8.38	20
4-Chloroaniline	A	10.0	8.03	0.311685	0.244145		-21.7	40
Bis(2-chloroethoxy)methane	A	10.0	9.99	0.39059	0.390176		-0.106	25
Bis(2-chloroethyl) Ether	A	10.0	11.3	1.50356	1.70226		13.2	25
Bis(2-chloroisopropyl) Ether	A	10.0	10.2	1.99165	2.03397		2.12	25
2-Chloronaphthalene	A	10.0	9.89	1.15269	1.13994		-1.11	25
2-Chlorophenol	A	10.0	10.2	1.39491	1.42769		2.35	25
4-Chlorophenyl Phenyl Ether	A	10.0	10.0	0.600637	0.601789		0.192	25
Chrysene	A	10.0	9.89	1.17002	1.15697		-1.12	25
Dibenz(a,h)anthracene	A	10.0	11.8	1.00965	1.19062		17.9	25
Dibenzofuran	A	10.0	9.85	1.62797	1.60413		-1.46	25
Di-n-butyl Phthalate	A	10.0	10.0	1.26104	1.26612		0.403	25
2,4-Dichlorophenol	A	10.0	10.2	0.261032	0.266189		1.98	20

: 00749

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY
USEPA-8270C

FSB3A

FSB4A

LM

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Group, Inc.

Matrix: Soil

SDG: 36440-27

Project: RFAAP SSP Investigation

Preparation: 3550B Sonication Extraction

Initial/Final: 30 g / 1 mL

Laboratory ID: 0604631-MS1

QC Batch: 0604631

Analyte	Spike Added	Sample Conc.	MS Conc.	MS % Rec. #	QC Limits Rec.	Units
4,6-Dinitro-2-methylphenol	427	ND	261	61	22 - 132	ug/kg dry
2,4-Dinitrophenol	427	ND	211	49	28 - 97	ug/kg dry
2,6-Dinitrotoluene	427	ND	364	85	61 - 114	ug/kg dry
2,4-Dinitrotoluene	427	ND	367	86	47 - 133	ug/kg dry
Di-n-octyl Phthalate	427	11.9	386	88	61 - 121	ug/kg dry
Bis(2-ethylhexyl) Phthalate	427	60.0	407	81	55 - 123	ug/kg dry
Fluoranthene	427	26.7	429	94	66 - 117	ug/kg dry
Fluorene	427	ND	353	83	65 - 112	ug/kg dry
Hexachlorobenzene	427	ND	357	84	63 - 113	ug/kg dry
Hexachlorobutadiene	427	ND	357	84	59 - 112	ug/kg dry
Hexachlorocyclopentadiene	427	ND	217	51	45 - 111	ug/kg dry
Hexachloroethane	427	ND	334	78	51 - 130	ug/kg dry
Indeno(1,2,3-cd)pyrene	427	ND	418	98	63 - 123	ug/kg dry
Isophorone	427	ND	384	90	68 - 112	ug/kg dry
2-Methylnaphthalene	427	ND	400	94	56 - 122	ug/kg dry
4-Methylphenol	427	ND	355	83	47 - 120	ug/kg dry
2-Methylphenol	427	ND	318	74	52 - 115	ug/kg dry
Naphthalene	427	ND	355	83	59 - 135	ug/kg dry
3-Nitroaniline	427	ND	251	59	32 - 107	ug/kg dry
2-Nitroaniline	427	ND	365	85	60 - 112	ug/kg dry
4-Nitroaniline	427	ND	219	51 *	57 - 110	ug/kg dry
Nitrobenzene	427	ND	343	80	51 - 126	ug/kg dry
2-Nitrophenol	427	ND	366	86	59 - 128	ug/kg dry
4-Nitrophenol	427	ND	369	86	41 - 125	ug/kg dry
N-Nitroso-diphenylamine	427	ND	275	64	57 - 132	ug/kg dry
N-Nitroso-di-n-propylamine	427	ND	377	88	50 - 128	ug/kg dry
Pentachlorophenol	427	ND	331	78	33 - 130	ug/kg dry
Phenanthrene	427	17.6	402	90	67 - 116	ug/kg dry
Phenol	427	ND	351	82	53 - 118	ug/kg dry
Pyrene	427	32.3	459	100	51 - 135	ug/kg dry
2,4,5-Trichlorophenol	427	ND	365	85	56 - 112	ug/kg dry
2,4,6-Trichlorophenol	427	ND	377	88	56 - 117	ug/kg dry
1,2,4,5-Tetrachlorobenzene	427	ND	406	95	50 - 150	ug/kg dry

: 00459

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY
USEPA-8270C

~~FSB3A~~
FSB4A
JM

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Matrix: Soil

SDG: 36440-27
Project: RFAAP SSP Investigation
Preparation: 3550B Sonication Extraction
Initial/Final: 30 g / 1 mL
QC Batch: 0604631

Laboratory ID: 0604631-MSD1

Analyte	Spike Added	MSD Conc.	MSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
2,4-Dinitrophenol	427	200	47	5	20	28 - 97	ug/kg dry
2,6-Dinitrotoluene	427	342	80	6	33	61 - 114	ug/kg dry
2,4-Dinitrotoluene	427	359	84	2	20	47 - 133	ug/kg dry
Di-n-octyl Phthalate	427	390	89	1	40	61 - 121	ug/kg dry
Bis(2-ethylhexyl) Phthalate	427	450	91	10	43	55 - 123	ug/kg dry
Fluoranthene	427	402	88	6	20	66 - 117	ug/kg dry
Fluorene	427	355	83	0.6	40	65 - 112	ug/kg dry
Hexachlorobenzene	427	358	84	0.3	40	63 - 113	ug/kg dry
Hexachlorobutadiene	427	367	86	3	40	59 - 112	ug/kg dry
Hexachlorocyclopentadiene	427	238	56	9	40	45 - 111	ug/kg dry
Hexachloroethane	427	322	75	4	21	51 - 130	ug/kg dry
Indeno(1,2,3-cd)pyrene	427	418	98	0	20	63 - 123	ug/kg dry
Isophorone	427	381	89	0.8	29	68 - 112	ug/kg dry
2-Methylnaphthalene	427	420	98	5	40	56 - 122	ug/kg dry
4-Methylphenol	427	351	82	1	40	47 - 120	ug/kg dry
2-Methylphenol	427	287	67	10	40	52 - 115	ug/kg dry
Naphthalene	427	354	83	0.3	22	59 - 135	ug/kg dry
3-Nitroaniline	427	263	62	5	20	32 - 107	ug/kg dry
2-Nitroaniline	427	371	87	2	40	60 - 112	ug/kg dry
4-Nitroaniline	427	232	54 *	6	40	57 - 110	ug/kg dry
Nitrobenzene	427	332	78	3	40	51 - 126	ug/kg dry
2-Nitrophenol	427	354	83	3	40	59 - 128	ug/kg dry
4-Nitrophenol	427	345	81	7	20	41 - 125	ug/kg dry
N-Nitroso-diphenylamine	427	297	70	8	40	57 - 132	ug/kg dry
N-Nitroso-di-n-propylamine	427	383	90	2	23	50 - 128	ug/kg dry
Pentachlorophenol	427	340	80	3	21	33 - 130	ug/kg dry
Phenanthrene	427	422	95	5	15	67 - 116	ug/kg dry
Phenol	427	333	78	5	19	53 - 118	ug/kg dry
Pyrene	427	397	85	14	23	51 - 135	ug/kg dry
2,4,5-Trichlorophenol	427	370	87	1	40	56 - 112	ug/kg dry
2,4,6-Trichlorophenol	427	361	85	4	40	56 - 117	ug/kg dry
1,2,4,5-Tetrachlorobenzene	427	415	97	2	40	50 - 150	ug/kg dry

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

: 00462

DATA VALIDATION WORKSHEET

Pesticides/PCBs

Reviewer: LAM
Date: 6/6/2006
DV Level: II III IV
Review Document:
X SW-846 - 8081/8082
X NFG - Region III Modifications
X project QAPP

Project Name: RFAAP SSP
Project Number: 11656628
Laboratory: TriMatrix
SDG No.: 36440-27
Test Name: ~~PEST~~/PCB
Method No.: ~~8081A~~/8082

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	✓		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	✓		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, or special circumstances affecting the quality of the data?		✓	
1.4	Do sample preservation, collection and storage condition meet method requirement?	✓		
	If samples were received with the cooler temperature exceeding 20 ^{O}C, then flag L(+)/UL(-).			
1.5	Do any soil samples contain more than 50% water? If yes, no dry weight correction is made and make notes in the DV Report.		✓	

Notes:

2.0 Holding Times		Yes	No	NA
2.2	Have any technical holding times, determined from date of sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-). Extraction: (aqueous) 7 days and (soil) 14 days; and Analysis: 40 days.		✓	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, J(+)/R(-) .		✓	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks prepared at the appropriate frequency (one per 20 samples or batch and matrix)?	✓		
3.2	Do any blanks have positive results? If yes, positive sample results should be reported and qualified "B", if the [sample≤5X[blank].		✓	
3.3	Do any field equipment blanks have positive results? If yes, use same rules above.		✓	

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are at least five standards included in the calibration curve for 1016, 1260, toxaphene, and technical chlordane; and at least one point for the other arochlors reported? If no, flag "R".	✓		
4.2	Was a second source calibration verification analyzed for each calibration curve? If no, flag "R".	✓		
4.3	Were continuing calibration standards analyzed every 12 hours or twenty samples? If no, flag "R".	✓		
4.4	Are all calibration standard %RSD (<20%, r>0.995, or r^2<0.99), second source (±15%) or %D(≤15%) within the control limits?	✓		
For initial calibration: %RSD > 20%, but < 50%, J(+), only; %RSD > 50%, but < 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).				
For second source: %D>15%, J(+)/R(-).				
For continuing calibration: Positive Bias - %D >+ 15%, J(+), only. Negative Bias - %D>-15% but <-50%, J(+)/UJ(-) and %D>-50%, J(+)/R(-).				

Notes:

5.0 GC/ECD Instrument Performance Check		Yes	No	NA
5.1	Has a Performance Evaluation Mixture (PEM) been analyzed at the beginning, every 12 hours, and at the end of every sequence.			✓
5.2	Is the 4,4'-DDT breakdown </= to 20%? If No, for positive DDT results, DDT-L(+), DDD/DDE - NJ(+). For non-detect DDT results, DDD/DDE - R(+).			✓
5.3	Is the endrin breakdown </= to 20%? If No, for positive endrin results, endrin-L(+), endrin aldehyde/ketone - NJ(+). For non-detect DDT results, endrin aldehyde/ketone - R(+).			✓
5.4	Is the combined breakdowns less than or equal to 30%? If No, for positive DDT/endrin results, DDT/endrin-L(+), DDD/DD/endrin aldehyde/endrin ketone - NJ(+). For non-detect DDT/endrin results, DDD/DDE/endrin aldehyde/endrin ketone - R(+).			✓

Notes:

6.0 Surrogate Recovery

		Yes	No	NA
6.1	Do all surrogate retention times fall within the RT windows established during the initial calibration sequence? If No, the associated sample result should be carefully evaluated.		✓	
6.2	Are surrogate recoveries within acceptance criteria for all samples and method blanks? Advisory limit: 60-150%.	✓		
6.3	If No in Section 6.3, are these sample(s) or method blank(s) reanalyzed?			✓
6.4	If No in Section 6.4, is any sample dilution factor greater than 10? (recoveries may be diluted out.)			✓

# of outliers	Recovery	Sample result from column with non-conformance	Sample result from column without non-conformance
1 out	high/low	No action	No action
2 out	2 high same column	K	No action
	2 low same column	L, UL	No action
	mixed same column	J, UJ	No action
	2 high diff columns	J	Not applicable
	2 low diff columns	J, UJ	Not applicable
	mixed diff columns	Professional judgement	Not applicable
3 out	All high	K	Not applicable
	All low	L, UL	Not applicable
	2 high, 1 low	K (2 high)	J (1 low 2nd column)
	2 low, 1 high	L, UJ (2 low)	J (1 high 2nd column)
	other mixed	J, UJ	Not applicable
4 out	All high	K	Not applicable
	All low	L, UL	Not applicable
	Mixed	J, UJ	Not applicable

If any recovery is >0% and <10% then L(+)/R(-).
If any recovery is 0% then R(+/-).

Notes:

LCS Tetrachloro-m-xylene [2C] - 30 (36-114) - no qual action.

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	✓		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
7.3	Are there any %R for matrix spike and matrix spike duplicate recoveries outside the QC limits?		✓	
7.4	Are there any RPD for matrix spike and matrix spike duplicate recoveries outside the QC limits?		✓	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data.			

Notes:

8.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)		Yes	No	NA
8.1	Is the LCS/LCSD recovery form present?	✓		
8.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
8.3	Are there any %R for LCS/LCSD recoveries outside the QC limits?	✓		
	If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			

Notes:

PCB-1016(2C): 56(63-129), associated samples ND, flagged R, I

9.0 Field Duplicate		Yes	No	NA
9.2	Evaluate field duplicate results? Generally, no action is taken on the basis of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	✓		

Notes:

see attached

10.0 Compound Identification and Detection Limit Verification		Yes	No	NA
10.1	Is the percent difference calculated for the positive sample results on both columns <40%? If No, J(+).	✓		
10.2	Do detection limits meet those required by the project QAPP and were properly adjusted for dilution factors and moisture?	✓		

Notes:

11.0 Data Completeness		Yes	No	NA
11.1	Is % completeness within the control limits? (Control limit $95\%_{sq}$ and $90\%_{so}$)	✓		
11.1.1	Number of samples: Pest X PCB 11			
11.1.2	Number of target compounds in each analysis: PEST X PCB 7			
11.1.3	Number of results rejected and not reported: Pest X PCB			
11.1.4	% Completeness = (11.1.1 x 11.1.2 - 11.1.3) x 100/(11.1.1 x 11.1.2)			
	% Completeness = Pest X PCB			

Notes:

SURROGATE STANDARD RECOVERY AND RT SUMMARY

USEPA-8082

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Sequence: 6050252
Matrix: Soil

SDG: 36440-27
Project: RFAAP SSP Investigation
Instrument: 144
Calibration: 6E02016

Lab Sample Id Surrogate Compound Name	RT	Calibration Mean RT	RT Diff	RT Diff Limit	% Recovery	Recovery Limits	Q
LCS (0604519-BS1)		**Lab File ID: A166058-0**		**Analyzed: 05/01/06 14:42**			
Decachlorobiphenyl	11.47	11.47	0.00	+/-0.1	101	30 - 120	
Tetrachloro-m-xylene	1.91	1.91	0.00	+/-0.1	33	36 - 114	*
Decachlorobiphenyl [2C]	10.75	10.75	0.00	+/-0.1	99	30 - 120	
Tetrachloro-m-xylene [2C]	2.26	2.26	0.00	+/-0.1	30	36 - 114	.*
EQBK-1 (0604361-04)		**Lab File ID: A166059-0**		**Analyzed: 05/01/06 15:00**			
Decachlorobiphenyl	11.47	11.47	0.00	+/-0.1	103	30 - 120	
Tetrachloro-m-xylene	1.91	1.91	0.00	+/-0.1	54	36 - 114	
Decachlorobiphenyl [2C]	10.75	10.75	0.00	+/-0.1	100	30 - 120	
Tetrachloro-m-xylene [2C]	2.26	2.26	0.00	+/-0.1	51	36 - 114	
FSB3A (0604361-01)		**Lab File ID: A166063-0**		**Analyzed: 05/01/06 16:11**			
Decachlorobiphenyl	11.47	11.47	0.00	+/-0.1	106	30 - 139	
Tetrachloro-m-xylene	1.91	1.91	0.00	+/-0.1	91	32 - 129	
Decachlorobiphenyl [2C]	10.75	10.75	0.00	+/-0.1	94	32 - 129	
Tetrachloro-m-xylene [2C]	2.26	2.26	0.00	+/-0.1	82	30 - 139	
FSB3B (0604361-02)		**Lab File ID: A166064-0**		**Analyzed: 05/01/06 16:29**			
Decachlorobiphenyl	11.47	11.47	0.00	+/-0.1	103	30 - 139	
Tetrachloro-m-xylene	1.91	1.91	0.00	+/-0.1	90	32 - 129	
Decachlorobiphenyl [2C]	10.75	10.75	0.00	+/-0.1	100	32 - 129	
Tetrachloro-m-xylene [2C]	2.26	2.26	0.00	+/-0.1	79	30 - 139	
Blank (0604625-BLK1)		**Lab File ID: A166065-0**		**Analyzed: 05/01/06 16:47**			
Decachlorobiphenyl	11.47	11.47	0.00	+/-0.1	107	30 - 139	
Tetrachloro-m-xylene	1.91	1.91	0.00	+/-0.1	101	32 - 129	
Decachlorobiphenyl [2C]	10.75	10.75	0.00	+/-0.1	104	32 - 129	
Tetrachloro-m-xylene [2C]	2.26	2.26	0.00	+/-0.1	91	30 - 139	
LCS (0604625-BS1)		**Lab File ID: A166066-0**		**Analyzed: 05/01/06 17:05**			
Decachlorobiphenyl	11.47	11.47	0.00	+/-0.1	106	30 - 139	
Tetrachloro-m-xylene	1.91	1.91	0.00	+/-0.1	95	32 - 129	
Decachlorobiphenyl [2C]	10.75	10.75	0.00	+/-0.1	104	32 - 129	
Tetrachloro-m-xylene [2C]	2.26	2.26	0.00	+/-0.1	84	30 - 139	

LCS / LCS DUPLICATE RECOVERY

USEPA-8082

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Group, Inc.

Matrix: Water

Laboratory ID: 0604519-BS1

SDG: 36440-27

Project: RFAAP SSP Investigation

Preparation: 3510C Liquid-Liquid Extraction

Initial/Final: 1000 mL / 2 mL

QC Batch: 0604519

Sequence: 6050252

Analyte	Spike Added	LCS Conc.	LCS % Rec. #	QC Limits Rec.	Units
PCB-1016	1.00	0.677	68	63 - 129	ug/L
PCB-1260	1.00	0.894	89	48 - 136	ug/L
PCB-1016 [2C]	1.00	0.564	56 *	63 - 129	ug/L
PCB-1260 [2C]	1.00	0.802	80	48 - 136	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

01821

DATA VALIDATION WORKSHEET

Pesticides/PCBs

Reviewer: LAM
Date: 6/6/2006
DV Level: II III IV
Review Document:
X SW-846 - 8081/8082
X NFG - Region III Modifications
X project QAPP

Project Name: RFAAP SSP
Project Number: 116566 28
Laboratory: TriMatrix
SDG No.: 36440-27
Test Name: PEST/PCB
Method No.: 8081A/8082

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	✓		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	✓		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, or special circumstances affecting the quality of the data?		✓	
1.4	Do sample preservation, collection and storage condition meet method requirement?	✓		
	If samples were received with the cooler temperature exceeding 20 ^{O}C, then flag L(+)/UL(-).			
1.5	Do any soil samples contain more than 50% water? If yes, no dry weight correction is made and make notes in the DV Report.		✓	

Notes:

2.0 Holding Times		Yes	No	NA
2.2	Have any technical holding times, determined from date of sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-). Extraction: (aqueous) 7 days and (soil) 14 days; and Analysis: 40 days.		✓	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, J(+)/R(-) .		✓	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks prepared at the appropriate frequency (one per 20 samples or batch and matrix)?	✓		
3.2	Do any blanks have positive results? If yes, positive sample results should be reported and qualified "B", if the [sample≤5X[blank].		✓	
3.3	Do any field equipment blanks have positive results? If yes, use same rules above.		✓	

Notes:

4.0 Initial and Continuing Calibration

		Yes	No	NA
4.1	Are at least five standards included in the calibration curve for 1016, 1260, toxaphene, and technical chlordane; and at least one point for the other arochlors reported? If no, flag "R".	✓		
4.2	Was a second source calibration verification analyzed for each calibration curve? If no, flag "R".	✓		
4.3	Were continuing calibration standards analyzed every 12 hours or twenty samples? If no, flag "R".	✓		
4.4	Are all calibration standard %RSD (<20%, r>0.995, or r^2<0.99), second source (±15%) or %D(≤15%) within the control limits?		✓	
For initial calibration: %RSD > 20%, but < 50%, J(+), only; %RSD > 50%, but < 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).				
For second source: %D>15%, J(+)/R(-).				
For continuing calibration: Positive Bias - %D >+ 15%, J(+), only. Negative Bias - %D>-15% but <-50%, J(+)/UJ(-) and %D>-50%, J(+)/R(-).				

Notes:

Second Source: Methoxychlor 128 (75-125), associated samples ND, flagged R, c.

Cont. Cal: Various analytes %D>+15%, associated samples ND, no qual action required.

5.0 GC/ECD Instrument Performance Check

		Yes	No	NA
5.1	Has a Performance Evaluation Mixture (PEM) been analyzed at the beginning, every 12 hours, and at the end of every sequence.	✓		
5.2	Is the 4,4'-DDT breakdown </= to 20%? If No, for positive DDT results, DDT-L(+), DDD/DDE - NJ(+). For non-detect DDT results, DDD/DDE - R(+).	✓		
5.3	Is the endrin breakdown </= to 20%? If No, for positive endrin results, endrin-L(+), endrin aldehyde/ketone - NJ(+). For non-detect DDT results, endrin aldehyde/ketone - R(+).	✓		
5.4	Is the combined breakdowns less than or equal to 30%? If No, for positive DDT/endrin results, DDT/endrin-L(+), DDD/DD/endrin aldehyde/endrin ketone - NJ(+). For non-detect DDT/endrin results, DDD/DDE/endrin aldehyde/endrin ketone - R(+).	✓		

Notes:

6.0 Surrogate Recovery

		Yes	No	NA
6.1	Do all surrogate retention times fall within the RT windows established during the initial calibration sequence? If No, the associated sample result should be carefully evaluated.		✓	
6.2	Are surrogate recoveries within acceptance criteria for all samples and method blanks? Advisory limit: 60-150%.		✓	
6.3	If No in Section 6.3, are these sample(s) or method blank(s) reanalyzed?	✓		
6.4	If No in Section 6.4, is any sample dilution factor greater than 10? (recoveries may be diluted out.)			

# of outliers	Recovery	Sample result from column with non-conformance	Sample result from column without non-conformance
1 out	high/low	No action	No action
2 out	2 high same column	K	No action
	2 low same column	L, UL	No action
	mixed same column	J, UJ	No action
	2 high diff columns	J	Not applicable
	2 low diff columns	J, UJ	Not applicable
	mixed diff columns	Professional judgement	Not applicable
3 out	All high	K	Not applicable
	All low	L, UL	Not applicable
	2 high, 1 low	K (2 high)	J (1 low 2nd column)
	2 low, 1 high	L, UJ (2 low)	J (1 high 2nd column)
	other mixed	J, UJ	Not applicable
4 out	All high	K	Not applicable
	All low	L, UL	Not applicable
	Mixed	J, UJ	Not applicable

If any recovery is >0% and <10% then L(+)/R(-).
If any recovery is 0% then R(+/-).

Notes: Decachlorobiphenyl 70R 182 (56-150) in samp. ASBS-A, no qual. action required

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	✓		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
7.3	Are there any %R for matrix spike and matrix spike duplicate recoveries outside the QC limits?	✓		
7.4	Are there any RPD for matrix spike and matrix spike duplicate recoveries outside the QC limits?		✓	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data.			

Notes: MS: 70R Dieldrin 18 (33-153), samp. flagged J,m
MSD: 70R delta-BHC 159 (44-150), samp. result is ND, no action
Dieldrin 25 (33-153), flagged J,m
Heptachlor 159 (34-150), samp. result is ND, no action

8.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)

		Yes	No	NA
8.1	Is the LCS/LCSD recovery form present?	✓		
8.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
8.3	Are there any %R for LCS/LCSD recoveries outside the QC limits?	✓		
	If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			

Notes: Delta-BHC : 190 (15-156) > all results ND, no qual. action required
Heptachlor : 190 (39-162) /

9.0 Field Duplicate

		Yes	No	NA
9.2	Evaluate field duplicate results? Generally, no action is taken on the basis of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	✓		

Notes:
see attached

10.0 Compound Identification and Detection Limit Verification

		Yes	No	NA
10.1	Is the percent difference calculated for the positive sample results on both columns <40%? If No, J(+).		✓	
10.2	Do detection limits meet those required by the project QAPP and were properly adjusted for dilution factors and moisture?	✓		

Notes: Dieldrin RPD >40, associated samples w/pos. results flagged J, g.

11.0 Data Completeness

		Yes	No	NA
11.1	Is % completeness within the control limits? (Control limit $95\%_{aq}$ and $90\%_{so}$)	✓		
11.1.1	Number of samples: Pest 11 PCB X			
11.1.2	Number of target compounds in each analysis: PEST 21 PCB X			
11.1.3	Number of results rejected and not reported: Pest 0 PCB X			
11.1.4	% Completeness = (11.1.1 x 11.1.2 - 11.1.3) x 100/(11.1.1 x 11.1.2)			
	% Completeness = Pest 100 PCB X			

Notes:

SECOND-SOURCE CALIBRATION VERIFICATION

USEPA-8081A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-27
Client: URS Group, Inc.
Project: RFAAP SSP Investigation
Calibration: 6E24010
Laboratory ID: 6051818-SCV1
Sequence: 6051818
Standard ID: A602697

Analyte	Expected (ug/mL)	Found (ug/mL)	% Rec.	QC Limit
alpha-BHC	0.0400	0.0406	102	75-125
beta-BHC	0.0400	0.0440	110	75-125
gamma-BHC (lindane)	0.0400	0.0414	104	75-125
delta-BHC	0.0800	0.0884	110	75-125
alpha-Chlordane	0.0400	0.0430	108	75-125
gamma-Chlordane	0.0400	0.0434	109	75-125
4,4'-DDD	0.0400	0.0490	123	75-125
4,4'-DDE	0.0400	0.0446	112	75-125
4,4'-DDT	0.0400	0.0489	122	75-125
Aldrin	0.0400	0.0408	102	75-125
Dieldrin	0.0400	0.0416	104	75-125
Endosulfan I	0.0400	0.0417	104	75-125
Endosulfan II	0.0400	0.0485	121	75-125
Endosulfan Sulfate	0.0400	0.0489	122	75-125
Endrin	0.0400	0.0432	108	75-125
Endrin Aldehyde	0.0400	0.0486	122	75-125
Endrin Ketone	0.0400	0.0466	117	75-125
Heptachlor	0.0800	0.0884	110	75-125
Heptachlor Epoxide	0.0400	0.0423	106	75-125
Methoxychlor	0.0400	0.0511	128 *	75-125
Tetrachloro-m-xylene	0.0400	0.0422	106	75-125
Decachlorobiphenyl	0.0400	0.0506	127 *	75-125

* Values outside of QC limits

NOTE: delta-BHC and Heptachlor co-elute on this column.

01586

CONTINUING CALIBRATION CHECK
USEPA-8081A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Instrument ID: 199
Lab File ID: B39_226-0
Sequence: 6051632
Lab Sample ID: 6051632-CCV2

SDG: 36440-27
Project: RFAAP SSP Investigation
Calibration: 6E24007
Calibration Date: 05/04/06 22:00
Injection Date: 05/05/06
Injection Time: 15:41

Analyte	Type	CONC. (ug/mL)		Response Factor			% Diff. / Drift	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
alpha-BHC [2C]	A	0.0400	0.0451	3169200	3575240		12.8	15
beta-BHC [2C]	A	0.0400	0.0446	1012280	1129460		11.6	15
gamma-BHC (Lindane) [2C]	A	0.0400	0.0444	2511420	2786380		10.9	15
delta-BHC [2C]	A	0.0400	0.0462	2038260	2416870		18.6	15 *
alpha-Chlordane [2C]	A	0.0400	0.0413	2054380	2121330		3.26	15
gamma-Chlordane [2C]	A	0.0400	0.0415	2162410	2245620		3.85	15
4,4'-DDD [2C]	A	0.0400	0.0474	1142220	1353870		18.5	15 *
4,4'-DDE [2C]	A	0.0400	0.0447	1729650	1934420		11.8	15
4,4'-DDT [2C]	A	0.0400	0.0432	1243330	1341940		7.93	15
Aldrin [2C]	A	0.0400	0.0432	2550110	2752310		7.93	15
Dieldrin [2C]	A	0.0400	0.0420	1929940	2024750		4.91	15
Endosulfan I [2C]	A	0.0400	0.0415	1950820	2022320		3.67	15
Endosulfan II [2C]	A	0.0400	0.0420	1393840	1464280		5.05	15
Endosulfan Sulfate [2C]	A	0.0400	0.0413	1121900	1170380		4.32	15
Endrin [2C]	A	0.0400	0.0425	1663000	1766380		6.22	15
Endrin Aldehyde [2C]	A	0.0400	0.0416	1016090	1062350		4.55	15
Endrin Ketone [2C]	A	0.0400	0.0411	1226350	1260320		2.77	15
Heptachlor [2C]	A	0.0400	0.0432	2875670	3105020		7.98	15
Heptachlor Epoxide [2C]	A	0.0400	0.0417	2194960	2289720		4.32	15
Methoxychlor [2C]	A	0.0400	0.0450	587396	666347		13.4	15

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

01616

CONTINUING CALIBRATION CHECK

USEPA-8081A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-27
Client: URS Group, Inc.
Project: RFAAP SSP Investigation
Instrument ID: 158
Calibration: 6E22005
Lab File ID: A134224-0
Calibration Date: 05/12/06 12:42
Sequence: 6052222
Injection Date: 05/12/06
Lab Sample ID: 6052222-CCV1
Injection Time: 20:52

Analyte	Type	CONC. (ug/mL)		Response Factor			% Diff. / Drift	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
alpha-BHC	L	0.0400	0.0403	2912830	3325770		0.750	15
beta-BHC	L	0.0400	0.0400	1044130	1139450		0.00	15
gamma-BHC (lindane)	L	0.0400	0.0405	2595840	2931870		1.25	15
delta-BHC	L	0.0800	0.0853	4111590	4467070		6.62	15
alpha-Chlordane	L	0.0400	0.0411	2699410	2867620		2.75	15
gamma-Chlordane	L	0.0400	0.0410	2691730	2873270		2.50	15
4,4'-DDD	Q	0.0400	0.0446	993009	1076910		11.5	15
4,4'-DDE	Q	0.0400	0.0415	1576280	1668120		3.75	15
4,4'-DDT	Q	0.0400	0.0445	1251650	1347050		11.2	15
Aldrin	L	0.0400	0.0416	3141700	3530940		4.00	15
Dieldrin	L	0.0400	0.0397	2327410	2546850		-0.750	15
Endosulfan I	L	0.0400	0.0403	2326880	2497480		0.750	15
Endosulfan II	Q	0.0400	0.0420	1804090	1886750		5.00	15
Endosulfan Sulfate	Q	0.0400	0.0448	1386360	1516640		12.0	15
Endrin	L	0.0400	0.0409	1754970	1934560		2.25	15
Endrin Aldehyde	Q	0.0400	0.0427	1431530	1505400		6.75	15
Endrin Ketone	L	0.0400	0.0396	1726180	1863740		-1.00	15
Heptachlor	L	0.0800	0.0853	4111590	4467070		6.62	15
Heptachlor Epoxide	L	0.0400	0.0410	2667190	2889000		2.50	15
Methoxychlor	Q	0.0400	0.0496	686419	797752		24.0	15 *

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

NOTE: delta-BHC and Heptachlor co-elute on this column.

: 01631

CONTINUING CALIBRATION CHECK

USEPA-8081A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-27
Client: URS Group, Inc.
Project: RFAAP SSP Investigation
Instrument ID: 158
Calibration: 6E22005
Lab File ID: A134225-0
Calibration Date: 05/12/06 12:42
Sequence: 6052222
Injection Date: 05/12/06
Lab Sample ID: 6052222-CCV2
Injection Time: 21:27

Analyte	Type	CONC. (ug/mL)		Response Factor			% Diff. / Drift	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
alpha-BHC	L	0.0400	0.0413	2912830	3415290		3.25	15
beta-BHC	L	0.0400	0.0423	1044130	1213840		5.75	15
gamma-BHC (lindane)	L	0.0400	0.0418	2595840	3035140		4.50	15
delta-BHC	L	0.0800	0.0909	4111590	4758040		13.6	15
alpha-Chlordane	L	0.0400	0.0434	2699410	3034000		8.50	15
gamma-Chlordane	L	0.0400	0.0435	2691730	3059320		8.75	15
4,4'-DDD	Q	0.0400	0.0478	993009	1169780		19.5	15 *
4,4'-DDE	Q	0.0400	0.0450	1576280	1830530		12.5	15
4,4'-DDT	Q	0.0400	0.0485	1251650	1487070		21.2	15 *
Aldrin	L	0.0400	0.0424	3141700	3609280		6.00	15
Dieldrin	L	0.0400	0.0422	2327410	2728290		5.50	15
Endosulfan I	L	0.0400	0.0427	2326880	2655630		6.75	15
Endosulfan II	Q	0.0400	0.0463	1804090	2095860		15.8	15 *
Endosulfan Sulfate	Q	0.0400	0.0488	1386360	1666430		22.0	15 *
Endrin	L	0.0400	0.0435	1754970	2078420		8.75	15
Endrin Aldehyde	Q	0.0400	0.0467	1431530	1651770		16.8	15 *
Endrin Ketone	L	0.0400	0.0436	1726180	2068910		9.00	15
Heptachlor	L	0.0800	0.0909	4111590	4758040		13.6	15
Heptachlor Epoxide	L	0.0400	0.0432	2667190	3056650		8.00	15
Methoxychlor	Q	0.0400	0.0529	686419	855103		32.2	15 *

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

NOTE: delta-BHC and Heptachlor co-elute on this column.

: 01634

SURROGATE STANDARD RECOVERY AND RT SUMMARY
USEPA-8081A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Sequence: 6042640
Matrix: Water

SDG: 36440-27
Project: RFAAP SSP Investigation
Instrument: 199
Calibration: 6E03017

Lab Sample Id Surrogate Compound Name	RT	Calibration Mean RT	RT Diff	RT Diff Limit	% Recovery	Recovery Limits	Q
Cal Standard (6042640-CALB)		**Lab File ID: A39_078-0**		**Analyzed: 04/25/06 21:48**			
Tetrachloro-m-xylene	8.78	8.83	-0.05	+/-1.0	NA	NA	
Tetrachloro-m-xylene [2C]	7.99	8.04	-0.05	+/-1.0	NA	NA	
Decachlorobiphenyl	24.94	25.01	-0.07	+/-1.0	NA	NA	
Decachlorobiphenyl [2C]	22.05	22.10	-0.05	+/-1.0	NA	NA	
Cal Standard (6042640-CALC)		**Lab File ID: A39_079-0**		**Analyzed: 04/25/06 22:23**			
Tetrachloro-m-xylene	8.79	8.83	-0.04	+/-1.0	NA	NA	
Tetrachloro-m-xylene [2C]	8.00	8.04	-0.04	+/-1.0	NA	NA	
Decachlorobiphenyl	24.96	25.01	-0.05	+/-1.0	NA	NA	
Decachlorobiphenyl [2C]	22.06	22.10	-0.04	+/-1.0	NA	NA	
Secondary Cal Check (6042640-SCV2)		**Lab File ID: A39_080-0**		**Analyzed: 04/25/06 22:58**			
Tetrachloro-m-xylene	8.80	8.83	-0.03	+/-1.0	96	75 - 125	
Tetrachloro-m-xylene [2C]	8.01	8.04	-0.03	+/-1.0	97	75 - 125	
Decachlorobiphenyl	24.96	25.01	-0.05	+/-1.0	103	75 - 125	
Decachlorobiphenyl [2C]	22.06	22.10	-0.04	+/-1.0	97	75 - 125	
LCS (0604518-BS2)		**Lab File ID: A39_085-0**		**Analyzed: 04/26/06 01:52**			
Tetrachloro-m-xylene	8.76	8.83	-0.07	+/-1.0	102	36 - 123	
Tetrachloro-m-xylene [2C]	7.97	8.04	-0.07	+/-1.0	99	36 - 123	
Decachlorobiphenyl	24.89	25.01	-0.12	+/-1.0	100	30 - 103	
Decachlorobiphenyl [2C]	22.01	22.10	-0.09	+/-1.0	112	30 - 103	*
LCS (0604518-BS1)		**Lab File ID: A39_086-0**		**Analyzed: 04/26/06 02:27**			
Tetrachloro-m-xylene	8.75	8.83	-0.08	+/-1.0	52	36 - 123	
Tetrachloro-m-xylene [2C]	7.96	8.04	-0.08	+/-1.0	50	36 - 123	
Decachlorobiphenyl	24.88	25.01	-0.13	+/-1.0	92	30 - 103	
Decachlorobiphenyl [2C]	22.00	22.10	-0.10	+/-1.0	88	30 - 103	
EQBK-1 (0604361-04)		**Lab File ID: A39_088-0**		**Analyzed: 04/26/06 03:36**			
Tetrachloro-m-xylene	8.75	8.83	-0.08	+/-1.0	63	36 - 123	
Tetrachloro-m-xylene [2C]	7.95	8.04	-0.09	+/-1.0	55	36 - 123	
Decachlorobiphenyl	24.87	25.01	-0.14	+/-1.0	91	30 - 103	
Decachlorobiphenyl [2C]	21.99	22.10	-0.11	+/-1.0	97	30 - 103	

SURROGATE STANDARD RECOVERY AND RT SUMMARY

USEPA-8081A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Sequence: 6042640
Matrix: Water

SDG: 36440-27
Project: RFAAP SSP Investigation
Instrument: 199
Calibration: 6E03017

Lab Sample Id Surrogate Compound Name	RT	Calibration Mean RT	RT Diff	RT Diff Limit	% Recovery	Recovery Limits	Q
Blank (0604518-BLK1)		**Lab File ID: A39_089-0**		**Analyzed: 04/26/06 04:11**			
Tetrachloro-m-xylene	8.74	8.83	-0.09	+/-1.0	64	36 - 123	
Tetrachloro-m-xylene [2C]	7.95	8.04	-0.09	+/-1.0	52	36 - 123	
Decachlorobiphenyl	24.86	25.01	-0.15	+/-1.0	112	30 - 103	*
Decachlorobiphenyl [2C]	21.98	22.10	-0.12	+/-1.0	84	30 - 103	
Calibration Check (6042640-CCV2)		**Lab File ID: A39_091-0**		**Analyzed: 04/26/06 05:21**			
Tetrachloro-m-xylene	8.73	8.83	-0.10	+/-1.0	102	85 - 115	
Tetrachloro-m-xylene [2C]	7.95	8.04	-0.09	+/-1.0	101	85 - 115	
Decachlorobiphenyl	24.83	25.01	-0.18	+/-1.0	112	85 - 115	
Decachlorobiphenyl [2C]	21.98	22.10	-0.12	+/-1.0	94	85 - 115	

01066

SURROGATE STANDARD RECOVERY AND RT SUMMARY
USEPA-8081A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Sequence: 6051930
Matrix: Water

SDG: 36440-27
Project: RFAAP SSP Investigation
Instrument: 158
Calibration: 6E19011

Lab Sample Id Surrogate Compound Name	RT	Calibration Mean RT	RT Diff	RT Diff Limit	% Recovery	Recovery Limits	Q
ASB5-A (0604426-05RE2)		**Lab File ID: A134060-0**		**Analyzed: 05/05/06 06:11**			
Tetrachloro-m-xylene	6.99	7.03	-0.04	+/-1.0	127	58 - 137	
Decachlorobiphenyl	21.36	21.37	-0.01	+/-1.0	182	56 - 150	*
Calibration Check (6051930-CCV3)		**Lab File ID: A134065-0**		**Analyzed: 05/05/06 09:04**			
Tetrachloro-m-xylene	6.99	7.03	-0.04	+/-1.0	108	85 - 115	
Decachlorobiphenyl	21.33	21.37	-0.04	+/-1.0	102	85 - 115	

: 01057

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-8081A

~~FSB3A~~

FSB4A

ZM

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Group, Inc.

Matrix: Soil

SDG: 36440-27

Project: RFAAP SSP Investigation

Preparation: 3550B Sonication Extraction

Initial/Final: 30 g / 10 mL

Laboratory ID: 0604629-MS2

QC Batch: 0604629

Analyte	Spike Added	Sample Conc.	MS Conc.	MS % Rec. #	QC Limits Rec.	Units
alpha-BHC	17.1	ND	12.2	71	48 - 149	ug/kg dry
beta-BHC	17.1	ND	13.3	78	57 - 127	ug/kg dry
gamma-BHC (lindane)	17.1	ND	12.3	72	31 - 151	ug/kg dry
delta-BHC	17.1	ND	25.4	149	44 - 150	ug/kg dry
alpha-Chlordane	17.1	ND	12.9	75	50 - 150	ug/kg dry
gamma-Chlordane	17.1	ND	13.2	77	50 - 150	ug/kg dry
4,4'-DDD	17.1	ND	15.7	92	43 - 156	ug/kg dry
4,4'-DDE	17.1	ND	14.7	86	30 - 157	ug/kg dry
4,4'-DDT	17.1	ND	16.6	97	22 - 171	ug/kg dry
Aldrin	17.1	ND	12.2	71	30 - 143	ug/kg dry
Dieldrin	17.1	9.19	12.2	18 *	33 - 153	ug/kg dry
Endosulfan I	17.1	ND	12.3	72	44 - 141	ug/kg dry
Endosulfan II	17.1	ND	12.4	73	43 - 145	ug/kg dry
Endosulfan Sulfate	17.1	ND	14.7	86	42 - 145	ug/kg dry
Endrin	17.1	ND	13.7	80	23 - 170	ug/kg dry
Endrin Aldehyde	17.1	ND	12.9	75	48 - 131	ug/kg dry
Endrin Ketone	17.1	ND	13.2	77	70 - 130	ug/kg dry
Heptachlor	17.1	ND	25.4	149	34 - 150	ug/kg dry
Heptachlor Epoxide	17.1	ND	12.5	73	49 - 134	ug/kg dry
Methoxychlor	17.1	ND	18.8	110	34 - 154	ug/kg dry

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

: 0i08

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-8081A

~~FSB3A~~

FSBHA

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Group, Inc.

Matrix: Soil

SDG: 36440-27

Project: RFAAP SSP Investigation

Preparation: 3550B Sonication Extraction

Initial/Final: 30 g / 10 mL

Laboratory ID: 0604629-MSD2

QC Batch: 0604629

Analyte	Spike Added	MSD Conc.	MSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
alpha-BHC	17.1	13.4	78	9	20	48 - 149	ug/kg dry
beta-BHC	17.1	14.8	87	11	20	57 - 127	ug/kg dry
gamma-BHC (lindane)	17.1	13.6	80	10	20	31 - 151	ug/kg dry
delta-BHC	17.1	27.2	159 *	7	20	44 - 150	ug/kg dry
alpha-Chlordane	17.1	14.1	82	9	20	50 - 150	ug/kg dry
gamma-Chlordane	17.1	14.4	84	9	20	50 - 150	ug/kg dry
4,4'-DDD	17.1	17.7	104	12	20	43 - 156	ug/kg dry
4,4'-DDE	17.1	16.5	96	12	20	30 - 157	ug/kg dry
4,4'-DDT	17.1	18.4	108	10	20	22 - 171	ug/kg dry
Aldrin	17.1	13.2	77	8	20	30 - 143	ug/kg dry
Dieldrin	17.1	13.5	25 *	10	20	33 - 153	ug/kg dry
Endosulfan I	17.1	13.5	79	9	20	44 - 141	ug/kg dry
Endosulfan II	17.1	13.7	80	10	20	43 - 145	ug/kg dry
Endosulfan Sulfate	17.1	16.5	96	12	20	42 - 145	ug/kg dry
Endrin	17.1	14.9	87	8	20	23 - 170	ug/kg dry
Endrin Aldehyde	17.1	14.4	84	11	20	48 - 131	ug/kg dry
Endrin Ketone	17.1	14.5	85	9	20	70 - 130	ug/kg dry
Heptachlor	17.1	27.2	159 *	7	20	34 - 150	ug/kg dry
Heptachlor Epoxide	17.1	13.8	81	10	20	49 - 134	ug/kg dry
Methoxychlor	17.1	21.8	127	15	20	34 - 154	ug/kg dry

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

LCS / LCS DUPLICATE RECOVERY

USEPA-8081A

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Group, Inc.

Matrix: Soil

Laboratory ID: 0604629-BS3

SDG: 36440-27

Project: RFAAP SSP Investigation

Preparation: 3550B Sonication Extraction

Initial/Final: 30 g / 10 mL

QC Batch: 0604629

Sequence: 6052222

Analyte	Spike Added	LCS Conc.	LCS % Rec. #	QC Limits Rec.	Units
alpha-BHC	13.3	12.3	92	35 - 142	ug/kg wet
beta-BHC	13.3	12.7	95	41 - 144	ug/kg wet
gamma-BHC (lindane)	13.3	12.2	92	46 - 152	ug/kg wet
delta-BHC	13.3	25.3	190 *	15 - 156	ug/kg wet
alpha-Chlordane	13.3	12.6	95	69 - 117	ug/kg wet
gamma-Chlordane	13.3	12.3	92	77 - 116	ug/kg wet
4,4'-DDD	13.3	14.5	109	68 - 137	ug/kg wet
4,4'-DDE	13.3	13.4	101	50 - 133	ug/kg wet
4,4'-DDT	13.3	15.0	113	49 - 162	ug/kg wet
Aldrin	13.3	12.4	93	46 - 152	ug/kg wet
Dieldrin	13.3	12.0	90	43 - 167	ug/kg wet
Endosulfan I	13.3	11.8	89	41 - 119	ug/kg wet
Endosulfan II	13.3	12.4	93	34 - 143	ug/kg wet
Endosulfan Sulfate	13.3	14.4	108	40 - 156	ug/kg wet
Endrin	13.3	13.1	98	57 - 167	ug/kg wet
Endrin Aldehyde	13.3	12.4	93	25 - 145	ug/kg wet
Endrin Ketone	13.3	12.6	95	59 - 126	ug/kg wet
Heptachlor	13.3	25.3	190 *	39 - 162	ug/kg wet
Heptachlor Epoxide	13.3	12.5	94	52 - 140	ug/kg wet
Methoxychlor	13.3	16.8	126	38 - 160	ug/kg wet
Toxaphene		ND		60 - 140	ug/kg wet

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

:0115

DUAL COLUMN CONFIRMATION CHECK

~~FSB3A~~

FSB4A ym

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-27

Client: URS Group, Inc.
Project: RFAAP SSP Investigation

Matrix: Soil
Laboratory ID: 0604361-01
File ID: A134077-0

Sampled: 04/19/06 09:20
Prepared: 04/27/06 09:11
Analyzed: 05/05/06 18:47

Solids: 78.00
Preparation: 3550B Sonication
Instrument: 158/199

QC Batch: 0604629
Sequence: 6051818

GC Column(1): RTX CLPEST2
GC Column(2): RTX CLPEST

Analyte	Col.	RT	EXP RT	Diff.	Area	Amount	Conc.	RPD
Dieldrin	* 1	14.36	14.37	0.01	49728.6		9.2	106
	2	15.50	15.59	0.09	14373.62		2.5	

* Column used for quantitation

01636

DUAL COLUMN CONFIRMATION CHECK

ASB4-A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Matrix: Soil
Sampled: 04/20/06 11:30
Solids: 78.00
QC Batch: 0604629
GC Column(1): RTX CLPEST2

Laboratory ID: 0604426-01
Prepared: 04/27/06 09:11
Preparation: 3550B Sonication
Sequence: 6051614
GC Column(2): RTX CLPEST

SDG: 36440-27
Project: RFAAP SSP Investigation
File ID: A134051-0
Analyzed: 05/05/06 00:59
Instrument: 158/199

Analyte	Col.	RT	EXP RT	Diff.	Area	Amount	Conc.	RPD
Dieldrin	* 1	14.31	14.35	0.04	83217.36		14.0	108
	2	15.51	15.59	0.08	24537.45		4.2	

* Column used for quantitation

01635

DUAL COLUMN CONFIRMATION CHECK

ASB4-B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Matrix: Soil
Sampled: 04/20/06 12:00
Solids: 78.00
QC Batch: 0604629
GC Column(1): RTX CLPEST2

Laboratory ID: 0604426-02
Prepared: 04/27/06 09:11
Preparation: 3550B Sonication
Sequence: 6051818
GC Column(2): RTX CLPEST

SDG: 36440-27
Project: RFAAP SSP Investigation
File ID: A134081-0
Analyzed: 05/05/06 21:06
Instrument: 158/199

Analyte	Col.	RT	EXP RT	Diff.	Area	Amount	Conc.	RPD
Dieldrin	* 1	14.32	14.37	0.05	21196.65		4.6	200
	2	15.50	15.59	0.09	4805.13		0.81	

* Column used for quantitation

: 61646

DUAL COLUMN CONFIRMATION CHECK

DUP-1

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-27
Client: URS Group, Inc.
Project: RFAAP SSP Investigation
Matrix: Soil
Laboratory ID: 0604426-04
File ID: A134083-0
Sampled: 04/20/06 00:00
Prepared: 04/27/06 09:11
Analyzed: 05/05/06 22:15
Solids: 77.00
Preparation: 3550B Sonication
Instrument: 158/199
QC Batch: 0604629
Sequence: 6051818
GC Column(1): RTX CLPEST2
GC Column(2): RTX CLPEST

Analyte	Col.	RT	EXP RT	Diff.	Area	Amount	Conc.	RPD
Dieldrin	* 1	14.34	14.37	0.03	12041.05		3.2	125
	2	15.56	15.59	0.03	1336.78		0.74	

* Column used for quantitation

01641

DATA VALIDATION WORKSHEET

Explosives

Reviewer: LAM
Date: 6/5/06
DV Level: II III IV

Review Document:

_X__ Region III Modified for National Functional Guidelines
_X__ SW-846
_X__ Project QAPP/SAP

Project Name: RFAAP SSP
Project Number: 116546628
Laboratory: TriMatrix
SDG No.: 36440-27
Test Name: Explosives
Method No.: 8330

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	✓		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	✓		
1.3	Do sample preservation, collection and storage condition meet method requirement?	✓		
	If samples were received with the cooler temperature exceeding 20 °C, then flag L(+)/UL(-).			
1.4	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		✓	

Notes:

2.0 Holding Times		Yes	No	NA
2.1	Have any technical holding times, determined from date of sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-). Extraction: (aqueous) 7 days and (soil) 14 days; and Analysis: 40 days.		✓	
2.2	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, J(+)/R(-) .		✓	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	✓		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		✓	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		✓	

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are at least five standards included in the calibration curve? If no, flag "R".	✓		
4.2	Was a second source calibration verification analyzed for each calibration curve? If no, flag "R".	✓		
4.3	Were continuing calibration standards analyzed every 12 hours or twenty samples? If no, flag "R".	✓		
4.4	Are all calibration standard %RSD (<20%, r>0.995, or r^2<0.99), second source (±15%) or %D(≤15%) within the		✓	
For initial calibration: %RSD > 20%, but < 50%, J(+), only; %RSD > 50%, but < 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).				
For second source: %D>15%, J(+)/R(-).				
For continuing calibration: Positive Bias - %D >+ 15%, J(+), only. Negative Bias - %D>-15% but <-50%, J(+)/UJ(-) and %D>-50%, J(+)/R(-).				

Notes:

Continuing cal: %D = -23.0 for Octahydro-1,3,5,7-tetranitro-1,3,5,7-
Assoc. samp result ND, flagged UJ, c

5.0 Laboratory Control Sample (LCS)		Yes	No	NA
5.1	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
5.2	Are there any %R for LCS/LCSD recoveries outside the QC limits?		✓	
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
5.3	Are there any RPD for LCS/LCSD recoveries outside the QC limits? If Yes, J(+) only.		✓	

Notes:

6.0 Surrogate Recovery					Yes	No	NA
6.1	Are surrogate recoveries within acceptance criteria for all samples and method blanks?				✓		
6.2	If No in Section 6.3, are these sample(s) or method blank(s) reanalyzed?						✓
6.3	If No in Section 6.4, is any sample dilution factor greater than 10? (recoveries may be diluted out.)						✓
		<10%	low	high			
	Positives	L	L	K			
	Non-detects	R	UL	No action			

Notes:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
7.1	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
7.2	Are there any %R for matrix spike and matrix spike duplicate recoveries outside the QC limits?		✓	
7.3	Are there any RPD for matrix spike and matrix spike duplicate recoveries outside the QC limits?		✓	
	Action: No action is required based on MS/MSd failure alone. Note in the report and use professional judgement.			

Notes:

8.0 Field Duplicate		Yes	No	NA
8.1	Evaluate field duplicate results? Generally, no action is taken on the basis of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	✓		

Notes: ASB4A and DUP-1
all results ND, no qual. action required.

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	Are any target compounds detected in the field samples? If Yes, is all positive identifications were confirmed in second column? Apply J flag if RPD >40% between first and second columns.	✓		
9.2	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	✓		

Notes: 2,4-DNT - 1.3 / 1.2 89%D ✓
2,6-DNT - 0.25 / 0.55 75%D, flagged J, q

10.0 Data Completeness		Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit $95\%_{aq}$ and $90\%_{so}$)	✓		
10.1.1	Number of samples:_____			
10.1.2	Number of target compounds in each analysis: 14			
10.1.3	Number of results rejected or not reported:_____			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)			
	% Completeness = 100%			

Notes:

CONTINUING CALIBRATION CHECK

USEPA-8330

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-27
Client: URS Group, Inc.
Project: RFAAP SSP Investigation
Instrument ID: 221
Calibration: 6E11005
Lab File ID: data022-0
Calibration Date: 03/16/06 12:02
Sequence: 6051104
Injection Date: 05/05/06
Lab Sample ID: 6051104-CCV2
Injection Time: 18:00

Analyte	Type	CONC. (ug/L)		Response Factor			% Diff. / Drift	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
1,3,5-Trinitrobenzene	A	400	349	11.9038	10.395		-12.7	15
1,3-Dinitrobenzene	A	400	353	21.2161	18.7425		-11.7	15
2,4,6-Trinitrotoluene	A	400	354	8.78319	7.7775		-11.5	15
2,4-Dinitrotoluene	A	400	356	15.7757	14.0275		-11.1	15
2,6-Dinitrotoluene	A	400	358	8.31472	7.445		-10.5	15
2-Amino-4,6-dinitrotoluene	A	400	689	22.6328	19.505		-13.8	15
2-Nitrotoluene	A	400	362	8.40038	7.4925		-10.8	15
3-Nitrotoluene	A	400	373	7.31011	6.7875		-7.15	15
4-Amino-2,6-dinitrotoluene	A	400	689	22.6328	19.505		-13.8	15
4-Nitrotoluene	A	400	354	8.72131	7.7225		-11.5	15
Hexahydro-1,3,5-trinitro-1,3,5-triazine	A	400	343	8.56197	7.3425		-14.2	15
Methyl-2,4,6-trinitrophenylnitramine	A	400	349	6.56649	5.735		-12.7	15
Nitrobenzene	A	400	348	17.1076	14.8925		-12.9	15
Octahydro-1,3,5,7-tetranitro-1,3,5,7-	Q	400	308	5.87078	4.945		-23.0	15 *

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

NOTE: 2-Amino-4,6-dinitrotoluene and 4-Amino-2,6-dinitrotoluene coelute on this column.

00541

DUAL COLUMN CONFIRMATION CHECK

ASB5-A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-27
Client: URS Group, Inc.
Project: RFAAP SSP Investigation
Matrix: Soil
Laboratory ID: 0604426-05
File ID: ata027-0
Sampled: 04/20/06 13:30
Prepared: 05/03/06 13:46
Analyzed: 04/27/06 09:04
Solids: 79.00
Preparation: 8330 Extraction
Instrument: 221
QC Batch: 0604600
Sequence: 6050431
GC Column(1): Synergi Hydro
GC Column(2): Synergi Polar

Analyte	Col.	RT	EXP RT	Diff.	Area	Amount	Conc.	RPD
2,4-Dinitrotoluene	* 1	21.54	21.47	0.07	1463		1.3	8.0
	2	21.64	21.58	0.06	1560		1.2	
2,6-Dinitrotoluene	1	20.51	20.88	0.37	161		0.25	
	* 2	20.51	20.56	0.05	121		0.55	75.0

* Column used for quantitation

DATA VALIDATION WORKSHEET

Explosives

Reviewer: LAM
Date: 6/6/2006
DV Level: II III IV

Project Name: RTAAP SSP
Project Number: 116566628
Laboratory: TriMatrix
SDG No.: 36440-27
Test Name: PETN/Nitroglycerin
Method No.: 8332

Review Document:

_X__ Region III Modified for National Functional Guidelines
_X__ SW-846
_X__ Project QAPP/SAP

no anomalies

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	✓		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	✓		
1.3	Do sample preservation, collection and storage condition meet method requirement?	✓		
	If samples were received with the cooler temperature exceeding 20 °C, then flag L(+)/UL(-).			
1.4	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		✓	

Notes:

2.0 Holding Times		Yes	No	NA
2.1	Have any technical holding times, determined from date of sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-). Extraction: (aqueous) 7 days and (soil) 14 days; and Analysis: 40 days.		✓	
2.2	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, J(+)/R(-) .		✓	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	✓		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		✓	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		✓	

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are at least five standards included in the calibration curve? If no, flag "R".	✓		
4.2	Was a second source calibration verification analyzed for each calibration curve? If no, flag "R".	✓		
4.3	Were continuing calibration standards analyzed every 12 hours or twenty samples? If no, flag "R".	✓		
4.4	Are all calibration standard %RSD (<20%, r>0.995, or r^2<0.99), second source (±15%) or %D(≤15%) within the	✓		
For initial calibration: %RSD > 20%, but < 50%, J(+), only; %RSD > 50%, but < 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).				
For second source: %D>15%, J(+)/R(-).				
For continuing calibration: Positive Bias - %D >+ 15%, J(+), only. Negative Bias - %D>-15% but <-50%, J(+)/UJ(-) and %D>-50%, J(+)/R(-).				

Notes:

5.0 Laboratory Control Sample (LCS)		Yes	No	NA
5.1	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
5.2	Are there any %R for LCS/LCSD recoveries outside the QC limits?		✓	
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
5.3	Are there any RPD for LCS/LCSD recoveries outside the QC limits? If Yes, J(+) only.		✓	

Notes:

6.0 Surrogate Recovery					Yes	No	NA
6.1	Are surrogate recoveries within acceptance criteria for all samples and method blanks?				✓		
6.2	If No in Section 6.3, are these sample(s) or method blank(s) reanalyzed?						✓
6.3	If No in Section 6.4, is any sample dilution factor greater than 10? (recoveries may be diluted out.)						✓
		<10%	low	high			
	Positives	L	L	K			
	Non-detects	R	UL	No action			

Notes:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
7.1	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
7.2	Are there any %R for matrix spike and matrix spike duplicate recoveries outside the QC limits?		✓	
7.3	Are there any RPD for matrix spike and matrix spike duplicate recoveries outside the QC limits?		✓	
	Action: No action is required based on MS/MSd failure alone. Note in the report and use professional judgement.			

Notes:

8.0 Field Duplicate		Yes	No	NA
8.1	Evaluate field duplicate results? Generally, no action is taken on the basis of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	✓		

Notes:

ASB4-A + DUP-1, all results ND - no qual. action req.

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	Are any target compounds detected in the field samples? If Yes, is all positive identifications were confirmed in second column? Apply J flag if RPD >40% between first and second columns.		✓	
9.2	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	✓		

Notes:

10.0 Data Completeness		Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit $95\%_{aq}$ and $90\%_{so}$)	✓		
10.1.1	Number of samples: 10			
10.1.2	Number of target compounds in each analysis: ~~14~~ 2			
10.1.3	Number of results rejected or not reported: 0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)			
	% Completeness = 100 %			

Notes:

DATA VALIDATION WORKSHEET
INORGANIC - ICP, CVAA, AND CYANIDE
REGION III - NATIONAL FUNCTIONAL GUIDELINES

SDG No.: 36446-27
Project No.: 11651628

Project Name: RFAAP SSP
Reviewer: Lee A. Marech
Date: 6/6/2006

1.0 Chain of Custody/Sample Condition/Raw Data

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples which were analyzed?	✓			✓			✓			✓		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	✓			✓			✓			✓		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		✓			✓			✓			✓	
1.4	Does sample preservation, collection and storage meet method requirement? (For metal: water samples: with Nitric Acid to pH < 2, and soil/sediment samples: 4 ^{o}C ± 2 ^{o}C)		✓			✓			✓				✓
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes. % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	✓			✓			✓			✓		

Note: Cooler TM 1373 Samples from 4/20/06 recorded @ 10.1°C, results for samples ASB4-A, ASB4-B, ASB4-C, DUP-1, ASB5-A, and ASB5-B flagged J/UJ, k.

2.0 Holding Time

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, CN: 14 days, other metals: 6 months) Action:L(+)/UL(-). If the holding time is grossly exceeded (twice the holding time criteria), L(+)/R(-).		✓			✓			✓			✓	

Note:

3.0 Instrument Calibration

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? (ICP& ICPMS: blank + one standard & a RL standard OR 3 standards and a blank with one standard at the RL; CVAA: blank + five standards with one standard at the RL). If not, qualify with "R".	✓			✓			✓			✓		
3.2	Are the correlation coefficients > 0.99? Action: J(+)/UJ(-).			✓	✓			✓			✓		
3.3	Once per calibration, did a high and low distilled standard recovery within 85-115%? If no, follow 3.6.										✓		
3.4	Was an initial calibration check standard (ICV) analyzed immediately after instrument system had been calibrated? Action: If no, all associated data are rejected "R".	✓			✓			✓			✓		
3.5	Was continuing calibration standard (CCS) analyzed at a minimum frequency of 10% (every 10 samples) during an analytical run and at the end of the analytical run? If not, document and flag based on professional judgement.	✓			✓			✓			✓		
3.6	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? FOR ICP 90%-110%, FOR Hg 80-120%, FOR CN 85-115%.	✓			✓			✓			✓		
	ICV and CCV: Action: L(+)/R(-) L(+)/UL(-) K(+) Mercury < 65% 65% - 79% > 120% Cyanide < 65% 65% - 84% > 115% Other Metals < 75% 75% - 89% > 110%												
3.7	For ICP & ICPMS, did the CRDL standard recover between 80-120%?	✓									✓		
	<50% 50%-79% >120% 2xCRDL>[sample]>IDL L(+)/R(-) L(+)/UL(-) K												

Note: _____

4.0 Blanks

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were method blank (MB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	✓			✓			✓			✓		
4.2	Were calibration blanks (ICB and CCBs) analyzed immediately after each and every ICV and CCVs? Action: If no ICB was run, all associated data are rejected. If the frequency of the CCBs does not follow requirement, all associated data are qualified "J".	✓			✓			✓			✓		
4.3	Are there reported MB or ICB/CCBs values > MDL?	✓			✓				✓			✓	
	Sample Results > MDL												
	< 5X Blank Contamination B		✓		✓				✓			✓	
4.4	Are there negative blank results with the absolute value > MDL?												
	Sample Results Non-detects > MDL												
	< 5X absolute Blank Contamination UL L	✓			✓				✓			✓	
4.5	Are there reported field blank > ± MDL?												
	Sample Results > MDL												
	< 5X Blank Contamination B												

Note: 6010B: MB: Ba, Mg, +K → pos. detect. < 5X in EQB, flagged B, P
ICB, CCB: various low level, all sample results > 5X blank, no qual. required EQB Fe > MDL, no results < 5X, no action
6020: MB: Cu, Ni, V - positive detect. < 5X → B, P
ICB, CCB: Antimony 0.927 × 5 = 4.635, results < 5X, qual. B, P
→ 6010B: EQB: Mn > MDL, no results < 5X, no qual. action

5.0 ICP Interference Check Sample (ICS)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1	Was ICS analyzed at beginning of each ICP run?	✓			✓								
5.2	Are the ICS AB recoveries within 80% - 120%?	✓			✓								
5.3	Are the results for unspiked analytes (in ICS A) < ± RL?	✓			✓								
5.4	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?			✓			✓						
	If not...												
	Action: Not Spiked Analytes < -MDL L(+)/UL(-); > MDL K(+); Spiked analytes (ICS AB analytes) < 50% L(+)/R(-); 50% - 79% L(+)/UL(-); >120% K(+)												

Note:

6.0 Laboratory Control Sample (LCS)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	✓			✓			✓			✓		
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)		✓			✓			✓			✓	
	Action: Solid: < LCL: L(+)/UL(-); > UCL: K(+). Aqueous: < 50%: L(+)/R(-); 50% - 79%: L(+)/UL(-); > 120%: K(+)												

Note: _____

7.0 Laboratory Duplicates (MSD)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), using professional judgement, analytes not associated with duplicate results.	✓			✓			✓			✓		
	For aqueous 6010B and Hg - RPD< 25%, aqueous CN - RPD < 20%, aqueous 6020 - RPD < 20%, and for soil - use laboratory generated limits for MS/MSD.												
7.2	Are all analyte duplicate results within control limits? If no, qualify all associated field samples J(+)/UJ(-) for the analyte with results that fall outside criteria.	✓			✓			✓			✓		

Note: _____

8.0 Spike Sample Analysis -Pre-Digestion/Post-Digestion

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
8.1	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, batch, matrix and level)? If not, J(+) with professional judgement.	✓			✓			✓			✓		
8.2	For all analytes with sample concentration > 4 x spike concentration, are spike recoveries within the control limit of 75-125% for aqueous matrices or lab limits for soil matrices?												
	%R > 125% / 30%< %R < 74% / < 30%												
	Positive: K / L / L		✓		✓			✓			✓		
	Non-detect: None / UL / R												
8.3	Where pre-digestion matrix spike analytes were outside the acceptable recovery limits(except Ag), was a post-digestion spike performed? Note any failures in DV report, but no data qualifying action is required.	✓			✓			✓			✓		

Note: 6010B: Ca -31 |-40, Mg 22|16, Al 2400|2080, Mn -628|-92, Zn -268|-20, Fe -2000|-2400 - Samp. conc >4X spike no action

6020: Vanadium 142 (56-141) - pos. sample results, flagged K,m

9.0 Instrument Detection Limits (IDL)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1	Are all IDLs/RLs equal to or less than the reporting limits specified?	✓			✓			✓			✓		

Note:

10.0 ICP/AA Serial Dilutions (Not for Mercury Analysis)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	✓			✓								
10.2	Was a five-fold dilution performed?	✓			✓								
10.3	Did the serial dilution results agree within 10% for ICP analyte concentration > 5 X the RL for 6010 or > 20 X the RL for 6020 in the original sample? If no, J(+).		✓		✓								

Note: 6020: Copper 16.1% flagged J,s
Nickel 12.9%

11.0 Field Duplicate Samples		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?	✓			✓			✓			✓		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.												
11.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report	✓			✓			✓			✓		

Note: ASB4-A + DUP-1
See attached

12.0 Result Verification/ Internal Standards/ Tune		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?	✓			✓			✓			✓		
12.2	Were all dilution reflected in the positive results and detection limits?	✓			✓			✓			✓		
12.3	Were the Internal Standard recoveries within 30-120%	✓			✓								
12.4	Were the tunes run at a minimum of four times with RSD < 5% for analytes in solution?	✓											
12.5	Were the tune mass calibrations < 0.1 amu from the true value?	✓											
12.6	Was the resolution check peak width < 0.9 amu at 10% peak height?	✓											

Note:

13.0 Completeness Calculation		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
13.1	Is % completeness within the control limits? (Control limit 90%)	✓			✓			✓			✓		
13.1.1	Number of samples:_____												
13.1.2	Number of target compounds in each analysis:_____												
13.1.3	Number of results rejected and not reported:_____												
	% Completeness = (13.1.1 x 13.1.2 - 13.1.3) x 100/(13.1.1 x 13.1.2) % Completeness = _____												

Note:

METHOD BLANK DATA SHEET
USEPA-6020

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-27
Client: URS Group, Inc.
Project: RFAAP SSP Investigation
Matrix: Soil
Laboratory ID: 0604716-BLK1
File ID: 6050523-017
Prepared: 04/28/06 07:02
Preparation: 3050B Digestion
Initial/Final: 0.5 g / 50 mL
Analyzed: 05/05/06 10:59
Instrument: 114
QC Batch: 0604716
Sequence: 6050523
Calibration: 6E08001

CAS No.	Analyte	MDL	MRL	Conc. (mg/kg dry wt.)	Q
7440-38-2	Arsenic, Total	0.023	0.40	0.40	U
7440-43-9	Cadmium, Total	0.0073	1.0	1.0	U
7440-50-8	Copper, Total	0.022	1.0	0.093	J
7439-92-1	Lead, Total	0.041	1.0	1.0	U
7440-02-0	Nickel, Total	0.027	0.50	0.094	J
7782-49-2	Selenium, Total	0.063	1.0	1.0	U
7440-22-4	Silver, Total	0.017	3.0	3.0	U
7440-28-0	Thallium, Total	0.0085	0.50	0.50	U

Cu: 0.093 x 5 = 0.465
Ni: 0.094 x 5 = 0.47

02815

METHOD BLANK DATA SHEET
USEPA-6020

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-27
Client: URS Group, Inc.
Project: RFAAP SSP Investigation
Matrix: Soil
Laboratory ID: 0604716-BLK2
File ID: 6050535-025
Prepared: 04/28/06 07:02
Preparation: 3050B Digestion
Initial/Final: 0.5 g / 50 mL
Analyzed: 05/08/06 14:53
Instrument: 114
QC Batch: 0604716
Sequence: 6050535
Calibration: 6E09014

CAS No.	Analyte	MDL	MRL	Conc. (mg/kg dry wt.)	Q
7440-62-2	Vanadium, Total	0.024	1.0	0.048	J

V : 0.048 x 5 = 0.24

02816

METHOD BLANK DATA SHEET
USEPA-6020

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-27
Client: URS Group, Inc.
Project: RFAAP SSP Investigation
Matrix: Water
Laboratory ID: 0604826-BLK1
File ID: 6050508-017
Prepared: 05/02/06 06:20
Preparation: 3010A Digestion
Initial/Final: 25 mL / 25 mL
Analyzed: 05/05/06 09:26
Instrument: 114
QC Batch: 0604826
Sequence: 6050508
Calibration: 6E05008

CAS No.	Analyte	MDL	MRL	Conc. (ug/L)	Q
7440-36-0	Antimony, Total	0.73	3.0	1.3	J
7440-38-2	Arsenic, Total	0.47	2.0	2.0	U
7440-43-9	Cadmium, Total	0.062	0.50	0.50	U
7440-48-4	Cobalt, Total	0.22	10	10	U
7440-50-8	Copper, Total	0.32	3.0	3.0	U
7439-92-1	Lead, Total	0.22	1.0	1.0	U
7439-96-5	Manganese, Total	0.74	10	10	U
7440-02-0	Nickel, Total	0.80	3.0	3.0	U
7782-49-2	Selenium, Total	0.73	3.0	3.0	U
7440-22-4	Silver, Total	0.073	0.50	0.50	U
7440-28-0	Thallium, Total	0.14	1.0	1.0	U
7440-62-2	Vanadium, Total	0.26	10	10	U

Sb: 1.3 x 5 = 6.5

: 02818

BLANKS
USEPA-6020

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Sequence: 6050508

SDG: 36440-27
Project: RFAAP SSP Investigation
Instrument ID: 114
Calibration: 6E05008

Lab Sample ID	Analyte	Found	MRL	MDL	Units	C	Analyzed
6050508-ICB1	Antimony, Total	0.927	3.0	0.73	ug/L	J	05/05/06 09:02
	Arsenic, Total	0.00443	2.0	0.47	ug/L	U	05/05/06 09:02
	Cadmium, Total	0.00117	0.50	0.062	ug/L	U	05/05/06 09:02
	Cobalt, Total	0.00126	10	0.22	ug/L	U	05/05/06 09:02
	Copper, Total	0.00623	3.0	0.32	ug/L	U	05/05/06 09:02
	Lead, Total	0.000871	1.0	0.22	ug/L	U	05/05/06 09:02
	Manganese, Total	0.00288	10	0.74	ug/L	U	05/05/06 09:02
	Nickel, Total	-0.00404	3.0	0.80	ug/L	U	05/05/06 09:02
	Selenium, Total	-0.000428	3.0	0.73	ug/L	U	05/05/06 09:02
	Silver, Total	0.00427	0.50	0.073	ug/L	U	05/05/06 09:02
	Thallium, Total	0.00210	1.0	0.14	ug/L	U	05/05/06 09:02
	Vanadium, Total	-0.00171	10	0.26	ug/L	U	05/05/06 09:02
6050508-CCB1	Antimony, Total	0.67	3.0	0.73	ug/L	U	05/05/06 09:23
	Arsenic, Total	-0.015	2.0	0.47	ug/L	U	05/05/06 09:23
	Cadmium, Total	0.00036	0.50	0.062	ug/L	U	05/05/06 09:23
	Cobalt, Total	0.00045	10	0.22	ug/L	U	05/05/06 09:23
	Copper, Total	0.0030	3.0	0.32	ug/L	U	05/05/06 09:23
	Lead, Total	0.00086	1.0	0.22	ug/L	U	05/05/06 09:23
	Manganese, Total	0.0011	10	0.74	ug/L	U	05/05/06 09:23
	Nickel, Total	-0.010	3.0	0.80	ug/L	U	05/05/06 09:23
	Selenium, Total	0.0034	3.0	0.73	ug/L	U	05/05/06 09:23
	Silver, Total	0.0042	0.50	0.073	ug/L	U	05/05/06 09:23
	Thallium, Total	0.0011	1.0	0.14	ug/L	U	05/05/06 09:23
	Vanadium, Total	-0.0081	10	0.26	ug/L	U	05/05/06 09:23
0604826-BLK1	Antimony, Total	1.3	3.0	0.73	ug/L	J	05/05/06 09:26
	Arsenic, Total	2.0	2.0	0.47	ug/L	U	05/05/06 09:26
	Cadmium, Total	0.50	0.50	0.062	ug/L	U	05/05/06 09:26
	Cobalt, Total	10	10	0.22	ug/L	U	05/05/06 09:26
	Copper, Total	3.0	3.0	0.32	ug/L	U	05/05/06 09:26
	Lead, Total	1.0	1.0	0.22	ug/L	U	05/05/06 09:26
	Manganese, Total	10	10	0.74	ug/L	U	05/05/06 09:26
	Nickel, Total	3.0	3.0	0.80	ug/L	U	05/05/06 09:26
	Selenium, Total	3.0	3.0	0.73	ug/L	U	05/05/06 09:26

BLANKS
USEPA-6020

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Sequence: 6050523

SDG: 36440-27
Project: RFAAP SSP Investigation
Instrument ID: 114
Calibration: 6E08001

Lab Sample ID	Analyte	Found	MRL	MDL	Units	C	Analyzed
6050523-ICB1	Arsenic, Total	0.00000400	0.0040	0.00023	mg/L	U	05/05/06 10:36
	Cadmium, Total	0.00	0.010	0.000073	mg/L	U	05/05/06 10:36
	Copper, Total	-0.00000100	0.010	0.00022	mg/L	U	05/05/06 10:36
	Lead, Total	0.00000100	0.010	0.00041	mg/L	U	05/05/06 10:36
	Nickel, Total	-0.00000700	0.0050	0.00027	mg/L	U	05/05/06 10:36
	Selenium, Total	0.0000290	0.010	0.00063	mg/L	U	05/05/06 10:36
	Silver, Total	0.00000600	0.030	0.00017	mg/L	U	05/05/06 10:36
	Thallium, Total	0.00000100	0.0050	0.000085	mg/L	U	05/05/06 10:36
6050523-CCB1	Arsenic, Total	0.000011	0.0040	0.00023	mg/L	U	05/05/06 10:55
	Cadmium, Total	0.0	0.010	0.000073	mg/L	U	05/05/06 10:55
	Copper, Total	0.0000040	0.010	0.00022	mg/L	U	05/05/06 10:55
	Lead, Total	0.0000010	0.010	0.00041	mg/L	U	05/05/06 10:55
	Nickel, Total	0.0000020	0.0050	0.00027	mg/L	U	05/05/06 10:55
	Selenium, Total	-0.0000040	0.010	0.00063	mg/L	U	05/05/06 10:55
	Silver, Total	0.0000050	0.030	0.00017	mg/L	U	05/05/06 10:55
	Thallium, Total	0.0000010	0.0050	0.000085	mg/L	U	05/05/06 10:55
0604716-BLK1	Arsenic, Total	0.40	0.40	0.023	mg/kg dry wt.	J	05/05/06 10:59
	Cadmium, Total	1.0	1.0	0.0073	mg/kg dry wt.	U	05/05/06 10:59
	Copper, Total	0.093	1.0	0.022	mg/kg dry wt.	J	05/05/06 10:59
	Lead, Total	1.0	1.0	0.041	mg/kg dry wt.	U	05/05/06 10:59
	Nickel, Total	0.094	0.50	0.027	mg/kg dry wt.	J	05/05/06 10:59
	Selenium, Total	1.0	1.0	0.063	mg/kg dry wt.	U	05/05/06 10:59
	Silver, Total	3.0	3.0	0.017	mg/kg dry wt.	U	05/05/06 10:59
	Thallium, Total	0.50	0.50	0.0085	mg/kg dry wt.	U	05/05/06 10:59
6050523-CCB2	Arsenic, Total	-0.000039	0.0040	0.00023	mg/L	U	05/05/06 11:35
	Cadmium, Total	0.0000020	0.010	0.000073	mg/L	U	05/05/06 11:35
	Copper, Total	0.000026	0.010	0.00022	mg/L	U	05/05/06 11:35
	Lead, Total	0.0000010	0.010	0.00041	mg/L	U	05/05/06 11:35
	Nickel, Total	0.0000010	0.0050	0.00027	mg/L	U	05/05/06 11:35
	Selenium, Total	-0.000018	0.010	0.00063	mg/L	U	05/05/06 11:35
	Silver, Total	0.0000070	0.030	0.00017	mg/L	U	05/05/06 11:35
	Thallium, Total	0.0	0.0050	0.000085	mg/L	U	05/05/06 11:35
6050523-CCB3	Arsenic, Total	-0.000031	0.0040	0.00023	mg/L	U	05/05/06 12:14

: 62605

BLANKS
USEPA-6020

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Sequence: 6050535

SDG: 36440-27
Project: RFAAP SSP Investigation
Instrument ID: 114
Calibration: 6E09014

Lab Sample ID	Analyte	Found	MRL	MDL	Units	C	Analyzed
6050535-ICB1	Copper, Total	0.0000100	0.010	0.00022	mg/L	U	05/08/06 14:06
	Lead, Total	0.00000400	0.010	0.00041	mg/L	U	05/08/06 14:06
	Vanadium, Total	0.0000170	0.010	0.00024	mg/L	U	05/08/06 14:06
6050535-CCB1	Copper, Total	0.0000080	0.010	0.00022	mg/L	U	05/08/06 14:19
	Lead, Total	0.0000030	0.010	0.00041	mg/L	U	05/08/06 14:19
	Vanadium, Total	0.000026	0.010	0.00024	mg/L	U	05/08/06 14:19
6050535-CCB2	Copper, Total	-0.0000050	0.010	0.00022	mg/L	U	05/08/06 14:35
	Lead, Total	0.000010	0.010	0.00041	mg/L	U	05/08/06 14:35
	Vanadium, Total	-0.000011	0.010	0.00024	mg/L	U	05/08/06 14:35
6050535-CCB3	Copper, Total	0.0	0.010	0.00022	mg/L	U	05/08/06 14:50
	Vanadium, Total	0.000063	0.010	0.00024	mg/L	U	05/08/06 14:50
0604716-BLK2	Vanadium, Total	0.048	1.0	0.024	mg/kg dry wt.	J	05/08/06 14:53
6050535-CCB4	Vanadium, Total	0.000057	0.010	0.00024	mg/L	U	05/08/06 15:14
6050535-CCB5	Vanadium, Total	0.000071	0.010	0.00024	mg/L	U	05/08/06 15:37

* Values outside of QC limits

: 02867

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-6020

~~FSB3A~~
FSB4A
JM

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-27

Client: URS Group, Inc.
Project: RFAAP SSP Investigation

Matrix: Soil
Preparation: 3050B Digestion

Initial/Final: 0.4996 g / 50 mL

Laboratory ID: 0604716-MSD2
QC Batch: 0604716

Analyte	Spike Added	MSD Conc.	MSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
Vanadium, Total	20.0	81.5	142 *	4	20	56 - 141	mg/kg dry wt.

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

02822

SERIAL DILUTION

USEPA-6020

~~FSB3A~~
FSB4A
ym

Laboratory: TriMatrix Laboratories, Inc.

SDG: 36440-27

Client: URS Group, Inc.

Project: RFAAP SSP Investigation

Matrix: Soil

% Solids: 78.00

Laboratory ID: 6050523-SRD1

QC Batch: 6050523

Lab Source ID: 0604361-01

Sequence: 6050523

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	Units	QC Limits % Difference
Arsenic, Total	0.0216		0.0237		9.7 #		mg/L	10
Cadmium, Total	0.00200	J	0.00218	J	9.0 #		mg/L	10
Copper, Total	0.161		0.187		16.1	*	mg/L	10
Lead, Total	0.260		0.272		4.6		mg/L	10
Nickel, Total	0.155		0.175		12.9	*	mg/L	10
Selenium, Total	0.00262	J	0.00131	U	50.0 #		mg/L	10
Silver, Total	0.000885	J	0.000890	J	0.6 #		mg/L	10
Thallium, Total	0.00242	J	0.00240	J	0.8 #		mg/L	10

* Values outside of QC limits

Initial Sample Result (I) was less than 50xMDL (for 6010) or 100xMDL (for 6020), therefore serial dilution is not required.

02834

METHOD BLANK DATA SHEET
USEPA-6010B

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-27
Client: URS Group, Inc.
Project: RFAAP SSP Investigation
Matrix: Soil
Laboratory ID: 0604714-BLK1
File ID: 6050801-029
Prepared: 04/27/06 07:01
Preparation: 3050B Digestion
Initial/Final: 0.5 g / 50 mL
Analyzed: 05/08/06 10:33
Instrument: 101
QC Batch: 0604714
Sequence: 6050801
Calibration: 6E09018

CAS No.	Analyte	MDL	MRL	Conc. (mg/kg dry wt.)	Q
7429-90-5	Aluminum, Total	1.6	50	50	U
7440-39-3	Barium, Total	0.10	5.0	0.31	J
7440-41-7	Beryllium, Total	0.016	1.0	1.0	U
7440-70-2	Calcium, Total	10	250	250	U
7440-47-3	Chromium, Total	0.57	5.0	5.0	U
7440-48-4	Cobalt, Total	0.35	1.0	1.0	U
7439-89-6	Iron, Total	0.46	10	10	U
7439-95-4	Magnesium, Total	3.4	250	3.5	J
7439-96-5	Manganese, Total	0.14	10	10	U
7440-09-7	Potassium, Total	7.5	100	12	J
7440-23-5	Sodium, Total	19	100	100	U
7440-66-6	Zinc, Total	0.85	4.0	4.0	U

Ba 0.31 x 5 = 1.55
Mg 3.5 x 5 = 17.5
K 12 x 5 = 60

: 02284

BLANKS
USEPA-6010B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Sequence: 6050801

SDG: 36440-27
Project: RFAAP SSP Investigation
Instrument ID: 101
Calibration: 6E09018

Lab Sample ID	Analyte	Found	MRL	MDL	Units	C	Analyzed
6050801-ICB1	Aluminum, Total	-0.0105	0.50	0.016	mg/L	U	05/08/06 09:59
	Barium, Total	0.00362	0.050	0.0010	mg/L	J	05/08/06 09:59
	Beryllium, Total	0.00000286	0.010	0.00016	mg/L	U	05/08/06 09:59
	Calcium, Total	-0.0584	2.5	0.10	mg/L	U	05/08/06 09:59
	Chromium, Total	0.00121	0.050	0.0057	mg/L	U	05/08/06 09:59
	Cobalt, Total	0.000340	0.010	0.0035	mg/L	U	05/08/06 09:59
	Iron, Total	-0.00990	0.10	0.0046	mg/L	J	05/08/06 09:59
	Magnesium, Total	0.0124	2.5	0.034	mg/L	U	05/08/06 09:59
	Manganese, Total	-0.00572	0.10	0.0014	mg/L	J	05/08/06 09:59
	Potassium, Total	0.150	1.0	0.075	mg/L	J	05/08/06 09:59
	Sodium, Total	0.324	1.0	0.19	mg/L	J	05/08/06 09:59
	Zinc, Total	0.000674	0.040	0.0085	mg/L	U	05/08/06 09:59
6050801-CCB1	Aluminum, Total	0.0053	0.50	0.016	mg/L	U	05/08/06 10:28
	Barium, Total	0.0036	0.050	0.0010	mg/L	J	05/08/06 10:28
	Beryllium, Total	0.00013	0.010	0.00016	mg/L	U	05/08/06 10:28
	Calcium, Total	-0.050	2.5	0.10	mg/L	U	05/08/06 10:28
	Chromium, Total	0.0012	0.050	0.0057	mg/L	U	05/08/06 10:28
	Cobalt, Total	0.00088	0.010	0.0035	mg/L	U	05/08/06 10:28
	Iron, Total	-0.011	0.10	0.0046	mg/L	J	05/08/06 10:28
	Magnesium, Total	0.012	2.5	0.034	mg/L	U	05/08/06 10:28
	Manganese, Total	-0.0052	0.10	0.0014	mg/L	J	05/08/06 10:28
	Potassium, Total	0.14	1.0	0.075	mg/L	J	05/08/06 10:28
	Sodium, Total	0.064	1.0	0.19	mg/L	U	05/08/06 10:28
	Zinc, Total	-0.0019	0.040	0.0085	mg/L	U	05/08/06 10:28
0604714-BLK1	Aluminum, Total	50	50	1.6	mg/kg dry wt.	U	05/08/06 10:33
	Barium, Total	0.31	5.0	0.10	mg/kg dry wt.	J	05/08/06 10:33
	Beryllium, Total	1.0	1.0	0.016	mg/kg dry wt.	U	05/08/06 10:33
	Calcium, Total	250	250	10	mg/kg dry wt.	U	05/08/06 10:33
	Chromium, Total	5.0	5.0	0.57	mg/kg dry wt.	U	05/08/06 10:33
	Cobalt, Total	1.0	1.0	0.35	mg/kg dry wt.	U	05/08/06 10:33
	Iron, Total	10	10	0.46	mg/kg dry wt.	U	05/08/06 10:33
	Magnesium, Total	3.5	250	3.4	mg/kg dry wt.	J	05/08/06 10:33
	Manganese, Total	10	10	0.14	mg/kg dry wt.	J	05/08/06 10:33

: 02263

BLANKS
USEPA-6010B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Sequence: 6050801

SDG: 36440-27
Project: RFAAP SSP Investigation
Instrument ID: 101
Calibration: 6E09018

Lab Sample ID	Analyte	Found	MRL	MDL	Units	C	Analyzed
0604714-BLK1	Potassium, Total	12	100	7.5	mg/kg dry wt.	J	05/08/06 10:33
	Sodium, Total	100	100	19	mg/kg dry wt.	U	05/08/06 10:33
	Zinc, Total	4.0	4.0	0.85	mg/kg dry wt.	U	05/08/06 10:33
6050801-CCB2	Aluminum, Total	0.012	0.50	0.016	mg/L	U	05/08/06 11:25
	Barium, Total	0.0036	0.050	0.0010	mg/L	J	05/08/06 11:25
	Beryllium, Total	0.000058	0.010	0.00016	mg/L	U	05/08/06 11:25
	Calcium, Total	-0.043	2.5	0.10	mg/L	U	05/08/06 11:25
	Chromium, Total	0.0018	0.050	0.0057	mg/L	U	05/08/06 11:25
	Cobalt, Total	-0.00042	0.010	0.0035	mg/L	U	05/08/06 11:25
	Iron, Total	-0.0038	0.10	0.0046	mg/L	U	05/08/06 11:25
	Magnesium, Total	0.0055	2.5	0.034	mg/L	U	05/08/06 11:25
	Manganese, Total	-0.0054	0.10	0.0014	mg/L	J	05/08/06 11:25
	Potassium, Total	0.13	1.0	0.075	mg/L	J	05/08/06 11:25
	Sodium, Total	0.066	1.0	0.19	mg/L	U	05/08/06 11:25
	Zinc, Total	0.000080	0.040	0.0085	mg/L	U	05/08/06 11:25
6050801-CCB3	Aluminum, Total	-0.0022	0.50	0.016	mg/L	U	05/08/06 12:27
	Barium, Total	0.0031	0.050	0.0010	mg/L	J	05/08/06 12:27
	Beryllium, Total	0.000078	0.010	0.00016	mg/L	U	05/08/06 12:27
	Calcium, Total	-0.051	2.5	0.10	mg/L	U	05/08/06 12:27
	Chromium, Total	-0.00016	0.050	0.0057	mg/L	U	05/08/06 12:27
	Cobalt, Total	0.00089	0.010	0.0035	mg/L	U	05/08/06 12:27
	Iron, Total	-0.011	0.10	0.0046	mg/L	J	05/08/06 12:27
	Magnesium, Total	0.019	2.5	0.034	mg/L	U	05/08/06 12:27
	Manganese, Total	-0.0055	0.10	0.0014	mg/L	J	05/08/06 12:27
	Potassium, Total	0.13	1.0	0.075	mg/L	J	05/08/06 12:27
	Sodium, Total	-0.19	1.0	0.19	mg/L	J	05/08/06 12:27
	Zinc, Total	-0.00065	0.040	0.0085	mg/L	U	05/08/06 12:27
6050801-CCB4	Aluminum, Total	0.016	0.50	0.016	mg/L	J	05/08/06 13:31
	Barium, Total	0.0034	0.050	0.0010	mg/L	J	05/08/06 13:31
	Beryllium, Total	0.000080	0.010	0.00016	mg/L	U	05/08/06 13:31
	Calcium, Total	-0.038	2.5	0.10	mg/L	U	05/08/06 13:31
	Chromium, Total	-0.00069	0.050	0.0057	mg/L	U	05/08/06 13:31
	Cobalt, Total	-0.00024	0.010	0.0035	mg/L	U	05/08/06 13:31

02270

BLANKS
USEPA-6010B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Sequence: 6050801

SDG: 36440-27
Project: RFAAP SSP Investigation
Instrument ID: 101
Calibration: 6E09018

Lab Sample ID	Analyte	Found	MRL	MDL	Units	C	Analyzed
6050801-CCB4	Iron, Total	-0.0088	0.10	0.0046	mg/L	J	05/08/06 13:31
	Magnesium, Total	0.034	2.5	0.034	mg/L	J	05/08/06 13:31
	Manganese, Total	-0.0050	0.10	0.0014	mg/L	J	05/08/06 13:31
	Potassium, Total	0.14	1.0	0.075	mg/L	J	05/08/06 13:31
	Sodium, Total	-0.18	1.0	0.19	mg/L	U	05/08/06 13:31
	Zinc, Total	0.00063	0.040	0.0085	mg/L	U	05/08/06 13:31
6050801-CCB5	Aluminum, Total	0.0097	0.50	0.016	mg/L	U	05/08/06 14:30
	Barium, Total	0.0034	0.050	0.0010	mg/L	J	05/08/06 14:30
	Beryllium, Total	-0.000052	0.010	0.00016	mg/L	U	05/08/06 14:30
	Calcium, Total	-0.038	2.5	0.10	mg/L	U	05/08/06 14:30
	Chromium, Total	-0.0033	0.050	0.0057	mg/L	U	05/08/06 14:30
	Cobalt, Total	-0.00054	0.010	0.0035	mg/L	U	05/08/06 14:30
	Iron, Total	-0.012	0.10	0.0046	mg/L	J	05/08/06 14:30
	Magnesium, Total	0.026	2.5	0.034	mg/L	U	05/08/06 14:30
	Manganese, Total	-0.0054	0.10	0.0014	mg/L	J	05/08/06 14:30
	Potassium, Total	0.13	1.0	0.075	mg/L	J	05/08/06 14:30
	Sodium, Total	-0.17	1.0	0.19	mg/L	U	05/08/06 14:30
	Zinc, Total	-0.0018	0.040	0.0085	mg/L	U	05/08/06 14:30
6050801-CCB6	Aluminum, Total	0.012	0.50	0.016	mg/L	U	05/08/06 14:51
	Barium, Total	0.0035	0.050	0.0010	mg/L	J	05/08/06 14:51
	Beryllium, Total	0.000020	0.010	0.00016	mg/L	U	05/08/06 14:51
	Calcium, Total	-0.041	2.5	0.10	mg/L	U	05/08/06 14:51
	Chromium, Total	-0.0025	0.050	0.0057	mg/L	U	05/08/06 14:51
	Cobalt, Total	0.00078	0.010	0.0035	mg/L	U	05/08/06 14:51
	Iron, Total	-0.0077	0.10	0.0046	mg/L	J	05/08/06 14:51
	Magnesium, Total	0.026	2.5	0.034	mg/L	U	05/08/06 14:51
	Manganese, Total	-0.0050	0.10	0.0014	mg/L	J	05/08/06 14:51
	Potassium, Total	0.12	1.0	0.075	mg/L	J	05/08/06 14:51
	Sodium, Total	-0.15	1.0	0.19	mg/L	U	05/08/06 14:51
	Zinc, Total	-0.00033	0.040	0.0085	mg/L	U	05/08/06 14:51
6050801-CCB7	Aluminum, Total	0.018	0.50	0.016	mg/L	J	05/08/06 15:55
	Barium, Total	0.0035	0.050	0.0010	mg/L	J	05/08/06 15:55
	Beryllium, Total	-0.000078	0.010	0.00016	mg/L	U	05/08/06 15:55

02271

BLANKS
USEPA-6010B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Sequence: 6050801

SDG: 36440-27
Project: RFAAP SSP Investigation
Instrument ID: 101
Calibration: 6E09018

Lab Sample ID	Analyte	Found	MRL	MDL	Units	C	Analyzed
6050801-CCB7	Calcium, Total	-0.044	2.5	0.10	mg/L	U	05/08/06 15:55
	Chromium, Total	-0.0031	0.050	0.0057	mg/L	U	05/08/06 15:55
	Cobalt, Total	0.0013	0.010	0.0035	mg/L	U	05/08/06 15:55
	Iron, Total	-0.0099	0.10	0.0046	mg/L	J	05/08/06 15:55
	Magnesium, Total	0.033	2.5	0.034	mg/L	U	05/08/06 15:55
	Manganese, Total	-0.0051	0.10	0.0014	mg/L	J	05/08/06 15:55
	Potassium, Total	0.14	1.0	0.075	mg/L	J	05/08/06 15:55
	Sodium, Total	-0.10	1.0	0.19	mg/L	U	05/08/06 15:55
	Zinc, Total	0.00091	0.040	0.0085	mg/L	U	05/08/06 15:55
6050801-CCB8	Aluminum, Total	0.024	0.50	0.016	mg/L	J	05/08/06 16:41
	Barium, Total	0.0038	0.050	0.0010	mg/L	J	05/08/06 16:41
	Beryllium, Total	0.000049	0.010	0.00016	mg/L	U	05/08/06 16:41
	Calcium, Total	-0.042	2.5	0.10	mg/L	U	05/08/06 16:41
	Chromium, Total	-0.00077	0.050	0.0057	mg/L	U	05/08/06 16:41
	Cobalt, Total	-0.00060	0.010	0.0035	mg/L	U	05/08/06 16:41
	Iron, Total	-0.0097	0.10	0.0046	mg/L	J	05/08/06 16:41
	Magnesium, Total	0.032	2.5	0.034	mg/L	U	05/08/06 16:41
	Manganese, Total	-0.0050	0.10	0.0014	mg/L	J	05/08/06 16:41
	Potassium, Total	0.17	1.0	0.075	mg/L	J	05/08/06 16:41
	Sodium, Total	-0.013	1.0	0.19	mg/L	U	05/08/06 16:41
	Zinc, Total	-0.00082	0.040	0.0085	mg/L	U	05/08/06 16:41
6050801-CCB9	Aluminum, Total	0.023	0.50	0.016	mg/L	J	05/08/06 17:05
	Barium, Total	0.0038	0.050	0.0010	mg/L	J	05/08/06 17:05
	Beryllium, Total	-0.00011	0.010	0.00016	mg/L	U	05/08/06 17:05
	Calcium, Total	-0.039	2.5	0.10	mg/L	U	05/08/06 17:05
	Chromium, Total	-0.0023	0.050	0.0057	mg/L	U	05/08/06 17:05
	Cobalt, Total	-0.00046	0.010	0.0035	mg/L	U	05/08/06 17:05
	Iron, Total	-0.0075	0.10	0.0046	mg/L	J	05/08/06 17:05
	Magnesium, Total	0.016	2.5	0.034	mg/L	U	05/08/06 17:05
	Manganese, Total	-0.0052	0.10	0.0014	mg/L	J	05/08/06 17:05
	Potassium, Total	0.16	1.0	0.075	mg/L	J	05/08/06 17:05
	Sodium, Total	0.020	1.0	0.19	mg/L	U	05/08/06 17:05
	Zinc, Total	-0.0015	0.040	0.0085	mg/L	U	05/08/06 17:05

* Values outside of QC limits

: 62272

BLANKS
USEPA-6010B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Sequence: 6050823

SDG: 36440-27
Project: RFAAP SSP Investigation
Instrument ID: 116
Calibration: 6E09004

Lab Sample ID	Analyte	Found	MRL	MDL	Units	C	Analyzed
6050823-ICB1	Sodium, Total	-0.0382	0.50	0.059	mg/L	U	05/08/06 14:02
	Aluminum, Total	14.2	100	16	ug/L	U	05/08/06 14:02
	Barium, Total	0.443	10	0.92	ug/L	U	05/08/06 14:02
	Calcium, Total	0.0165	0.50	0.052	mg/L	U	05/08/06 14:02
	Potassium, Total	0.00611	0.20	0.036	mg/L	U	05/08/06 14:02
	Iron, Total	1.02	100	3.2	ug/L	U	05/08/06 14:03
	Magnesium, Total	0.00499	0.50	0.032	mg/L	U	05/08/06 14:03
	Beryllium, Total	0.201	4.0	0.50	ug/L	U	05/08/06 14:04
	Chromium, Total	0.536	50	5.5	ug/L	U	05/08/06 14:04
	Zinc, Total	1.07	30	7.7	ug/L	U	05/08/06 14:04
6050823-CCB1	Sodium, Total	-0.10	0.50	0.059	mg/L	J	05/08/06 14:37
	Aluminum, Total	16	100	16	ug/L	J	05/08/06 14:37
	Barium, Total	0.68	10	0.92	ug/L	U	05/08/06 14:37
	Calcium, Total	0.021	0.50	0.052	mg/L	U	05/08/06 14:37
	Potassium, Total	0.012	0.20	0.036	mg/L	U	05/08/06 14:37
	Iron, Total	1.5	100	3.2	ug/L	U	05/08/06 14:38
	Magnesium, Total	0.021	0.50	0.032	mg/L	U	05/08/06 14:38
	Beryllium, Total	0.15	4.0	0.50	ug/L	U	05/08/06 14:39
	Chromium, Total	1.4	50	5.5	ug/L	U	05/08/06 14:39
	Zinc, Total	1.3	30	7.7	ug/L	U	05/08/06 14:39
0604827-BLK1	Aluminum, Total	100	100	16	ug/L	J	05/08/06 14:43
	Barium, Total	10	10	0.92	ug/L	U	05/08/06 14:43
	Calcium, Total	500	500	52	ug/L	U	05/08/06 14:43
	Potassium, Total	200	200	36	ug/L	U	05/08/06 14:43
	Sodium, Total	500	500	59	ug/L	J	05/08/06 14:43
	Iron, Total	100	100	3.2	ug/L	U	05/08/06 14:43
	Magnesium, Total	500	500	32	ug/L	U	05/08/06 14:43
	Beryllium, Total	4.0	4.0	0.50	ug/L	U	05/08/06 14:45
	Chromium, Total	50	50	5.5	ug/L	U	05/08/06 14:45
	Zinc, Total	12	30	7.7	ug/L	J	05/08/06 14:45
6050823-CCB2	Sodium, Total	-0.036	0.50	0.059	mg/L	U	05/08/06 15:18
	Aluminum, Total	19	100	16	ug/L	J	05/08/06 15:18
	Barium, Total	0.46	10	0.92	ug/L	U	05/08/06 15:18

: 62273

BLANKS
USEPA-6010B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Sequence: 6050823

SDG: 36440-27
Project: RFAAP SSP Investigation
Instrument ID: 116
Calibration: 6E09004

Lab Sample ID	Analyte	Found	MRL	MDL	Units	C	Analyzed
6050823-CCB2	Calcium, Total	0.022	0.50	0.052	mg/L	U	05/08/06 15:18
	Potassium, Total	-0.0092	0.20	0.036	mg/L	U	05/08/06 15:18
	Iron, Total	1.6	100	3.2	ug/L	U	05/08/06 15:18
	Magnesium, Total	0.0093	0.50	0.032	mg/L	U	05/08/06 15:18
	Beryllium, Total	0.18	4.0	0.50	ug/L	U	05/08/06 15:20
	Chromium, Total	1.3	50	5.5	ug/L	U	05/08/06 15:20
	Zinc, Total	1.5	30	7.7	ug/L	U	05/08/06 15:20

* Values outside of QC limits

: 02274

METHOD BLANK DATA SHEET
USEPA-6010B

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-27
Client: URS Group, Inc.
Project: RFAAP SSP Investigation
Matrix: Water
Laboratory ID: 0604827-BLK1
File ID: 6050823-014
Prepared: 05/02/06 06:25
Preparation: 3010A Digestion
Initial/Final: 25 mL / 25 mL
Analyzed: 05/08/06 14:45
Instrument: 116
QC Batch: 0604827
Sequence: 6050823
Calibration: 6E09004

CAS No.	Analyte	MDL	MRL	Conc. (ug/L)	Q
7440-41-7	Beryllium, Total	0.50	4.0	4.0	U
7440-47-3	Chromium, Total	5.5	50	50	U
7440-66-6	Zinc, Total	7.7	30	12	J

Zn 12 X 5 = 60

: 62266

BLANKS
USEPA-6010B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Sequence: 6050927

SDG: 36440-27
Project: RFAAP SSP Investigation
Instrument ID: 101
Calibration: 6E10012

Lab Sample ID	Analyte	Found	MRL	MDL	Units	C	Analyzed
6050927-ICB1	Chromium, Total	0.00200	0.050	0.0057	mg/L	U	05/09/06 11:41
	Iron, Total	-0.0115	0.10	0.0046	mg/L	J	05/09/06 11:41
	Zinc, Total	-0.00311	0.040	0.0085	mg/L	U	05/09/06 11:41
6050927-CCB1	Chromium, Total	0.0013	0.050	0.0057	mg/L	U	05/09/06 12:10
	Iron, Total	-0.012	0.10	0.0046	mg/L	J	05/09/06 12:10
	Zinc, Total	-0.0019	0.040	0.0085	mg/L	U	05/09/06 12:10
6050927-CCB2	Chromium, Total	-0.000030	0.050	0.0057	mg/L	U	05/09/06 13:04
	Iron, Total	-0.012	0.10	0.0046	mg/L	J	05/09/06 13:04
	Zinc, Total	-0.0019	0.040	0.0085	mg/L	U	05/09/06 13:04
6050927-CCB3	Chromium, Total	-0.0015	0.050	0.0057	mg/L	U	05/09/06 13:58
	Iron, Total	-0.012	0.10	0.0046	mg/L	J	05/09/06 13:58
	Zinc, Total	-0.0033	0.040	0.0085	mg/L	U	05/09/06 13:58
6050927-CCB4	Chromium, Total	-0.000076	0.050	0.0057	mg/L	U	05/09/06 14:52
	Iron, Total	-0.012	0.10	0.0046	mg/L	J	05/09/06 14:52
	Zinc, Total	-0.0022	0.040	0.0085	mg/L	U	05/09/06 14:52
6050927-CCB5	Chromium, Total	-0.0032	0.050	0.0057	mg/L	U	05/09/06 15:21
	Iron, Total	-0.011	0.10	0.0046	mg/L	J	05/09/06 15:21
	Zinc, Total	-0.0012	0.040	0.0085	mg/L	U	05/09/06 15:21
6050927-CCB6	Chromium, Total	-0.0028	0.050	0.0057	mg/L	U	05/09/06 16:18
	Iron, Total	-0.012	0.10	0.0046	mg/L	J	05/09/06 16:18
	Zinc, Total	-0.0015	0.040	0.0085	mg/L	U	05/09/06 16:18
6050927-CCB7	Chromium, Total	-0.0023	0.050	0.0057	mg/L	U	05/09/06 16:47
	Iron, Total	-0.010	0.10	0.0046	mg/L	J	05/09/06 16:47
	Zinc, Total	-0.0017	0.040	0.0085	mg/L	U	05/09/06 16:47

* Values outside of QC limits

02275

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-6010B

~~FSB3A~~
FSB4A
LM

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Matrix: Soil

SDG: 36440-27
Project: RFAAP SSP Investigation
Preparation: 3050B Digestion
Initial/Final: 0.5 g / 50 mL

Laboratory ID: 0604714-MS1
QC Batch: 0604714

Analyte	Spike Added	Sample Conc.	MS Conc.	MS % Rec. #	QC Limits Rec.	Units
Barium, Total	25.0	111	128	68	65 - 118	mg/kg dry wt.
Beryllium, Total	2.50	0.953	3.05	84	72 - 134	mg/kg dry wt.
Calcium, Total	1250	5740 ✓	5350	-31 *	70 - 121	mg/kg dry wt.
Chromium, Total	25.0	31.0	55.1	96	65 - 112	mg/kg dry wt.
Cobalt, Total	25.0	12.8	34.7	88	61 - 120	mg/kg dry wt.
Magnesium, Total	1250	6070 ✓	6350	22 *	81 - 111	mg/kg dry wt.
Potassium, Total	1250	2180	3330	92	56 - 183	mg/kg dry wt.
Sodium, Total	1250	ND	1080	86	64 - 144	mg/kg dry wt.

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

✓sample conc >4X spike

02257

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-6010B

~~FSB34~~

FSB4A

YM

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Group, Inc.

Matrix: Soil

SDG: 36440-27

Project: RFAAP SSP Investigation

Preparation: 3050B Digestion

Initial/Final: 0.4997 g / 50 mL

Laboratory ID: 0604714-MSD1

QC Batch: 0604714

Analyte	Spike Added	MSD Conc.	MSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
Barium, Total	25.0	131	80	2	20	65 - 118	mg/kg dry wt.
Beryllium, Total	2.50	2.97	81	3	20	72 - 134	mg/kg dry wt.
Calcium, Total	1250	5240 ✓	-40 *	2	20	70 - 121	mg/kg dry wt.
Chromium, Total	25.0	53.9	92	2	20	65 - 112	mg/kg dry wt.
Cobalt, Total	25.0	33.4	82	4	20	61 - 120	mg/kg dry wt.
Magnesium, Total	1250	6270 ✓	16 *	1	20	81 - 111	mg/kg dry wt.
Potassium, Total	1250	3270	87	2	20	56 - 183	mg/kg dry wt.
Sodium, Total	1250	1050	84	3	20	64 - 144	mg/kg dry wt.

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

✓ samp. conc > 4x spike

: 62288

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-6010B

~~FSB3A~~ FSB4A LM

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Group, Inc.

Matrix: Soil

SDG: 36440-27

Project: RFAAP SSP Investigation

Preparation: 3050B Digestion

Initial/Final: 0.5 g / 50 mL

Laboratory ID: 0604714-MS2

QC Batch: 0604714

Analyte	Spike Added	Sample Conc.	MS Conc.	MS % Rec. #	QC Limits Rec.	Units
Aluminum, Total	125	16800 ✓	19800	2400 *	76 - 118	mg/kg dry wt.

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

✓ Samp Conc >4X Spike

: 02289

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-6010B

~~FSB3A~~

FSB4A

ZM

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Group, Inc.

Matrix: Soil

SDG: 36440-27

Project: RFAAP SSP Investigation

Preparation: 3050B Digestion

Initial/Final: 0.4997 g / 50 mL

Laboratory ID: 0604714-MSD2

QC Batch: 0604714

Analyte	Spike Added	MSD Conc.	MSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
Aluminum, Total	125	19400	2080 *	2	20	76 - 118	mg/kg dry wt.

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

✓ samp. conc >4X spike

62290

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-6010B

~~FSB3A~~
FSB4A
LM

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-27
Client: URS Group, Inc.
Project: RFAAP SSP Investigation
Matrix: Soil
Preparation: 3050B Digestion
Initial/Final: 0.5 g / 50 mL
Laboratory ID: 0604714-MS3
QC Batch: 0604714

Analyte	Spike Added	Sample Conc.	MS Conc.	MS % Rec. #	QC Limits Rec.	Units
Manganese, Total	25.0	897 ✓	740	-628 *	56 - 135	mg/kg dry wt.
Zinc, Total	25.0	601 ✓	534	-268 *	47 - 125	mg/kg dry wt.

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

✓ samp conc. > 4X spike

: 02291

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-6010B

~~FSB3A~~
FSB4A
JM

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-27
Client: URS Group, Inc.
Project: RFAAP SSP Investigation
Matrix: Soil
Preparation: 3050B Digestion
Initial/Final: 0.4997 g / 50 mL
Laboratory ID: 0604714-MSD3
QC Batch: 0604714

Analyte	Spike Added	MSD Conc.	MSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
Manganese, Total	25.0	874 ✓	-92 *	17	20	56 - 135	mg/kg dry wt.
Zinc, Total	25.0	596 ✓	-20 *	11	20	47 - 125	mg/kg dry wt.

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

✓samp. conc. >4X spike

: 02292

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-6010B

~~FSB3A~~

FSB4A

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Group, Inc.

Matrix: Soil

SDG: 36440-27

Project: RFAAP SSP Investigation

Preparation: 3050B Digestion

Initial/Final: 0.5 g / 50 mL

Laboratory ID: 0604714-MS4

QC Batch: 0604714

Analyte	Spike Added	Sample Conc.	MS Conc.	MS % Rec. #	QC Limits Rec.	Units
Iron, Total	25.0	32700	32200	-2000 *	70 - 123	mg/kg dry wt.

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

✓ samp. conc > 4X spike

02253

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-6010B

~~FSB3A~~

FSB4A LM

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Group, Inc.

Matrix: Soil

SDG: 36440-27

Project: RFAAP SSP Investigation

Preparation: 3050B Digestion

Initial/Final: 0.4997 g / 50 mL

Laboratory ID: 0604714-MSD4

QC Batch: 0604714

Analyte	Spike Added	MSD Conc.	MSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
Iron, Total	25.0	32100 ✓	-2400 *	0.3	20	70 - 123	mg/kg dry wt.

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

✓ samp. conc >4X spike

: 02294

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Radford Army Ammunition Plant
SSP

SDG – 36440-27
MAY 25, 2006
REVISED JUNE 26, 2006

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SDG CASE NARRATIVE

REVISED
6/24/06 WR

URS Group, Inc.
Radford Army Ammunition Plant
SSP

SDG – 36440-27
MAY 25, 2006
REVISED JUNE 23, 2006

This case narrative is applicable to SSP samples collected from Radford Army Ammunition Plant (the Site), Radford, Virginia by URS Group, Inc. (the Client) and received by TriMatrix Laboratories, Inc. (TriMatrix) on April 20 and 24, 2006. The samples were assigned to TriMatrix project sample delivery group (SDG) 36440-27 for analytical services (the Project) to be performed according to:

a) Subcontract No. 129851.UB, Work Order 129883.US, between the Client and TriMatrix

b) Radford Army Ammunition Plant Final Master Work Plan, August, 2003 and SSP Request for Cost Proposal Work Instructions, and

c) verbal and written correspondence between the Client and TriMatrix as the Project progressed.

No part of this Project was subcontracted.

Reason for and Nature of Revisions

On June 19, 2006 TriMatrix was informed that the Client had assigned incorrect field sample names to three samples. TriMatrix was asked to revise affected sample result forms (i.e., Form 1's), this narrative, and the EDD for the report for those sample names. An errata sheet to address all other instances where the original field sample names appear in the report was also requested. The errata sheet has been designated as page 34A.

Certain pages have also been marked revised due to a pagination change.

Field Sample and Assigned Laboratory Sample ID Summary

For the samples received, a field sample to laboratory sample ID cross-reference table follows below and on the next page.

Field Sample Name	Laboratory Sample ID	Date Sampled	Date Received
FSB4A	0604361-01	04/19/06	04/20/06
FSB4B	0604361-02	04/19/06	04/20/06
FSB4C	0604361-03	04/19/06	04/20/06
EQBK-1	0604361-04	04/19/06	04/20/06
Trip Blank	0604361-05	04/19/06	04/20/06
ASB4-A	0604426-01	04/20/06	04/24/06
ASB4-B	0604426-02	04/20/06	04/24/06
ASB4-C	0604426-03	04/20/06	04/24/06

00004

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6/26/06 WK

Field Sample and Assigned Laboratory Sample ID Summary – (continued)

Field Sample Name	Laboratory Sample ID	Date Sampled	Date Received
DUP-1	0604426-04	04/20/06	04/24/06
ASB5-A	0604426-05	04/20/06	04/24/06
ASB5-B	0604426-06	04/20/06	04/24/06

Sample Receipt and Log-in

There were two receipt events.

Receipt Event One

On April 20, 2006 at 09:00 hrs, two sample coolers containing multiple soil samples, one equipment blank, and one trip blank were received at TriMatrix via FedEx (the carrier). The coolers had been shipped from the Site on April 19.

The external custody seal affixed to each cooler was intact. The samples were received on ice and in good condition. The receipt temperature of the interior of each cooler was measured via a 'temperature blank' shipped with the cooler; the measured temperatures, in °C, were 3.2 and 5.1.

Shipping documents included two field chain-of-custody forms (COC) and associated carrier air bills.

Sample 'FSB4A' was designated by the Client for MS/MSD analysis for all target parameters.

Samples were assigned to SDG 36440-27 and Work Order 0604361.

Receipt Event Two

On April 24, 2006 at 08:35 hrs, one sample cooler containing multiple soil samples were received at TriMatrix via FedEx (the carrier). The cooler had been shipped from the Site on April 23. Additional coolers with samples were received but those samples were for a separate location at the Site and they were assigned to SDG 36440-28.

The external custody seal affixed to the cooler was intact. The samples were received on ice and in good condition. The receipt temperature of the interior of each cooler was measured via a 'temperature blank' shipped with the cooler; the measured temperature, in °C, was 10.1.

Shipping documents included one field chain-of-custody forms (COC) and associated carrier air bills.

Samples were assigned to SDG 36440-27 and Work Order 0604426.

All Receipt Events

Sample receipt activities and observations were recorded on TriMatrix Sample Receiving and Log-in Checklists. Copies of the field chain of custody and a LIMS-generated work order have been included at the end of the report. Correspondence regarding sample receipt and project-related matters as analysis progressed is included in Narrative Attachment 1.

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REVISED
6/26/06 MJR

Analytical Methods

Sample preparation and analytical methods that were employed are per the quotation and additional correspondence/discussion with the Client.

Provision of Sample Receipt Information to Client

A copy of the COCs and receipt checklist were transmitted to the Client within one day of sample receipt. The Client did not request any modification(s) to the analyses, as requested on the COC, but did provide clarification.

Post-Receipt Sample Custody

Custody of the sample during sample preparation (if applicable) and analysis was assigned to individual analysts. Copies of completed 'internal chain of custody' forms are included in Section A.

Analytical Methods

Sample preparation and analytical methods that were employed are per the Work Instructions and any subsequent discussion with the Client.

Target Analyte List and Reporting Limits

The target analyte list (by parameter) and reporting limit (goals) employed for the sample are summarized in the Work Instructions and/or as agreed upon with the Client. Each reporting limit employed is at least three times the MDL per the USACE Shell for Analytical Chemistry Requirements (EM200-1-3 Feb 1, 2001) and project Data Quality Objectives (DQO).

Quality Control Limits

Per discussion with the Client, internal quality control limits not to exceed the Work Plan limits were employed except where no Work Plan limits were provided. If an internal lower control limit and/or an internal upper control limit was/were outside the Work Plan limits, one or both internal limits was/were revised to be applicable Work Plan limit(s).

Hold Times

All samples were analyzed within hold time.

Technical Issues

There was one technical issue involving the reporting of second (confirmation) column analysis for chlorinated pesticides. See the quality control section for pesticides for details.

Sample Result Reporting Convention

Sample results are reported as RL "U" (e.g., 0.001 U) if the target analyte was not detected above the MDL. If a sample for an organic parameter (e.g., PCBs) is reanalyzed and also reported, the second analysis includes the suffix "REn" where n = the first, second, etc. reanalysis.

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Data Qualifier Designation

If applicable, sample results are qualified with:

- a "J" flag if the analyte was detected but the concentration is greater than the MDL but less than the RL,
- a "B" flag if the analyte was also detected at or above the RL in the associated method blank and the sample concentration was less than five times the method blank result,
- an "E" flag if the analyte exceeded the instrument calibration range and reanalysis was needed,
- an asterisk (*) if a LIMS-generated statement of qualification applies. Qualifying statements, if any, will be found in Attachment 2 to this narrative.

QC Batch and Analytical Batch Designation

A QC Batch is a seven digit number that associates all samples that have been prepared together (or analyzed together if there is no preparation); it is limited to no more than twenty samples, excluding batch QC (method blanks, control spikes, etc.). An Analytical Batch (or Sequence) is a seven digit number that associates all samples analyzed as a set under one analytical sequence.

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Quality Control Results – Volatile Organics by GC/MS

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6/26/06 WR

Calibration

All initial instrument calibrations, second source calibration verifications (SCV), and continuing calibration verifications (CCV) were method-compliant.

Note: the initial calibration summaries list all compounds present in the calibration standards and not just target analytes.

For the two SCVs, only one of the two summaries lists the Work Plan-specified criterion of 80-120 but this criterion was used for assessment.

Method Blanks

No target analytes were detected at or above the RL in the low-level aqueous method blank. Acetone and Methylene chloride were detected at J-level concentrations.

Acetone and MEK were detected above the RL in the low-level soil method blank. Acetone and MEK are artifacts of the low-level method. Cyclohexane, Ethylbenzene, Toluene, and Total Xylene were detected at J-level concentrations but there were no detections for these analytes in any of the associated samples.

No target analytes were detected at or above the RL in the high-level soil method blank. Acetone, 1,3-Dichlorobenzene, 1,4-Dichlorobenzene, Methylene chloride, and Trichloroethene were detected at J-level concentrations. There were no detections for 1,3-Dichlorobenzene, 1,4-Dichlorobenzene, or Trichloroethene in any of the associated samples.

Surrogates

All surrogate recoveries were in control.

Laboratory Control Samples

Laboratory Control Samples were fortified with all target analytes. All recoveries were in control.

Matrix Spikes

Sample 'FSB4A' was fortified with all target analytes. The majority of the recoveries and RPDs were in control; see Statements of Data Qualifications and MS/MSD summary reports for details.

Sample Results

See Section B. Samples assigned to work order 0604361 were analyzed low-level per Client request (all samples assigned to work order 0604426 were methanol-extracted in the field).

Statements of Data Qualification

See Narrative Attachment 2.

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REVISED
6/26/06 WR

Quality Control Results – Semivolatile Organics by GC/MS

Calibration

All initial instrument calibrations, second source calibration verifications (SCV), and continuing calibration verifications (CCV) were method-compliant.

Note: the initial calibration summary lists all compounds present in the calibration standards and not just target analytes.

For the SCV, the Work Plan-specified criterion of 80-120 was used for assessment even though the report lists limits of 75-125.

Method Blanks

No target analytes were detected at or above the RL. Di-n-butyl Phthalate was detected at a J-level concentration in the aqueous method blank.

Surrogates

All surrogate recoveries were in control. Surrogates were diluted out in the second of two dilutions required for sample 'ASB5-A'.

Laboratory Control Samples

Laboratory Control Samples were fortified with all target analytes. All recoveries were in control.

Matrix Spikes

Sample 'FSB4A' was fortified with all target analytes. All recoveries and RPDs were in control with the exception of both recoveries (51%, 54%) for 4-Nitroaniline; see the Statement of Data Qualifications and MS/MSD summary report for details.

Sample Results

See Section C. Sample 'ASB5-A' required multiple reanalyses with the initial analysis at no dilution (no RE suffix), a 100X dilution identified with a "RE1" suffix, and a 10X dilution identified with a "RE2" suffix to the laboratory sample ID.

Statements of Data Qualification

See Narrative Attachment 2.

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REVISED
6/26/06 WR

Quality Control Results – Nitroaromatic Explosives

Calibration

All initial instrument calibrations, second source verification, and continuing calibration verifications were method-compliant.

Note: for the SCV, the Work Plan limit of 85-115% was used for assessment.

Method Blanks

No target analytes were detected at or above the RL. In addition, there were no J-flagged detections.

Surrogates

All surrogate recoveries were in control.

Laboratory Control Samples

The Laboratory Control Samples (LCS) were fortified with all target analytes. For soils, all recoveries on both the primary and confirmation columns were in control. For the aqueous equipment blank, an LCS and Laboratory Control Sample Duplicate (LCSD or BSD) were analyzed; all recoveries and RPDs were in control.

Matrix Spikes

Sample 'FSB4A' was fortified with all target analytes. All recoveries and RPDs were in control. The matrix spikes were not (also) analyzed on the confirmation column because all target analytes for the unspiked sample were non-detect.

Sample Results

See Section D. If an analyte is confirmed as present, the higher of the two concentrations has been reported, per the Work Plan. Dual Column Confirmation Check Summaries will be found at the beginning of the Raw Quality Control Data section. One sample, 'ASB5-A', required confirmation analysis for 2,4-Dinitrotoluene and 2,6-Dintrotoluene. Per the Work Plan, the higher of the two concentrations are reported. These compounds were also identified by GC/MS analysis of the sample but at higher concentrations. The Client was informed; no corrective action appeared warranted.

Note: for all soil samples for explosives analysis, a representative subsample is dried and a smaller measured amount of that dried subsample is then extracted. Unlike most other parameters for a soil sample that are processed on a wet-weight basis, the Percent Solids value is not applied to the MDL, RL, or to the result for explosives.

Statements of Data Qualification

See Narrative Attachment 2.

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6/26/06 WR

Quality Control Results – Nitroglycerin & PETN

Calibration

All initial instrument calibrations, second source verification, and continuing calibration verifications were method-compliant.

Note: for the SCV, the Work Plan limit of 85-115% was used for assessment.

Method Blanks

No target analytes were detected at or above the RL. In addition, there were no J-flagged detections.

Surrogates

All surrogate recoveries were in control.

Laboratory Control Samples

The Laboratory Control Samples (LCS) were fortified with both target analytes. All recoveries and RPDs were in control.

Matrix Spikes

Sample 'FSB4A' was fortified with both target analytes. All recoveries and RPDs were in control. The matrix spikes were not (also) analyzed on the confirmation column because all target analytes for the unspiked sample were non-detect.

Sample Results

See Section E. There were no detections.

Note: for all soil samples for explosives analysis, a representative subsample is dried and a smaller measured amount of that dried subsample is then extracted. Unlike most other parameters for a soil sample that are processed on a wet-weight basis, the Percent Solids value is not applied to the MDL, RL, or to the result for explosives.

Statements of Data Qualification

No statements were generated.

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6/26/06 WR

Quality Control Results – Chlorinated Pesticides

Note: second column confirmation analyses were run on a second instrument. Due to LIMS constraints which did not then permit the inclusion of confirmation data on the same summary forms, it was decided that the most straightforward approach to data presentation was to identify those confirmation column analyses as the laboratory sample ID followed by an "RE1" suffix.

Calibration

All initial instrument calibrations were method-compliant. Some analytes in some second source verifications (SCV) exceeded the Work Plan limit of 85-115%. Continuing calibration verifications for some analytes exceeded 15%, however, responses for those analytes were increasing.

Method Blanks

No target analytes were detected at or above the RL on either the primary for confirmation [2C] column. In addition, there were no J-flagged detections.

Surrogates

All surrogate recoveries were in control with the exception of Decachlorobiphenyl on the confirmation column for one of the laboratory control samples and this same surrogate on the primary column for one of the method blanks. Both recoveries exceeded the upper control limit. Surrogate recoveries were not obtainable for sample 'ASB5-A' reanalyzed at dilution and the recovery of Decachlorobiphenyl exceeded the upper control limit for the initial analysis. Also see Statements of Data qualification.

Laboratory Control Samples

The Laboratory Control Samples were fortified with all target analytes. All recoveries on both columns were in control with the exception of delta-BHC and Heptachlor in one LCS; both recoveries exceeded the upper control limit.

Matrix Spikes

Sample 'FSB4A' was fortified with all single component target analytes. All recoveries and RPDs on both columns were in control with the exception of the recovery for Aldrin on the confirmation column.

Note: the MS and MSD analyzed on the confirmation column are identified as 0604629-MS2 and 0604629-MSD2.

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6/26/06WR

Quality Control Results – Chlorinated Pesticides – (continued)

Sample Results

See Section F. Samples 'FSB4A', 'ASB4-A', 'ASB4-B', 'DUP-1' had J-level detections for Dieldrin.

Sample 'ASB5-A' required analysis at dilution due to matrix interference. Data is also provided from the initial runs for surrogate recoveries.

If an analyte is confirmed as present, the higher of the two concentrations has been reported, per the Work Plan. Dual Column Confirmation Check Summaries will be found at the beginning of the Raw Quality Control Data section.

Statements of Data Qualification

See Narrative Attachment 2.

00013

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Individual sample results relate only to the sample tested.

REVISED
6/26/06 WR

Quality Control Results –Polychlorinated Biphenyls

Calibration

All initial instrument calibrations, second source verification, and continuing calibration verifications were method-compliant.

Note: for the SCV, the Work Plan limit of 85-115% was used for assessment.

Method Blanks

No target analytes were detected at or above the RL on either the primary for confirmation [2C] column. In addition, there were no J-flagged detections.

Surrogates

All surrogate recoveries were in control with the exception of TCMX on both primary and confirmation columns for one of the laboratory control samples. Both recoveries (33%, 30%) were below the laboratory's internal control limits.

Laboratory Control Samples

The Laboratory Control Samples (LCS) were fortified with Aroclors 1016 and 1260. With the exception of a low recovery (56%) for Aroclor 1016 on the confirmation column for the aqueous LCS, all recoveries on both columns were in control.

Matrix Spikes

Sample 'FSB4A' was fortified with Aroclors 1016 and 1260. All recoveries and RPDs on both columns were in control.

Sample Results

See Section G. Aroclor 1254 was detected in samples 'FSB4A', 'ASB4-A', 'ASB4-B', 'DUP-1', 'ASB5-A', and 'ASB5-B'.

If an analyte is confirmed as present, the higher of the two concentrations has been reported, per the Work Plan. Dual Column Confirmation Check Summaries will be found at the beginning of the Raw Quality Control Data section.

Statements of Data Qualification

See Narrative Attachment 2.

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Quality Control Results – ICP Metals

Calibration

All instrument calibrations and continuing calibrations were method-compliant. Note: instrument reports for ICP include the listing of initial calibration correlation coefficients and internal standard recoveries; those values may either be imbedded with raw data from each run or included as a summary (also within the instrument printout).

Method Blanks

No target elements were detected at or above the RL. Depending upon the method blank, there were J-flagged detections for Barium, Magnesium, Potassium, and/or Zinc. Since the project does not allow the use of an instrument's linear range for quantitation, extended calibration curves were employed for Aluminum, Barium, Calcium, Iron, Magnesium, Manganese, and Sodium in order to reduce the number of samples requiring reanalysis at dilution. Since the MDLs for these elements were not determined using an extended curve, the occurrence of J-flagged results for some of these analytes in the method blank may be a consequence.

Internal Standard Response

Internal standard responses for all standards, samples, and quality control samples were method-compliant.

Laboratory Control Samples

All Laboratory Control Sample recoveries were in control.

Matrix Spike

Sample 'FSB4A' was fortified with all target analytes. All recoveries and RPDs were in control (including those not-qualified because the unspiked sample concentration was greater than or equal to four times the amount spiked). See the MS/MSD summaries and Statements of Data Qualification for details.

Serial Dilutions and Post-Digestion Spikes

Serial dilution and post-digestion spike (PDS) analysis was performed on the sample employed for MS/MSD analysis; all values were in control.

Sample Results

See Section H.

Note: for all soil samples for metals analysis, a representative subsample is dried and a smaller measured amount of that dried subsample is then digested. Unlike most other parameters for a soil sample that are processed on a wet-weight basis, the Percent Solids value is not applied to the MDL, RL, or to the result for metals.

Statements of Data Qualification

See Narrative Attachment 2.

00015

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REVISED
6/26/06 WR

Quality Control Results – ICP/MS Metals

Calibration

All instrument calibrations and continuing calibrations were method-compliant. Note: instrument reports for ICPMS include the listing of initial calibration correlation coefficients and internal standard recoveries; those values may either be imbedded with raw data from each run or included as a summary (also within the instrument printout).

Method Blanks

No target elements were detected at or above the RL. Depending upon the method blank, there were J-flagged detections for Copper, Nickel, Vanadium and/or Antimony.

Internal Standard Response

Internal standard responses for all standards, samples, and quality control samples were method-compliant.

Laboratory Control Samples

All Laboratory Control Sample recoveries were in control.

Matrix Spike

Sample 'FSB4A' was fortified with all target analytes. All recoveries and RPDs were in control with the exception of the MSD recovery (142%) for Vanadium.

Serial Dilutions and Post-Digestion Spikes

Serial dilution and post-digestion spike (PDS) analysis was performed on the sample employed for MS/MSD analysis; all values were in control with the exception of Copper and Nickel.

Sample Results

See Section I.

Note: for all soil samples for metals analysis, a representative subsample is dried and a smaller measured amount of that dried subsample is then digested. Unlike most other parameters for a soil sample that are processed on a wet-weight basis, the Percent Solids value is not applied to the MDL, RL, or to the result for metals.

Statements of Data Qualification

See Narrative Attachment 2.

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REVISED
6/26/06 WR

Quality Control Results – Mercury (CVAA)

Calibration

Instrument calibration and continuing calibrations were method-compliant.

Method Blanks

Mercury was not detected at or above the Reporting Limit (RL). In addition, there were no J-level detections.

Laboratory Control Samples

The Laboratory Control Sample recoveries were in control.

Matrix Spikes

Sample 'FSB4A' was fortified. Both recoveries and RPD were in control.

Serial Dilutions and Post-Digestion Spikes

Not applicable.

Sample Results

See Section J.

Note: for all soil samples for metals analysis, a representative subsample is dried and a smaller measured amount of that dried subsample is then digested. Unlike most other parameters for a soil sample that are processed on a wet-weight basis, the Percent Solids value is not applied to the MDL, RL, or to the result for metals.

Statements of Data Qualification

There were no statements generated.

00017

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REVISED
6/26/06 WR

Quality Control Results – Wet Chemistry (Cyanide and Percent Solids)

Note: quality control summaries and raw data are presented in the following order in the data package.

Total Cyanide
Percent Solids

Calibration

Instrument calibrations (including gravimetric), second source calibration verifications, and continuing calibrations (where applicable) were method-compliant.

Method Blanks

No target analyte was detected at or above the RL. There was a J-level detection for Cyanide in one of the two method blanks.

Laboratory Control Samples

All Laboratory Control Sample recoveries were in control.

Matrix Spikes (Total Cyanide)

Sample 'FSB4A' was fortified. Both recoveries and RPD were in control.

Laboratory Duplicates (Percent Solids)

Samples 'FSB4A' and 'ASB4-A' were analyzed in duplicate. Both RPDs were in control.

Sample Results

Please see Section K of the data package.

Statements of Data Qualification

There were no statements generated.

00018

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Data Review and Approval

All data was peer-reviewed by a second analyst and then by appropriate data management staff against laboratory quality control requirements and project specifications; it was then reviewed and approved by the group supervisor/manager prior to further review by the project chemist. All reviews were documented.

Data Deliverables

The data deliverables, both hardcopy and electronic (EDD), that comprise this data package are intended to comply with the documents referenced in the introductory section of this narrative. The EDD has been issued separate from this hardcopy report.

Walt Roudebush, Project Chemist

6/26/06
Date

00019

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SDG 36440-27

TriMatrix Laboratories, Inc.

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www.trimatrixlabs.com

Chain of Custody Record

COC No. 113041

Page 1 of 1

For Lab Use Only
Cart: 4
VOA Rack/Tray:
Receipt Log No.: 5-11
Project Chemist: LMSR
Laboratory Project No.: E0604361

Client Name: URS Corp
Address: 5540 Falmouth St Ste 2
Richmond VA 23230
Phone: 804.965-9000
Fax: 804-965-9764

Project Name: SSP - Further Actions
Client Project No. / P.O. No.: SSP - Further Action
Invoice To: ☒ Client ☐ Other (comments)
Contact/Report To: Lee Anne Mareck

Analyses Requested

Test Group	Matrix Code	Laboratory Sample Number		Sample ID	Cooler ID	Sample Date	Sample Time	COMP	GRAB	Matrix	Container Type (corresponds to Container Packing List)	TCL VOCs	TCL SVOC/PAH	PCB Pest	Explosives	NG, PETN	TAL Inorganics (metals & cyanide)					Total	Sample Comments
											21	17	17	17	17		16						
											Number of Containers Submitted												
02	SO	01	1	FSB3A/MS/MSD	TM 0603	4-19-06	9:20		X	S	3/5	1	1	1	1		1					10	MS & MSD will come from jars - 5 Additional Encores provided for VOC MS/MSD
01	SO	02	2	FSB3B	↓	4-19-06	9:40		X	S	3	1	1	1	1		1					5	
01	SO	03	3	FSB3C	↓	4-19-06	10:00		X	S	3	1	1	1	1		1					5	
			4		WR																		
			5																				
			6																				
			7																				
			8																				
			9																				
			10																				

SAME JAR

Preservatives:
A NONE pH~7
B HNO_3 pH<2
C H_2SO_4 pH<2
D 1+1 HCl pH<2
E NaOH pH>12
F ZnAc/NaOH pH>9
G MeOH
H Other (note below)

Sampled By (print): John Spangler
Sampler's Signature: [signature]
Company: URS

How Shipped? Hand Carrier: Fed Ex
Tracking No.:

Comments:

1. Relinquished By	Date	Time	2. Relinquished By	Date	Time	3. Relinquished By	Date	Time
[signature]	4/19/06	1730						
1. Received By	Date	Time	2. Received By	Date	Time	3. Received For Lab By	Date	Time
						[signature]	4/20/06	9:00

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(1)

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Chain of Custody Record

COC No. 113690

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Cart	4
VOA Rack/Tray	10B
Receipt Log No.	5-11
Project Chemist	WJR
Laboratory Project No.	E 0604361

Client Name	URS
Address	5540 Falmouth St. Ste 201 Richmond VA 23230
Phone	804-965-9000
Fax	804-965-9764
Project Name	SSP - Further Actions
Client Project No. / P.O. No.	SSP
Invoice To	☒ Client ☐ Other (comments)
Contact/Report To	Lee Anne Moreck

Analyses Requested

Test Group	Matrix Code	Laboratory Sample Number		Sample ID	Cooler ID	Sample Date	Sample Time	COMP	GRAB	Matrix	SVOC (A)	Chlor Pest (A)	PCB (A)	Expl/Nitro/PETN (A)	VOC (C)	Metals (B)					Total	Sample Comments
											Container Type (corresponds to Container Packing List)											
											2	2	2	2	1	6						
											Number of Containers Submitted											
03	WQ	04	1	EQBK-1	FM 1463	4/19/06	1515		X	W	2	2	2	2	2	1					11	
04	WQ	05	2	Trip Blank	↓	4/19/06	1515			W					1						1	
			3	Temp ✓						W												
			4																			
			5																			
			6																			
			7																			
			8																			
			9																			
			10																			

⇦ PRESERVATIVES
- A NONE pH~7
- B HNO_3 pH<2
- C H_2SO_4 pH<2
- D 1+1 HCl pH<2
- E NaOH pH>12
- F ZnAc/NaOH pH>9
- G MeOH
- H Other (note below)

Sampled By (print)	John Spangler	How Shipped? Hand Carrier Fed Ex
Sampler's Signature	JSpangler	Tracking No.
Company	URS	

Comments: Trip = Trip Blank, sample date/time added by TriMatrix (WR)

1. Relinquished By	Date	Time	2. Relinquished By	Date	Time	3. Relinquished By	Date	Time
JSpangler	4/19/06	1730						
1. Received By	Date	Time	2. Received By	Date	Time	3. Received For Lab By	Date	Time
						William [illegible]	4/20/06	9:00

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(2)

#10

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Chain of Custody Record

COC No. 113031

Page ____ of ____

For Lab Use Only
Cart #2 bottom
VOA Rack/Tray 520 Red
Receipt Log No. 11-1
Project Chemist [illegible]
Laboratory Project No. E 0604426

Client Name: URS
Address: 5540 Falmouth St. Ste 201
Richmond VA 23230
Phone 804-965-9000
Fax 804-965-9764

Project Name: SSP - Further Action
Client Project No. / P.O. No.: SSP
Invoice To: ☒ Client ☐ Other (comments)
Contact/Report To: Lee Anne Marek

Analyses Requested

Test Group	Matrix Code	Laboratory Sample Number		Sample ID	Cooler ID	Sample Date	Sample Time	COMP	GRAB	Matrix	VOC	SVOC	Pest/PCB	TAL Metals/Cyanide	Explosives	NG/PETN	500 mL	250 mL			Total	Sample Comments
				Container Type (corresponds to Container Packing List)							F	A	A	A	A	A						
				Number of Containers Submitted							3	17	17	16	17	17	22	17	17			
01	SO	01	1	ASB4-A	[illegible]73	4/30-06	11:30		X	S	1	1	1	1	1	1	1	1	1		3	
01	SO	02	2	ASB4-B		"	12:00		X	S	1	1	1	1	1	1	1	1	1		3	
01	SO	03	3	ASB4-C		"	1225		X	S	1	1	1	1	1	1	1	1	1		3	
05	SO	04	4	DUP-1		"	—		X	S	1	1	1	1	1	1	1	1	1		3	
01	SO	05	5	ASB5-A		"	1330		X	S	1	1	1	1	1	1	1	1	1		3	
01	SO	06	6	ASB5-B		"	1350		X	S	1	1	1	1	1	1	1	1	1		3	
			7																			
			8																			
			9																			
			10																			

⇦ PRESERVATIVES
A NONE pH~7
B HNO_3 pH<2
C H_2SO_4 pH<2
D 1+1 HCl pH<2
E NaOH pH>12
F ZnAc/NaOH pH>9
G MeOH
H Other (note below)

Sampled By (print): John Spangler
Sampler's Signature: [signature]
Company: URS

How Shipped? Hand Carrier Fed Ex
Tracking No.

Comments

1. Relinquished By	Date	Time	2. Relinquished By	Date	Time	3. Relinquished By	Date	Time
[signature]	4/24/06	1540						
1. Received By	Date	Time	2. Received By	Date	Time	3. Received For Lab By	Date	Time
[signature]						Kim Ziegler	4/24/06	8:35

TriMatrixCOC -- COC

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Data Qualifying Codes

Two types of data qualifying codes or flags are applied in the course of the data review. The data validation flags indicate data that are not usable for decision-making, more than normally biased and/or variable, or not representative of field conditions. These codes and their definitions are presented below in the hierarchy stipulated in the USEPA Region III Modifications to the National Functional Guidelines for Data Review (September 1994).

Data Validation Flags

Flag	Interpretation
R	Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.
U	Not detected. The associated number indicates the approximate sample concentration is necessary to be detected.
B	Not detected substantially above the level reported in laboratory or field blanks.
N	Tentative Identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.
J	Analyte present. Reported value may not be accurate or precise.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
UL	Not detected, quantitation limit is probably higher.
NT	Not tested, no analytical result provided.

The other type of code used by URS is a "Reason Code". The reason code indicates the type of quality control failure that led to the application of the data validation flag.

Reason Codes

GC/MS Organics		GC and HPLC Organics		Inorganics and Conventionals	
Code	Interpretation	Code	Interpretation	Code	Interpretation
a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence
b	Bubble found in vial >6mm	b	Instrument performance failure	c	Calibration failure
c	Calibration failure; poor or unstable response	c	Calibration failure; poor or unstable response	d	MS/MSD imprecision
d	MS/MSD imprecision	d	MS/MSD imprecision	e	LCSD imprecision
e	LCSD imprecision	e	LCSD imprecision	f	Field duplicate imprecision
f	Field duplicate imprecision	f	Field duplicate imprecision	g	Laboratory duplicate imprecision
g	Tuning failure or poor mass spectrometer performance	g	Dual column confirmation imprecision	h	Holding time violation
h	Holding time violation	h	Holding time violation	k	Cooler receipt temperature exceeds limits
i	Internal standard failure	i	Internal standard failure	l	LCS recovery failure
k	Cooler receipt temperature exceeds limits	k	Cooler receipt temperature exceeds limits	m	MS/MSD recovery failure
l	LCS recovery failure	l	LCS recovery failure	n	ICS failure
m	MS/MSD recovery failure	m	MS/MSD recovery failure	o	Calibration blank contamination
p	Poor chromatography	p	Poor chromatography	p	Preparation blank contamination
q	Concentration exceeded the linear range of the instrument	q	Concentration exceeded the linear range	q	Concentration exceeded the linear range
r	Linearity failure in initial calibration	r	Linearity failure in initial calibration	r	Linearity failure in calibration or MSA
s	Surrogate failure	s	Surrogate failure	s	Serial dilution failure
t	TIC	u	No confirmation column	v	Post-digestion spike failure
w	Identification criteria failure	w	Retention time failure	w	CRDL Standard Failure
x	Field blank contamination	x	Field blank contamination	x	Field blank contamination
y	Trip blank contamination	z	Method blank contamination	z	Laboratory storage blank contamination
z	Method blank contamination				

APPENDIX K.3

ADDITIONAL INVESTIGATION SAMPLING – NOVEMBER 2006
DATA VALIDATION REPORTS
AND LABORATORY ANALYTICAL DATA (FORM I)

TriMatrix Laboratories, Inc.

VOCs, Pesticides, and Metals (Chromium)

DATA VALIDATION REPORT - Level III Review

SDG No.: 36440-31 **Fraction:** VOCs, Pest, & Chromium

Lab: TriMatrix **Project Name** Radford SSP

Reviewer: RA **Date:** January 12, 2007

This report presents the findings of a review of the referenced data. The report consists of this summary, a listing of the samples included in the review, copies of data reports with data qualifying flags applied (as required), the completed data validation checklist, supporting documentation, and an explanation of the data qualifying flags employed. The review performed is based on the Region III Modifications to the USEPA National Functional Guidelines for Organic and Inorganic Data Review as pertains to the specifics of the analytical method employed and provisions of the approved project-specific QAPP.

Major Anomalies: None.

Minor Anomalies: None.

Correctable Anomalies: None.

Comments: On the basis of this evaluation, the laboratory appears to have followed the specified method. All data are usable for their intended purpose based on the data reviewed. It should be noted that a second laboratory control sample for toxaphene was not analyzed due to laboratory oversight. This had no impact on data usability.

Signed: Rayann

SDG CASE NARRATIVE

URS Group, Inc.
Radford Army Ammunition Plant
SSP

SDG – 36440-31
JANUARY 10, 2007

This case narrative is applicable to samples collected from SSP at Radford Army Ammunition Plant (the Site), Radford, Virginia by URS Group, Inc. (the Client) and received by TriMatrix Laboratories, Inc. (TriMatrix) on November 30, 2006. The samples were assigned to TriMatrix project sample delivery group (SDG) 36440-31 for analytical services (the Project) to be performed according to:

a) Subcontract #129851.UB, Work Order 129883.US,

b) the Scope of Work (SOW) for the above,

c) Department of Defense Quality Systems Manual for Environmental Laboratories, Final Version 3, January 2006 (by reference)

d) any verbal and written correspondence between the Client and TriMatrix as the Project progressed.

No part of this Project was subcontracted.

Field Sample and Assigned Laboratory Sample ID Summary

For the samples received, a field sample to laboratory sample ID cross-reference table follows.

Field Sample Name	Sample Matrix	Laboratory Sample ID	Date Sampled	Date Received
46MW1	Water	0612018-01	11/28/06	11/30/06
DUP-1	Water	0612018-02	11/28/06	11/30/06
DUP-2	Water	0612018-03	11/29/06	11/30/06
FMW1	Water	0612018-04	11/29/06	11/30/06
Trip Blank	Water	0612018-05	11/29/06	11/30/06

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Individual sample results relate only to the sample tested.

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

46MW1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-31 4MD

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Ground Water Laboratory ID: 0612018-01 File ID: 01801.D

Sampled: 11/28/06 12:35 Prepared: 12/05/06 08:00 Analyzed: 12/05/06 17:17

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0614257 Sequence: 6120613 Calibration: 6K30003 Instrument: 145

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
75-35-4	1,1-Dichloroethene	1	1.0	1.0	0.13	U
156-59-2	cis-1,2-Dichloroethene	1	1.0	1.0	0.16	U
156-60-5	trans-1,2-Dichloroethene	1	1.0	1.0	0.15	U
127-18-4	Tetrachloroethene	1	1.0	1.0	0.13	U
79-01-6	Trichloroethene	1	1.0	1.0	0.14	U
75-01-4	Vinyl Chloride	1	1.0	1.0	0.15	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	41.2	103	85 - 115	
1,2-Dichloroethane-d4	40.0	39.0	98	70 - 120	
Toluene-d8	40.0	36.8	92	85 - 120	
4-Bromofluorobenzene	40.0	41.0	103	75 - 125	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	684657	5.25	617513	5.23	
Chlorobenzene-d5	284477	8.63	290856	8.63	
1,4-Dichlorobenzene-d4	260101	11.02	227051	11.02	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

DUP-1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-31 4MD

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Ground Water Laboratory ID: 0612018-02 File ID: 01802.D

Sampled: 11/28/06 00:00 Prepared: 12/05/06 08:00 Analyzed: 12/05/06 17:46

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0614257 Sequence: 6120613 Calibration: 6K30003 Instrument: 145

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
75-35-4	1,1-Dichloroethene	1	1.0	1.0	0.13	U
156-59-2	cis-1,2-Dichloroethene	1	1.0	1.0	0.16	U
156-60-5	trans-1,2-Dichloroethene	1	1.0	1.0	0.15	U
127-18-4	Tetrachloroethene	1	1.0	1.0	0.13	U
79-01-6	Trichloroethene	1	1.0	1.0	0.14	U
75-01-4	Vinyl Chloride	1	1.0	1.0	0.15	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	41.5	104	85 - 115	
1,2-Dichloroethane-d4	40.0	37.9	95	70 - 120	
Toluene-d8	40.0	36.7	92	85 - 120	
4-Bromofluorobenzene	40.0	41.3	103	75 - 125	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	675803	5.24	617513	5.23	
Chlorobenzene-d5	282433	8.63	290856	8.63	
1,4-Dichlorobenzene-d4	256039	11.02	227051	11.02	

* Values outside of QC limits

00050

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

Trip Blank

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-31 4MD

Client: URS Group, Inc. Project: RFAAP SSP Investigation

Matrix: Water Laboratory ID: 0612018-05 File ID: 01805.D

Sampled: 11/29/06 12:35 Prepared: 12/05/06 08:00 Analyzed: 12/05/06 16:48

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0614257 Sequence: 6120613 Calibration: 6K30003 Instrument: 145

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
75-35-4	1,1-Dichloroethene	1	1.0	1.0	0.13	U
156-59-2	cis-1,2-Dichloroethene	1	1.0	1.0	0.16	U
156-60-5	trans-1,2-Dichloroethene	1	1.0	1.0	0.15	U
127-18-4	Tetrachloroethene	1	1.0	1.0	0.13	U
79-01-6	Trichloroethene	1	1.0	1.0	0.14	U
75-01-4	Vinyl Chloride	1	1.0	1.0	0.15	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	40.6	101	85 - 115	
1,2-Dichloroethane-d4	40.0	38.5	96	70 - 120	
Toluene-d8	40.0	36.2	91	85 - 120	
4-Bromofluorobenzene	40.0	40.6	101	75 - 125	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	709944	5.24	617513	5.23	
Chlorobenzene-d5	296219	8.63	290856	8.63	
1,4-Dichlorobenzene-d4	266955	11.02	227051	11.02	

* Values outside of QC limits

ANALYSIS DATA SHEET

DUP-2

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Matrix: Ground Water
Sampled: 11/29/06 00:00
Solids:
QC Batch: 0614200

SDG: 36440-31
Project: RFAAP SSP Investigation
Laboratory ID: 0612018-03
File ID: A46_161-0
Prepared: 12/05/06 08:01
Analyzed: 12/07/06 00:28
Preparation: 3510C Liquid-Liquid Ex
Initial/Final: 1060 mL / 2 mL
Sequence: 6120718
Calibration: 6L07005
Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/L)	MRL	MDL	Q
319-84-6	alpha-BHC	1	0.050	0.050	0.0034	U
319-85-7	beta-BHC	1	0.050	0.050	0.0030	U
58-89-9	gamma-BHC (lindane)	1	0.050	0.050	0.0026	U
319-86-8	delta-BHC	1	0.10	0.10	0.0031	U
5103-71-9	alpha-Chlordane	1	0.050	0.050	0.0033	U
5103-74-2	gamma-Chlordane	1	0.050	0.050	0.0034	U
72-54-8	4,4'-DDD	1	0.10	0.10	0.0036	U
72-55-9	4,4'-DDE	1	0.10	0.10	0.0036	U
50-29-3	4,4'-DDT	1	0.10	0.10	0.0036	U
309-00-2	Aldrin	1	0.050	0.050	0.0027	U
60-57-1	Dieldrin	1	0.050	0.050	0.0032	U
959-98-8	Endosulfan I	1	0.10	0.10	0.0028	U
33213-65-9	Endosulfan II	1	0.10	0.10	0.0031	U
1031-07-8	Endosulfan Sulfate	1	0.10	0.10	0.0041	U
72-20-8	Endrin	1	0.10	0.10	0.0029	U
7421-93-4	Endrin Aldehyde	1	0.10	0.10	0.0037	U
53494-70-5	Endrin Ketone	1	0.050	0.050	0.0045	U
76-44-8	Heptachlor	1	0.050	0.050	0.0030	U
1024-57-3	Heptachlor Epoxide	1	0.050	0.050	0.0031	U
72-43-5	Methoxychlor	1	0.50	0.50	0.0036	U
8001-35-2	Toxaphene	1	5.0	5.0	0.10	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	0.189	0.165	88	25 - 140	
Decachlorobiphenyl	0.189	0.118	63	30 - 135	

* Values outside of QC limits

00167

ANALYSIS DATA SHEET

FMW1

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-31
Client: URS Group, Inc.
Project: RFAAP SSP Investigation
Matrix: Ground Water
Laboratory ID: 0612018-04
File ID: A46_162-0
Sampled: 11/29/06 09:35
Prepared: 12/05/06 08:01
Analyzed: 12/07/06 01:08
Solids:
Preparation: 3510C Liquid-Liquid Ex
Initial/Final: 1050 mL / 2 mL
QC Batch: 0614200
Sequence: 6120718
Calibration: 6L07005
Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/L)	MRL	MDL	Q
319-84-6	alpha-BHC	1	0.050	0.050	0.0034	U
319-85-7	beta-BHC	1	0.050	0.050	0.0030	U
58-89-9	gamma-BHC (lindane)	1	0.050	0.050	0.0026	U
319-86-8	delta-BHC	1	0.10	0.10	0.0031	U
5103-71-9	alpha-Chlordane	1	0.050	0.050	0.0033	U
5103-74-2	gamma-Chlordane	1	0.050	0.050	0.0034	U
72-54-8	4,4'-DDD	1	0.10	0.10	0.0036	U
72-55-9	4,4'-DDE	1	0.10	0.10	0.0036	U
50-29-3	4,4'-DDT	1	0.10	0.10	0.0036	U
309-00-2	Aldrin	1	0.050	0.050	0.0027	U
60-57-1	Dieldrin	1	0.050	0.050	0.0032	U
959-98-8	Endosulfan I	1	0.10	0.10	0.0028	U
33213-65-9	Endosulfan II	1	0.10	0.10	0.0031	U
1031-07-8	Endosulfan Sulfate	1	0.10	0.10	0.0041	U
72-20-8	Endrin	1	0.10	0.10	0.0029	U
7421-93-4	Endrin Aldehyde	1	0.10	0.10	0.0037	U
53494-70-5	Endrin Ketone	1	0.050	0.050	0.0045	U
76-44-8	Heptachlor	1	0.050	0.050	0.0030	U
1024-57-3	Heptachlor Epoxide	1	0.050	0.050	0.0031	U
72-43-5	Methoxychlor	1	0.50	0.50	0.0036	U
8001-35-2	Toxaphene	1	5.0	5.0	0.10	U
System Monitoring Compound		**ADDED (ug/L)**	**CONC (ug/L)**	**% Rec.**	**QC Limits**	**Q**
Tetrachloro-m-xylene		0.190	0.169	89	25 - 140	
Decachlorobiphenyl		0.190	0.128	67	30 - 135	

* Values outside of QC limits

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

FMW1

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Matrix: Ground Water
Sampled: 11/29/06 09:35
Solids: 0.00
Laboratory ID: 0612018-04

SDG: 36440-31
Project: RFAAP SSP Investigation
Preparation: 3020A Digestion
Prepared: 12/05/06 07:30
Initial/Final: 25 mL / 125 mL
QC Batch: 0614211

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-47-3	Chromium, Total	3.7	ug/L	1	2.0	0.66		12/19/06 09:58

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

DUP-2

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Group, Inc.
Matrix: Ground Water
Sampled: 11/29/06 00:00
Solids: 0.00
Laboratory ID: 0612018-03

SDG: 36440-31
Project: RFAAP SSP Investigation
Preparation: 3020A Digestion
Prepared: 12/05/06 07:30
Initial/Final: 25 mL / 125 mL
QC Batch: 0614211

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-47-3	Chromium, Total	3.2	ug/L	1	2.0	0.66		12/19/06 09:56

DATA VALIDATION WORKSHEET

Volatile Organic Analysis by GC/MS

Reviewer: RA
Date: 11/4/07
DV Level: II (III) IV
Review Document:
X NFG - Region III Modifications
X Project QAPP/SAP

Project Name: Radford SSP
Project Number:
Laboratory: TriMatrix
SDG No.: 36440-31
Test Name: VOC
Method No.: 8260B

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	✓		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	✓		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		✓	
1.4	Do sample preservation, collection and storage condition meet method requirement?	✓		
	If the temperature of the cooler was elevated (> 10 °C) or bubble size in aqueous sample was too big (tiny bubble is OK.), then flag all positive results with a "L" and all non-detects "UL".			
1.5	Do any soil samples contain more than 50% water? If yes, no dry weight correction is made and make notes in the DV Report.			✓

Notes:

2.0 Holding Times		Yes	No	NA
2.1	Were samples preserved on ice for soils and on ice with HCL for aqueous samples?	✓		
2.2	Have any technical holding times (14 days), determined from date of sampling to date of analysis, been exceeded? If yes, L(+)/UL(-).		✓	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, L(+)/R(-) .		✓	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks prepared at the appropriate frequency (every 12 hour period per GCMS, matrix, and level)?	✓		
3.2	Do any method blanks have positive results? Action: If yes, positive sample results should be reported and qualified "B", if the [sample]≤ 5X[associated blank]. (or 10 times for the common volatile lab contaminants - methylene chloride, acetone, and 2-butanone)		✓	
3.3	Do any field equipment blanks/trip blanks have positive results? If Yes, use same rules above.		✓	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, noted in the DV report.	✓		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are at least five standards included in the calibration curve?Are at least five standards included in the calibration curve?	✓		
4.2	Was an initial calibration analyzed at the beginning of each analysis?	✓		
4.3	Was a second source calibration verification analyzed for each calibration curve?	✓		
4.4	Has a continuing calibration standard been analyzed for every 12 hours of sample analysis per instrument?	✓		
4.5	Are all calibration standard %RSDs, correlation coefficient, or % drift within the control limits (%RSD <15%, r>0.995 or r^2>0.99; for 2° source: %D<+20%; and for CCC, %D < 20%)?	✓		
For initial calibration: %RSD > 15%, but < 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).				
For second source: %D>20% J(+)/R(-).				
For continuing calibration: Positive Bias - %D >+ 20%, J(+), only. Negative Bias - %D>-20% but <-50%, J(+)/UJ(-) and %D>-50%, J(+)/R(-).				
4.6	Are any CCCs (chloroform, 1,1-DCE, 1,2-DCPA, ethylbenzene, toluene, and vinyl chloride) displaying an RSD greater than 30%? If yes, L(+)/R(-) all associated results.		✓	
4.7	Do any SPCC have an RRF low? (<0.10 for chloromethane, 1,1-dichloroethane, and bromoform or <0.30 for chlorobenzene and 1,1,2,2-tetrachloroethane) If yes, L(+)/R(-) all associated results.		✓	

Notes:

5.0 GC/MS Instrument Performance Check		Yes	No	NA
5.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?	✓		
5.2	Have all samples been analyzed within twelve hours of the BFB tune? If twelve hours have elapsed according to the system clock, and the laboratory had analyzed standards, blanks, field samples or QC samples after twelve (12) hours, the data for the affected standards, blanks, field samples or QC samples are rejected "R".	✓		
5.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag "R".	✓		

Notes:

6.0 Surrogate Recovery		Yes	No	NA
6.1	Are surrogate recoveries within acceptance criteria for all samples and method blanks?	✓		
6.2	If No in Section 6.2, are these sample(s) or method blank(s) reanalyzed?			✓
	If any system monitoring compound(s) in the volatile fraction is out of specification, there should be a reanalysis to confirm			
6.3	If No in Section 6.3, is any sample dilution factor greater than 10? DV report should indicate that extraction efficiency/			✓
	1 or more <10% 1 high/low 2 or 3 high/low 2 or 3 all low 2 or 3 all high Positives L J J L K Non-detects R UJ UJ UJ NONE			
	Note: The B qualifier remains over surrogate flagging.			

Notes:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	✓		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
7.3	Are there any %R for matrix spike and matrix spike duplicate recoveries outside the QC limits?		✓	
7.4	Are there any RPD for matrix spike and matrix spike duplicate recoveries outside the QC limits?		✓	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data.			

Notes:

8.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)		Yes	No	NA
8.1	Is the LCS/LCSD recovery form present?	✓		
8.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
8.3	Are %R for LCS/LCSD recoveries outside the QC limits? If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).		✓	
8.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits? If Yes, J(+) only.			✓

Notes:

9.0 Internal Standard		Yes	No	NA
9.1	Are internal standard area of every sample and blank within +100% or -50% of the mid point calibration standard? If not, J(+)/UJ(-).	✓		
	If extremely low area counts are reported, or performance exhibits a major abrupt drop-off, then a severe loss of sensitivity is indicated. Non-detect target compounds should then be qualified as unusable (R).			
9.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	✓		
	The chromatographic profile for that sample must be examined to determine if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction. Positive results should not needed to be qualified as "R", if the mass spectral criteria are met.			

Notes:

10.0 Field Duplicate		Yes	No	NA
10.1	Was a field duplicate prepared and analyzed at the correct frequency (one per 20 samples, matrix, and level)?	✓		
	For sample results > 5 x RL, use 50% RPD. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 x RL for soil will be used.			
10.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV	✓		

Notes:

Both NDs ✓

11.0 Detection Limit Verification		Yes	No	NA
11.1	Do detection limits meet those required by the project QAPP and were they properly adjusted to reflect all sample dilutions and dry weight factors?	✓		
11.2	Were sample concentrations above the highest standard run at a dilution? If not, for ion saturation flag "L", unsaturated	✓		

Notes:

12.0 Data Completeness		Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit 95%$_{aq}$ and 90%$_{so}$)	✓		
12.1.1	Number of samples:			
12.1.2	Number of target compounds in each analysis:			
12.1.3	Number of results rejected and not reported:			
	% Completeness = (12.1.1 x 12.1.2 - 12.1.3) x 100/(12.1.1 x 12.1.2)			
	% Completeness = 100%			

Notes:

Quality Control Results – Volatile Organics by GC/MS

Calibration

All instrument calibrations, second source calibration verification standards (SCV), and continuing calibrations (CCV) were in-control.

Note: The "Initial Calibration Data" and SCV forms may also list non-target analytes.

Note: There are no DoD QSM-specified % Difference or % Drift limits for non-CCC analytes and internal limits were used.

Method Blank

No target analytes were detected.

Surrogates

All surrogate recoveries were in control.

Laboratory Control Sample

The Laboratory Control Sample (LCS) was fortified with all target analytes. All recoveries were in control.

Matrix Spikes

Sample '46MW1' was fortified with all target analytes. All recoveries and RPDs were in control.

Sample Results

Please see Section B of the data package. All samples were analyzed without the need for dilution.

Corrective Actions

No corrective actions were deemed necessary.

Statements of Data Qualification

No statements were generated.

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Individual sample results relate only to the sample tested.

DATA VALIDATION WORKSHEET

Pesticides/PCBs

Reviewer: RA
Date: 1/14/07
DV Level: II (III) IV
Review Document:
X SW-846 - 8081/8082
X NFG - Region III Modifications
X project QAPP

Project Name: Radford 55P
Project Number:
Laboratory: TriMatrix
SDG No.: 30440-31
Test Name: Pest.
Method No.: 8081A

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	✓		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	✓		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, or special circumstances affecting the quality of the data?		✓	
1.4	Do sample preservation, collection and storage condition meet method requirement?	✓		
	If samples were received with the cooler temperature exceeding 20 °C, then flag L(+)/UL(-).			
1.5	Do any soil samples contain more than 50% water? If yes, no dry weight correction is made and make notes in the DV Report.			✓

Notes:

2.0 Holding Times		Yes	No	NA
2.2	Have any technical holding times, determined from date of sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-). Extraction: (aqueous) 7 days and (soil) 14 days; and Analysis: 40 days.		✓	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, J(+)/R(-) .		✓	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks prepared at the appropriate frequency (one per 20 samples or batch and matrix)?	✓		
3.2	Do any blanks have positive results? If yes, positive sample results should be reported and qualified "B", if the [sample≤5X[blank].		✓	
3.3	Do any field equipment blanks have positive results? If yes, use same rules above.			✓

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are at least five standards included in the calibration curve for 1016, 1260, toxaphene, and technical chlordane; and at least one point for the other arochlors reported? If no, flag "R".	✓		
4.2	Was a second source calibration verification analyzed for each calibration curve? If no, flag "R".	✓		
4.3	Were continuing calibration standards analyzed every 12 hours or twenty samples? If no, flag "R".	✓		
4.4	Are all calibration standard %RSD (<20%, r>0.995, or r^2<0.99), second source (±15%) or %D(≤15%) within the control limits?	✓		
For initial calibration: %RSD > 20%, but < 50%, J(+), only; %RSD > 50%, but < 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).				
For second source: %D>15%, J(+)/R(-).				
For continuing calibration: Positive Bias - %D >+ 15%, J(+), only. Negative Bias - %D>-15% but <-50%, J(+)/UJ(-) and %D>-50%, J(+)/R(-).				

Notes:

5.0 GC/ECD Instrument Performance Check		Yes	No	NA
5.1	Has a Performance Evaluation Mixture (PEM) been analyzed at the beginning, every 12 hours, and at the end of every sequence.	✓		
5.2	Is the 4,4'-DDT breakdown </= to 20%? If No, for positive DDT results, DDT-L(+), DDD/DDE - NJ(+). For non detect DDT results, DDD/DDE - R(+).	✓		
5.3	Is the endrin breakdown </= to 20%? If No, for positive endrin results, endrin-L(+), endrin aldehyde/ketone - NJ(+). For non-detect DDT results, endrin aldehyde/ketone - R(+).	✓		
5.4	Is the combined breakdowns less than or equal to 30%? If No, for positive DDT/endrin results, DDT/endrin-L(+), DDD/DD/endrin aldehyde/endrin ketone - NJ(+). For non-detect DDT/endrin results, DDD/DDE/endrin aldehyde/endrin ketone - R(+).	✓		

Notes:

6.0 Surrogate Recovery

		Yes	No	NA
6.1	Do all surrogate retention times fall within the RT windows established during the initial calibration sequence? If No, the associated sample result should be carefully evaluated.	✓		
6.2	Are surrogate recoveries within acceptance criteria for all samples and method blanks? Advisory limit: 60-150%.	✓		
6.3	If No in Section 6.3, are these sample(s) or method blank(s) reanalyzed?			✓
6.4	If No in Section 6.4, is any sample dilution factor greater than 10? (recoveries may be diluted out.)			✓

# of outliers	Recovery	Sample result from column with non-conformance	Sample result from column without non-conformance
1 out	high/low	No action	No action
2 out	2 high same column	K	No action
	2 low same column	L, UL	No action
	mixed same column	J, UJ	No action
	2 high diff columns	J	Not applicable
	2 low diff columns	J, UJ	Not applicable
	mixed diff columns	Professional judgement	Not applicable
3 out	All high	K	Not applicable
	All low	L, UL	Not applicable
	2 high, 1 low	K (2 high)	J (1 low 2nd column)
	2 low, 1 high	L, UJ (2 low)	J (1 high 2nd column)
	other mixed	J, UJ	Not applicable
4 out	All high	K	Not applicable
	All low	L, UL	Not applicable
	Mixed	J, UJ	Not applicable

If any recovery is >0% and <10% then L(+)/R(-).
If any recovery is 0% then R(+/-).

Notes:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	✓		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
7.3	Are there any %R for matrix spike and matrix spike duplicate recoveries outside the QC limits?		✓	
7.4	Are there any RPD for matrix spike and matrix spike duplicate recoveries outside the QC limits?		✓	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data.			

Notes:

8.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)		Yes	No	NA
8.1	Is the LCS/LCSD recovery form present?	✓		
8.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
8.3	Are there any %R for LCS/LCSD recoveries outside the QC limits?		✓	
	If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			

Notes:

9.0 Field Duplicate		Yes	No	NA
9.2	Evaluate field duplicate results? Generally, no action is taken on the basis of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	✓		

Notes: Both NDs

10.0 Compound Identification and Detection Limit Verification		Yes	No	NA
10.1	Is the percent difference calculated for the positive sample results on both columns <40%? If No, J(+).			✓
10.2	Do detection limits meet those required by the project QAPP and were properly adjusted for dilution factors and moisture?	✓		

Notes:

11.0 Data Completeness		Yes	No	NA
11.1	Is % completeness within the control limits? (Control limit $95\%_{aq}$ and $90\%_{so}$)	✓		
11.1.1	Number of samples: Pest_____ PCB_____			
11.1.2	Number of target compounds in each analysis: PEST_____ PCB_____			
11.1.3	Number of results rejected and not reported: Pest_____ PCB_____			
11.1.4	% Completeness = (11.1.1 x 11.1.2 - 11.1.3) x 100/(11.1.1 x 11.1.2)			
	% Completeness = Pest 100% PCB_____			

Notes:

Quality Control Results – Chlorinated Pesticides

Note: second column (confirmation) data is identified as the compound[2C].

Calibration

Initial instrument calibrations, second source verification (SCV), and continuing calibration verifications (CCV) for both the primary and confirmation columns were method-compliant. However, neither a SCV nor a CCV was analyzed for Toxaphene. Toxaphene is a multi-component pesticide, the referenced method does not require a CCV for multi-component pesticides, and it is assumed that a compliant CCV comprised of single-component pesticides demonstrates the same for a multi-component analyte (i.e., Toxaphene). The DoD QSM is not clear on the matter. The absence of a SCV for Toxaphene was due to laboratory oversight.

Method Blank

No target analytes were detected.

Surrogates

All surrogate recoveries were in control for both the primary column and confirmation column runs.

Laboratory Control Sample

The Laboratory Control Sample (LCS) was fortified with all single-component target analytes. All recoveries were in control for both the primary column and confirmation column runs. A second LCS for Toxaphene was not analyzed due to laboratory oversight.

Matrix Spikes

Sample 'FMW1' was fortified with all single-component target analytes. All recoveries and RPDs for both the primary column and confirmation column runs were in control. There was not sufficient sample volume for a second MS/MSD for Toxaphene-only and it is unclear from the DoD QSM whether one is needed.

Sample Results

Please see Section C of the data package. No analytes confirmed as detected.

Statements of Data Qualification

No statements were generated.

REVISED
CWR 1/12/07

0008

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Individual sample results relate only to the sample tested.
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DATA VALIDATION WORKSHEET
INORGANIC - ICP, CVAA, AND CYANIDE
REGION III - NATIONAL FUNCTIONAL GUIDELINES

SDG No.: 36440-31
Project No.: 11656628.20000

Project Name: Radford SSP
Reviewer: RA
Date: 1/11/07

Total or Only

1.0 Chain of Custody/Sample Condition/Raw Data		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples which were analyzed?	✓											
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	✓											
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		✓										
1.4	Does sample preservation, collection and storage meet method requirement? (For metal: water samples: with Nitric Acid to pH < 2, and soil/sediment samples: 4 $^{O}C \pm 2\ ^{O}C$)	✓											
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes. % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	✓											

Note: _____

2.0 Holding Time		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, CN: 14 days, other metals: 6 months) Action:L(+)/UL(-). If the holding time is grossly exceeded (twice the holding time criteria), L(+)/R(-).		✓										

Note: _____

3.0 Instrument Calibration		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? (ICP& ICPMS: blank + one standard & a RL standard OR 3 standards and a blank with one standard at the RL; CVAA: blank + five standards with one standard at the RL). If not, qualify with "R".	✓											
3.2	Are the correlation coefficients > 0.99? Action: J(+)/UJ(-).			✓	✓								
3.3	Once per calibration, did a high and low distilled standard recovery within 85-115%? If no, follow 3.6.												
3.4	Was an initial calibration check standard (ICV) analyzed immediately after instrument system had been calibrated? Action: If no, all associated data are rejected "R".	✓											
3.5	Was continuing calibration standard (CCS) analyzed at a minimum frequency of 10% (every 10 samples) during an analytical run and at the end of the analytical run? If not, document and flag based on professional judgement.	✓											
3.6	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? FOR ICP 90%-110%, FOR Hg 80-120%, FOR CN 85-115%.	✓											
	ICV and CCV: Action: L(+)/R(-) L(+)/UL(-) K(+) Mercury < 65% 65% - 79% > 120% Cyanide < 65% 65% - 84% > 115% Other Metals < 75% 75% - 89% > 110%												
3.7	For ICP & ICPMS, did the CRDL standard recover between 80-120%? <50% 50%-79% >120% 2xCRDL>[sample]>IDL L(+)/R(-) L(+)/UL(-) K	✓											

Note: _____

_____

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_____

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_____

_____

_____

4.0 Blanks

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were method blank (MB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	✓											
4.2	Were calibration blanks (ICB and CCBs) analyzed immediately after each and every ICV and CCVs? Action: If no ICB was run, all associated data are rejected. If the frequency of the CCBs does not follow requirement, all associated data are qualified "J".	✓											
4.3	Are there reported MB or ICB/CCBs values > MDL?		✓										
	Sample Results > MDL												
	< 5X Blank Contamination B												
4.4	Are there negative blank results with the absolute value > MDL?		✓										
	Sample Results Non-detects > MDL												
	< 5X absolute Blank Contamination UL L												
4.5	Are there reported field blank > ± MDL?			✓									
	Sample Results > MDL												
	< 5X Blank Contamination B												

Note:

5.0 ICP Interference Check Sample (ICS)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1	Was ICS analyzed at beginning of each ICP run?	✓											
5.2	Are the ICS AB recoveries within 80% - 120%?	✓											
5.3	Are the results for unspiked analytes (in ICS A) < ± RL?	✓											
5.4	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?			✓									
	If not...												
	Action: Not Spiked Analytes: < -MDL L(+)/UL(-); > MDL K(+). Spiked analytes (ICS AB analytes): < 50% L(+)/R(-); 50% - 79% L(+)/UL(-); >120% K(+)												

Note: NA Level IV

6.0 Laboratory Control Sample (LCS)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	✓											
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)		✓										
	Action: Solid: < LCL L(+)/UL(-); > UCL K(+). Aqueous: < 50% L(+)/R(-); 50% - 79% L(+)/UL(-); > 120% K(+)												

Note: _____

7.0 Laboratory Duplicates (MSD)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), using professional judgement, analytes not associated with duplicate results.	✓											
	For aqueous 6010B and Hg - RPD< 25%, aqueous CN - RPD < 20%, aqueous 6020 - RPD < 20%, and for soil - use laboratory generated limits for MS/MSD.												
7.2	Are all analyte duplicate results within control limits? If no, qualify all associated field samples J(+)/UJ(-) for the analyte with results that fall outside criteria.	✓											

Note: _____

8.0 Spike Sample Analysis -Pre-Digestion/Post-Digestion

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
8.1	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, batch, matrix and level)? If not, J(+) with professional judgement.	✓											
8.2	For all analytes with sample concentration > 4 x spike concentration, are spike recoveries within the control limit of 75-125% for aqueous matrices or lab limits for soil matrices?												
	%R > 125% / 30%< %R < 74% / < 30%												
	Positive: K / L / L	✓											
	Non-detect: None / UL / R												
8.3	Where pre-digestion matrix spike analytes were outside the acceptable recovery limits(except Ag), was a post-digestion spike performed? Note any failures in DV report, but no data qualifying action is required.			✓									

Note: _____

9.0 Instrument Detection Limits (IDL)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1	Are all IDLs/RLs equal to or less than the reporting limits specified?	✓											

Note: _____

10.0 ICP/AA Serial Dilutions (Not for Mercury Analysis)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	✓											
10.2	Was a five-fold dilution performed?	✓											
10.3	Did the serial dilution results agree within 10% for ICP analyte concentration > 5 X the RL for 6010 or > 20 X the RL for 6020 in the original sample? If no, J(+).	✓											

Note: N/A Level IV

11.0 Field Duplicate Samples		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?	✓											
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.												
11.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report		✓										

Note: FMW1 DUP-2 RL
Cr 3.7 3.2 2 OK✓

12.0 Result Verification/ Internal Standards/ Tune		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?			✓									
12.2	Were all dilution reflected in the positive results and detection limits?			✓									
12.3	Were the Internal Standard recoveries within 30-120%	✓											
12.4	Were the tunes run at a minimum of four times with RSD < 5% for analytes in solution?	✓											
12.5	Were the tune mass calibrations < 0.1 amu from the true value?	✓											
12.6	Was the resolution check peak width < 0.9 amu at 10% peak height?	✓											

Note:

13.0 Completeness Calculation		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
13.1	Is % completeness within the control limits? (Control limit 90%)	✓											
13.1.1	Number of samples:												
13.1.2	Number of target compounds in each analysis:												
13.1.3	Number of results rejected and not reported:												
	% Completeness = (13.1.1 x 13.1.2 - 13.1.3) x 100/(13.1.1 x 13.1.2) % Completeness = 100%												

Note:

Quality Control Results – ICP/MS Metals

Calibration

All instrument calibrations and continuing calibrations were method-compliant. Note: instrument reports for ICPMS include the listing of initial calibration correlation coefficients and internal standard recoveries; those values may either be imbedded with raw data from each run or included as a summary (also within the instrument printout).

Note: TriMatrix interprets the QSM requirement for a "low-level calibration check standard" as one pertaining to a one-point initial calibration. Given that a multi-point initial calibration was performed, the specification for a low-level calibration check either does not apply or has been satisfied since the lowest calibration standard is equivalent in concentration to the reporting limit.

Note: although a CRDL standard may have been analyzed and reported, the concentration of that standard was less than the (equivalent) reporting limit and the QSM criterion of $\pm$ 20% does not apply.

Method Blanks

No analytes were detected.

Internal Standard Response

Internal standard responses for all standards, samples, and quality control samples were method-compliant.

Laboratory Control Sample

The Laboratory Control Sample (LCS) recovery was in control.

Matrix Spike

Sample 'FMW1' was fortified with the target analyte. Both recoveries and the RPD were in control.

Serial Dilutions and Post-Digestion Spikes

Serial dilution (SD) and post-digestion spike (PDS) analysis was performed on the samples employed for MS/MSD analysis. All values were in control.

Sample Results

Please see Section D of the data package.

Note: for all soil samples for metals analysis, a representative subsample is dried and a smaller measured amount of that dried subsample is then digested. Unlike most other parameters for a soil sample that are processed on a wet-weight basis, a Percent Solids value (if determined) for the sample is not applied to the MDL, RL, or to the result.

Statements of Data Qualification

See Narrative Attachment 2.

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Individual sample results relate only to the sample tested.

Data Review and Approval

All data was reviewed and approved by the group supervisor/manager prior to further review by data management staff and the project chemist.

Data Deliverables

The data deliverables, both hardcopy and electronic (EDD), that comprise this data package are intended to comply with the documents referenced in the introductory section of this narrative. The EDD has been issued separate from this hardcopy report.

Walt Roudebush, Project Chemist

1/9/07
Date

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Sample Receipt and Log-in

On November 30, 2006 at 08:45 hrs, one sample cooler containing multiple water samples and one trip blank was received at TriMatrix via FedEx (the carrier). The cooler had been shipped from the Site on November 29.

The external custody seal affixed to the cooler was intact. The samples were received on ice and in good condition. The receipt temperature of the interior of the cooler was measured via a 'temperature blank' shipped in it; the measured temperature, in °C, was 1.9.

Shipping documents included one field chain-of-custody (COC) and associated carrier air bill.

Sample '46MW1' was designated by the Client for MS/MSD analysis for Volatiles and sample 'FMW1' for MS/MSD analysis for Chlorinated Pesticides and Metals.

Samples were assigned to Work Order 0612018and SDG 36440-31.

Copies of all referenced receipt and custody documents are provided in Section A of this data package. Correspondence regarding completed sample log-in activities will be found in Attachment 1 of this narrative.

Provision of Sample Receipt Information to Client

A copy of the COCs and receipt checklist were transmitted to the Client within one day of sample receipt. The Client did not request any modification(s) to the analyses, as listed on the COC but later requested a change in the target analyte list for volatiles.

Post-Receipt Sample Custody

Custody of the sample during sample preparation (if applicable) and analysis was assigned to individual analysts. Copies of completed 'internal chain of custody' forms are included in Section A.

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Variances

Data Qualifier Flags

Data qualifier flags other than those listed in the DoD QSM were employed or the definition of an existing flag was modified.

J – Estimated: the analyte was detected at a concentration greater than the limit of detection (i.e., MDL) but less than the reporting limit (i.e., MRL).

B – Blank contamination: The analyte was detected above one-half the reporting limit in an associated method blank. The same analyte in the sample was detected at less than five times the method blank concentration. (If a common laboratory contaminant is present in the method blank at a concentration greater than one-half the reporting limit but less than or equal to that reporting limit, any associated sample results are flagged but corrective action is not necessarily taken. A text qualifier is also associated with such a result.)

E – Exceeds calibration range: The analyte response exceeded the calibrated range of the instrument. (With the exception of metals for which only the final non-qualified result is reported, both the initial E-qualified result and final non-qualified result from reanalysis-at-dilution are reported.)

Text Qualifier

A LIMS-generated text qualifier is substituted for many instances in which the DoD QSM "Q" flag would otherwise apply. The text qualifiers are listed in a summary format by parameter with applicable samples identified.

Method 6020A

The acceptance criterion of < 2 x RL was substituted for < 2 x MDL for interference check solution ICS-A.

Analytical Methods

Sample preparation and analytical methods that were employed are per the SOW.

Method Detection Limits, Target Analytes, and Reporting Limits

All method detection limits (MDL) for analytes in this report are compliant with the DoD QSM specification that each reporting limit (RL) employed is to be at least three times the MDL. In addition, no RL is less than the equivalent concentration of the lowest instrument calibration standard. The target analyte list was specified by the Client in the SOW. Proposed RLs were submitted by TriMatrix to the Client prior to the receipt of any samples. On January 3, 2007 the Client requested that the target analyte list for volatiles be reduced to those in this final report.

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Project-specific Analytes of Concern

No project-specific analytes of concern were identified in the SOW.

Quality Control Limits

Quality control limits specified in the DoD QSM were employed. Although Method 6010B LCS recovery limits are specified in the QSM, limits for Method 6020A are not. However, Method 6010B limits from the QSM were also employed for Method 6020A.

Hold Times

All samples were extracted/digested (where applicable) and analyzed within hold time.

Technical Issues

There were no technical issues.

Sample Result Reporting Convention

Sample results are reported as RL 'U' (e.g., 0.001 U) if the target analyte was not detected above the MDL. If a sample for an organic parameter is reanalyzed and also reported, the second analysis includes the suffix 'REn' where n = the first, second, etc. reanalysis. If a sample for an organic parameter is reanalyzed for confirmation purposes and also reported, the second analysis includes the suffix 'RE1'.

Data Qualifier Designation

If applicable, a sample result is qualified with:

- a "U" flag if the analyte was not detected at a concentration greater than the MDL,
- a "B", "J", and/or an "E" flag as defined in the preceding Variance section,
- a LIMS-generated statement of qualification. Qualifying statements, if any, will be found in Attachment 2 to this narrative.

QC Batch and Analytical Batch Designation

A QC Batch is a seven digit number that associates all samples that have been prepared together (or analyzed together if there is no preparation); it is limited to no more than twenty samples, excluding batch QC (method blanks, control spikes, etc.).

An Analytical Batch (or Sequence) is a seven digit number that associates all samples analyzed as a set under one analytical sequence.

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TriMatrix Laboratories, Inc.

5560 Corporate Exchange Court SE Grand Rapids, MI 49512
Phone (616) 975-4500 Fax (616) 942-7463
www.trimatrixlabs.com

Chain of Custody Record

COC No. 117015

Page 1 of 1

For Lab Use Only
Cart: 4
VOA Rack/Tray: 412R
Receipt Log No.: 2304
Project Chemist: WSR
Laboratory Project No.: E060120018

Client Name: URS Corp.
Address: 5540 Falmouth St. Suite 201
Richmond, VA 23230
Phone: 804.965.9000
Fax: 804.965.9764

Project Name: SSP
Client Project No. / P.O. No.: 11657628
Invoice To: ☒ Client ☐ Other (comments)
Contact/Report To: Lee Anne Mareck

Analyses Requested

Container Type (corresponds to Container Packing List): 1 = D, 2 = A, 6 = B

Test Group	Matrix Code	Laboratory Sample Number		Sample ID	Cooler ID	Sample Date	Sample Time	COMP	GRAB	Matrix	Number of Containers Submitted: 1	2	6	Total	Sample Comments
09	WG	01	1	46MW1	TM1423	11/28/06	1235		X	GW	1			3	
	WG		2	46MW1 MS		↓	↓		X	GW	2			2	
	WG		3	46MW1 MSD		↓	↓		X	GW	2			2	
04	WG	02	4	DUP-1		11/28/06	—		X	GW	3			3	
05	WG	03	5	DUP-2		11/29/06	—		X	GW		2	1	3	
06	WG	04	6	FMW1 plus MS/MSD		11/29/06	935		X	GW		6	1	7	
			7												
			8			added by TriMatrix (MW)									
			9			11/29/06	1235								
07	WQ	05	10	TRIP BLANK		—	—		X	GW	2			2	

Preservatives: A NONE pH~7; B HNO_3 pH<2; C H_2SO_4 pH<2; D 1+1 HCl pH<2; E NaOH pH>12; F ZnAc/NaOH pH>9; G MeOH; H Other (note below)

Sampled By (print): David Copen
Sampler's Signature: David Copen
Company: URS Corp

How Shipped? Hand Carrier: Fed Ex
Tracking No.

Comments

	Relinquished By	Date	Time	Received By	Date	Time
1	David Copen	11/29/06	1620			
2						
3						

3. Received For Lab By: [illegible] Date: 11-30-06 Time: 0845

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